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XIV.—Meteorological Observations registered at the Madras Observatory during the Storm which occurred on the 30th of October 1836.

1836	Time.	Baro- meter.	Cor- rec- tion.	Baro- meter reduc- ed.	Wind.	Weather, &c.
Oct.		Inch.		Inch.		
29	10 A. M.	30,050	0,000	30,050	N.	
	Noon	30,050	....	....	N.	
	2 P. M.	29,970	....	....	N.	
	6 "	,940	....	....	N.	
	8 "	,956	....	....		
	10 "	,950	....	....		
30	6 A. M.	,940	....	....	N.	Brisk breeze.
	7 "	,880	....	....	N.	Do. do.
	7.30 "	,864	....	....	N. N. W.	Strong wind at intervals
	8 "	,852	....	....	N. W. by N.	Do. do. rain.
	9 "	,850	....	....	N. by W.	Do. do. heavy rain.
	10 "	,795	....	....	N. by W.	Do. do. rain.
	11 "	,750	....	....	N.	Do. do. do.
	Noon	,707	....	....	N. N. W.	Approaching to a gale.
	1 P. M.	,586	....	....	N. by W.	Brisk gale—rain.
	2 "	,560	,239	29,321	N.	do. do.
	3 "	,510	,241	,269	N.	At times a violent gale.
	4 "	,360	,249	,111	N.	Very violent gale—rain.
	5 "	29,150	,259	28,891	N.	Approaching to a hurri- cane.
	6 "	28,980	—	—	N.	Do. do.
	7 "	,915	—	—	N.	Up to $\frac{1}{2}$ before 7 the wind continued to blow a perfect hurricane ; from this time up to 7 o'clock it gradually abated, and from 7 till $\frac{1}{2}$ before 8 a perfect calm ensued ; from $\frac{1}{2}$ before 8 the wind be- gan to blow from the south, moderately at first, but increasing in strength every mo- ment.
	8 "	28,915	—	—	S.	Blowing a perfect hur- ricane.
	9 "	29,280	,253	29,027	S.	A violent gale.
	10 "	,500	,242	,258	S.	Do.
	11 "	,650	,235	,415	S.	A strong wind.

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The barometer employed in the observations of the 29th, and up to 1 P. M. of the 30th, was the standard barometer which has hitherto been in use. At 2 P. M. the northern doors of the Observatory were burst in, and the moveable roof blown open, whereby the standard barometer and thermometer, at one rude rush of the wind, were, with telescopes, tables and chairs, overturned and broken. I was consequently under the necessity of registering the first barometer which came to hand (one by *Harris*), whose indications are given above for 2 P. M. *et seq.* To discover the error of this barometer, and to replace as well as I could the standard which had been broken, I availed myself of the old frames of the two standard barometers just alluded to (which had not been damaged), and filled two tubes which are now in use. In the first place it was desirable to examine the scales; this I was enabled to do very satisfactorily, by means of a standard two feet scale by *Adams* with the assistance of a pair of beam compasses. The divisions on one of the frames (*Dollond's*) agreed perfectly with the standard scale; but the other frame (*Gilbert's*) was in error, .025. In the next place the purity of the quicksilver was to be ascertained—having failed for several days to meet with any means of distilling quicksilver or any one who could assist me in this respect, I had recourse to washing it repeatedly in diluted nitric acid, which combining with the bismuth or antimony with which quicksilver is generally adulterated, leaves the quicksilver quite pure. I have not yet determined its specific gravity to any great degree of accuracy, for want of proper means; but from two separate experiments agreeing very well with one another, it came out 13,645; shewing that a correction 0,033 subtractive should be applied to the readings, to obtain those which should obtain were the quicksilver of standard purity. Doubtful if this or any correction was necessary, from the apparent purity of the quicksilver; I procured some very bad bazar quicksilver, and washed it with nitric acid in the same way as practised before on quicksilver, procured from the Medical stores; when the same tube, successively filled with the two sorts of quicksilver, did not differ .010, of an inch in its indications. The quicksilver was not boiled in the tube, by reason of the danger attendant upon such an experiment; but both the tube and quicksilver were heated before being used, to a temperature of about 180 degrees. To be sure that no air or moisture existed in the tube or quicksilver, I have refilled one of the tubes three successive times, and found a difference in the third decimal place only. The particulars of these barometers are as follows:

	<i>Dollond's scale.</i>	<i>Gilbert's scale.</i>
Correction of the divisions.....	Inches 0,000	Inches —0,025
Diameter of bore of the tube.....	" 0,19	" 0,23
Correction due to capillary action.....	" +0,011	" +0,031
Relative indications.....	37 29,958	" 30,020

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Applying the corrections due to error of division and capillary action, the relative indications are as follows:

Dollond.....30,019
Gilbert.....30,026

Differing... ,007

For the present I propose to consider the barometer named *Gilbert* as a standard, liable only to some very small correction for the specific gravity of the quicksilver. On comparing this barometer with that by *Harris*, (which, as I have already stated, was employed at and after 2 P. M. on the 30th); when the latter stood at 30,200, it required a correction —0,207 inches, and, on account of the large bore of the tube, and a small cistern, it should be further diminished by one-twentieth of its indications below that state. This at least is true for the indications at and near 30 inches: for indications near to and below 29 inches, however, (by reason of a sudden contraction in the cistern, whose relative capacity to that of the tube I have no means of determining without destroying the barometer) a much larger amount of correction becomes necessary. Hence, the corrections due to the indications at 6, 7 and 8 o'clock are necessarily involved in doubt, and, since any attempt to estimate their value can be but little better than a guess, I have preferred omitting them altogether. To render the observations complete, however, I here subjoin a registry which was made at an adjoining house; having first compared the barometer with, and reduced its indications to, my present standard.

Barometrical Observations reduced to the *Gilbert* standard:

	<i>h. m.</i>	
1836, October 30th at 6.0		28,625 inches.
	6.55	,285 "
	7.45	,285 "
	8.30	,725 "

The above barometrical indications, as well as those which precede them, are corrected for capillary action, and are consequently those which belong to an elevation of 27 feet above the level of the sea, and to the various temperatures under which they were taken.

The thermometrical indications are read off from a thermometer by *Bate*, which was sent out to me from England a short time before the storm; its indications corresponded exactly with *Troughton's* standard at the temperature of 75°, but I had no opportunity of verifying it on the other divisions.

Madras Observatory.

T. G. TAYLOR,
H. C.'s Astronomer.

h. m. s.
Longitude.. 5 21 7.7 E.
Latitude... 13 4 8.5 N.

HOURLY OBSERVATIONS MADE AT THE MADRAS OBSERVATORY,
ON DECEMBER 20, 22, 1836.

1836.	Time.	Barometer.	Ther.	Wind.	REMARKS.
Dec. 20	6 P. M.	29.942	74.3	N. E.	F. C. gentle breeze.
	7 "	29.948	73.1	do.	do.
	8 "	29.963	71.8	do.	do.
	9 "	29.986	71.5	do.	do.
	10 "	29.990	70.1	Calm.	Clear
	11 "	29.980	70.1	do.	F. C.
	12 "	29.972	70.0	do.	do.
21	1 A. M.	29.972	69.8	do.	Clear
	2 "	29.954	68.7	do.	do.
	3 "	29.934	67.4	do.	do.
	4 "	29.952	66.8	do.	do.
	5 "	29.958	66.2	N. E.	do. gentle breeze.
	6 "	29.962	66.0	do.	do.
	7 "	29.978	67.7	N by E.	do.
	8 "	30.000	70.5	do.	do.
	9 "	30.020	73.7	do.	do.
	10 "	30.022	76.2	N.	do.
	11 "	30.014	78.0	N.	F. C. do.
	12 "	29.986	77.8	N.	do. moderate breeze.
	1 P. M.	29.962	77.9	N. E.	do.
	2 "	29.930	79.2	do.	do.
	3 "	29.932	78.2	do.	Clear
	4 "	29.933	78.1	do.	do.
	5 "	29.940	76.0	do.	do.
	6 "	29.932	74.2	do.	do.
	7 "	29.952	73.8	Calm.	do.
	8 "	29.960	72.1	do.	F. C.
	9 "	29.990	72.3	N.	do.
	10 "	29.990	71.8	Calm.	Clear
	11 "	29.978	71.5	do.	F. C.
	12 "	29.976	70.9	do.	do.
	1 A. M.	29.950	70.0	do.	Clear
	2 "	29.944	68.8	do.	do.
	3 "	29.922	68.6	do.	do.
	4 "	29.916	68.0	do. E	do.
	5 "	29.924	67.8	do.	do.
	6 "	29.942	68.0	do.	Hazy
	7 "	29.964	68.4	do.	Th. do.
	8 "	29.986	70.3	do.	do. do. gentle breeze.
	9 "	29.998	73.9	N. by W.	do. do. F. C. do.
	10 "	30.000	74.3	do.	Cloudy do.
	11 "	29.996	77.8	N.	F. C. do.
	12 "	29.986	78.8	N.	Cloudy do.
22	1 P. M.	29.970	79.1	N. E.	do.
	2 "	29.950	80.2	do.	do.
	3 "	29.950	80.0	do.	Moderate breeze.
	4 "	29.950	78.5	do.	Cloudy do.
	5 "	29.942	76.1	N.	Flying clouds.
	6 "	29.944	75.6	N. E.	Haze.

METEOROLOGICAL REGISTER KEPT AT THE MADRAS OBSERVATORY FOR THE MONTH OF OCTOBER, 1836.

Days.	BAROMETER AT			THERMOMETER AT			RAIN.		DIRECTION OF WIND.			REMARKS.	
	10 A. M.	2 P. M.	Sum set.	10 P. M.	10 A. M.	Noon.	2 P. M.	8 P. M.	10 P. M.	Morning.	Noon.	Evening.	
1836	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	by S	by S	by S	
Oct. 1	29.301	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
2	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
3	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
4	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
5	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
6	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
7	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
8	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
9	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
10	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
11	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
12	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
13	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
14	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
15	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
16	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
17	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
18	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
19	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
20	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
21	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
22	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
23	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
24	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
25	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
26	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
27	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
28	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
29	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
30	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
31	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	
Mean	29.300	29.370	29.356	29.356	29.356	29.356	29.356	29.356	29.356	by S	by S	by S	

METEOROLOGICAL REGISTER KEPT AT THE MADRAS OBSERVATORY FOR THE MONTH OF NOVEMBER, 1836.

BAROMETER AT										THERMOMETER AT										RAIN.		DIRECTION OF WIND.				REMARKS.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
Days.	10 A. M.		Noon.		2 P. M.		Sun set.		8 P. M.		10 P. M.		Sun rise.		10 A. M.		Noon.		2 P. M.		Sun set.		8 P. M.		10 P. M.		Sun rise.		Evaporation.		Morning.		Noon.		Evening.		Morning.		Noon.		Evening.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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Memorandum--The wet bulb Thermometer was broken on the 20th October.

METEOROLOGICAL REGISTER, KEPT AT THE MADRAS OBSERVATORY FOR THE MONTH OF DECEMBER, 1825.

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MADRAS JOURNAL

OF

LITERATURE AND SCIENCE.

No. 15.—April, 1837.

Traditions concerning the Migration of Buddhists into Europe.
By the Reverend B. SCHMID.

The Icelandic historians, to whom we owe our knowledge of the most ancient history of the north, and amongst whom Snorro Sturleson is the chief, state that Odin or Wodan was the first conqueror and legislator of the north of Europe. In their writings the following notices are scattered.

About sixty years before the Christian era, when the Romans subdued the world, Odin, in order to remain independent, left his country, named Tyrkland, on the Caspian sea, between the Borysthenes and the Tanais, and came with his followers to the shores of the German ocean, where the nations, astonished at his wisdom and splendour, took him and his companions for messengers from the gods, and submitted willingly to their rule and instructions, because they acted with mildness and benignity. Odin united those tribes under one form of government, and made his sons their leaders.

Odin being informed that there were fine meadows in Sweden, went thither and built a town which he called Sigtun,* either after himself, for he was also called Sigge, or after one of his sons. But the Swedes named that town, *Asegarth*, i. e. the habitation (city) of the Asiatics.

Odin established the worship of the god *Thor* and the belief in immortality in *Walhalla*. A temple of Thor, near old Upsála, built by him, is said to exist still and to serve as a village church.

* *Sieg*, in German, means *Victory*; *Sigtun*, therefore, may mean the town of Victory, or the town of the Victor.

He extended his power far and wide, and constituted his sons viceroy in Saxony, Denmark and Norway. He even returned several times to his native country to fight against the Romans.

When Odin had firmly established his power in the countries subject to him, many Asiatics emigrated thither. A number of Swedes seems to have withdrawn from his authority and to have fled to Finland, and still farther to the north, whither Odin did not penetrate. These people were called Lappes,* i. e. fugitives. But they called themselves Sáme or Sabni.

His tomb and the tombs of his wife, Frœia or Frigga, and of twenty of his successors, are still to be seen near Gamla Upsåla. The northern nations came every year to the temple of Upsåla, where they sacrificed, burned children, and hanged men. Until this day the peasants make pilgrimages to a spring, about a mile distant from Upsåla, and memorable through ancient traditions. They drink of the water of that spring and pronounce prayers. Another tradition affirms that Odin concluded his active life at *Odensee*, one of the most ancient towns in Denmark. Thus far the Icelandic historians.

A tradition from quite a different and unsuspected source, remarkably coincides in the main point with these narrations of the Icelanders. It is one preserved by Tacitus, who says in the third chapter of his *Germania*: "Some imagine that Ulysses, in the course of his long and fabulous wanderings, was driven into this ocean, and landed in Germany; and that Ascipurgium, a place situated near the Rhine, was founded by him and named *Ασκιπυργιον*. These allegations I shall neither attempt to confirm nor to refute: let every one believe concerning them as he is disposed."

Who was this Ulysses?—We know that the original seat of the Pali and Sanscrit dialects, the language of the Buddhists and of the ancient *Brachmanes*, is to be sought in the Himålaya range, or more generally speaking, in the mountainous countries of middle Asia, from whence various tribes must have, in different ages, descended into the plains of India, and likewise emigrated towards the north and the west;—we know, likewise, that the ground-work of the Greek, Latin and German languages is Pali, Sanscrit or Pracrit; and it is a most remarkable fact that the very same day of the week, which the Tamulians call *Buden-kålamei* (புதன் கிழமை or Buddha's day), is denominated by the Teutonic nations, *Wodans-day*, (in English, *Wednesday*). This coincidence cannot have its origin in mere accident! Moreover, Ulysses certainly never came to Germany; but when the Germans related to Tacitus, or to some other inquiring Roman, that a certain Odin

* *Låufen* in high German, and *loven* in the nether Saxon dialect, means to run, to flee,—hence the English word *elope*.

had come amongst them from a far country, what is more natural than that the Roman took it for granted that the Germans alluded to *Odysseus*, changing this name into *Odin*, which is certainly not so great a corruption of the Greek word, as the word *Ulysses*. The meaning of *Ascipurgium* is clear from the Icelandic tradition; *burg* (a fortress) in German is the same as *burgh* or *borough* in English; and *puri* and *puram* (புரி, and புரம்) in the Sanscrit dialects of India, and is identic with *garth* in the word, *Asegarth*, since *garth* is the same as *guard* in English, and *garde*, *garder* in French, viz. an *enclosure*, a fortress, a city, as well as a *garden*;—and "*Asburg in the county of Meurs*" may as well have been built by the *Asiatic* followers of Odin, as *Asegarth* in Sweden, and *Odensee* in Denmark. But I abstain from further etymologies.

Thus much seems to be evident, that Tacitus mistook *Odysseus* for Odin or Wodan. The same author says in his second chapter, "The Germans, in their ancient songs, which are their only records or annals, celebrate the god Tuisto (or Tuiscon), sprung from the earth, and his son Mannus, as the father and founders of their race. To Mannus they ascribe three sons"—whose names are supposed to have been Ingäff, Isläff and Hermin. We must infer from these passages, that in Tacitus' time, Wodan had not yet attained to divine honours (at least not in the western parts of Germany where Tacitus had gathered his information), and that consequently the tradition of the Icelandic historians is correct, that *one of the last immigrations of Asiatics into Germany took place at the time of the Mithridatic war*. I say, *one of the last*, for the Huns came from the mountains of middle Asia, possibly by the very same road as Odin; and the Greek and Latin languages are evidences that, long before Odin, various other tribes who spoke Sanscrit, settled on the continent of Europe.

In conclusion I cannot but advert to the judiciousness and truly philosophical spirit, which Tacitus displayed in not rejecting at once as nonsense and passing over in silence, a national tradition, although he individually was not prepared to credit it. Posterity, after nearly 2,000 years, understand the hint thus given by him, and thank him for it. And I feel persuaded that many, apparently absurd, legends scattered in the Purånams or preserved in the mouth or songs of quite illiterate tribes, if critically examined and cautiously compared with collateral historical facts, will lead to discoveries still more curious and important.

A brief notice of some of the Persian Poets.—By Lieut. T. J. NEWBOLD.

(Continued from No. 14, P. 132).

Kadiri,

قادري

Or *Abdal Kadir*, was formerly in the retinue of the emperor *Akber* with *Shaikh Faizi* and *Abul Fazel*. He compiled the *Tarikh-i-Bedawin*. His style is said to be easy and flowing.

Kamil Ahmed Beg,

کامل احمد بېگ

Son of *Mirza Afzal Nujm*, came with his father from Persia into Hindustan and entered into the service of the emperor *Alumgir*, by whom he was ennobled. He espoused the daughter of *Khan Mahomed Tahir*, vizier to *Alumgir*, and a noble of high family. He was invested with the killadarship of the fort of *Talnair* in *Khandeish*. Shortly after this, according to his biographer, "The Sultan, the soul, evacuated its fortress, its body." He is said to have composed a *Diwan*, which I have in vain attempted to procure a copy of.

Karkashi,

کارکاشی

Or *Najin-uddin*, was the panegyrist of *Khajeh Khaldi*, by whom he was preferred to his rival *Kemal-uddin Ismail Zanjani*.

Karkhi,

کارخی

Of *Cazvin*. A poet of some genius. The following quatrain, in answer to *Seraj-uddin Kamari*, is quoted by his biographer:

رباعي

گفتی که گنه نزد من سهل بود
وین نکته نگوید آنکه او اهل بود
علم از بی علت تو عصیان کردن
نزد عقلا از غایت جهل بود

Rubai.

Thou hast said "sin in my opinion is not folly."
A man would not have spoken thus;
Wisdom would be sin, according to thy unreasonableness;
This by the wise is deemed the height of folly.

Karkhi flourished in the seventh century of the Hejira, during the reign of *Abaka Khan*.

Kashani.

کاشانی

Also called *Ghururi*, a native of Persia who travelled into Hindustan and resided under the patronage of *Abdur Rahim Khan*, *Khan*, *Khan*, to whom he dedicated a *Saki-namch*, written in a flowery style.

Kasim,

قاسم

Or *Kahi Kabili*, was cotemporary with *Jami*, whose society he sought. He lived nearly one hundred and twenty years. His poems are intermixed with the compositions of other authors.

Kahi was well versed in theological matters, and in the dreamy species of metaphysics, professed by those Mahomedan enthusiasts, the *Sufis*.

Kasim Anwar.

قاسم انوار

A man of rank and birth and a good poet. He is the author of a *Diwan*, flourished during the reign of *Alumgir* and was educated at Ispahan.

Kasim Khan.

قاسم خان

Author of a *Diwan*. He was brought up at the court of *Jehangir* and in 1041 A. H. was made governor of the province of *Acca* by *Shah Jehan*. He became a distinguished patron of poets. *Asef Khan* was his grand father.

Kasim Mushahedi.

قاسم مشهدي

Or *Kasim Dineaneh*, one of the disciples of *Reshid Mirza Sayeb*. According to the *Tazkirat-i-Serkhush*, he possessed a vivid imagination and an elegant manner of expression. His ideas are lofty, and his works full of abstruse allusions. He lived during the reign of *Shah Jehan*. The *Tazkirat-i-Serkhush*, contains a specimen of his style.

Kelim.

کلیم

Or *Talib*, was born at *Hamadan* in Persia, and is a cotemporary of *Kudsi* and *Sheida*, who flourished in the reign of *Shahjehan*. This

"nightingale of the rose-garden of literature," as he is called, which young, spent a considerable time in the acquisition of the sciences at Shiraz, and then travelled into Hindustan to the court of Shahjehan. He died on the road to Cashmir, whither he had been sent to versify the *Badshah-námeh*. *Mohomed Afzal*, the author of the *Tuzkire-i-Sirkhashi*, says that he retired to Cashmir after the completion of his *Zefer-námeh*. He wrote an account of *Akber-abza*, of a famine in the Deccan, and of his travels to Cashmir, in form of a *Masnawi*. He is also author of a *Diwan*.

Kemal uddin Ismail Isfahani.

کمال الدین خاندی

This poet flourished in the seventh century of the Hejira, and died A. H. 639; or, according to some authors, was slain by infidels. Doulet Shah fixes the date of his demise in 635 A. H. Among the compositions of *Isfahani* is a *Diwan* comprizing about 9,900 couplets—a poem in eulogy of the sultans of the Syed dynasty, particularly of Sultan *Jelal-uddin*. • A collection of tracts entitled the *Russâib al Fani*; and, according to D'Herbelot, "un poeme allegorique sur les cheveux, dont le sens est fort caché, quoique le nom de cheveux soit enfermé dans chaque vers." There is much beautiful imagery interspersed throughout the compositions of this poet. *Isfahani* was compelled to quit his native city Isfahan, on account of the persecutions of several of the principal inhabitants, who were envious of the honours he received at court. He assumed the habit of a dervise and retired to a secluded spot; where, however, the horrors of the Tartar invasion under *Genghiz Khan* soon reached him. The people of the neighbouring villages had consigned to his care all their scanty savings, in order to conceal them from their rapacious invaders. *Isfahani* humanely acceded to their wishes and deposited the sums in a deep dry well near the hermitage. One day it unluckily happened, that a Tartar archer, shooting at a bird perched on the top of the building, dropped the ivory ring of his bow down a crevice, communicating with the well. The Tartar, in his search after the ring, found the concealed treasure. The circumstance soon became noised abroad, and the archer's comrades imagining that *Isfahani* had more valuables hidden, put him to the torture and threw him into imprisonment. The unfortunate poet, deprived of the ordinary means of writing, was wont to pour forth the lamentations of his soul in the Tasso-like bitterness of despair, in stanzas written with his own blood on the walls of the dungeon. For farther particulars regarding *Isfahani* the Persian reader is referred to *Doulet Shah*, the *Nigaristan* and the *Manâr-us-suwâbi*. He was styled "*Malek-us-Shora*"—the prince of poets.

Kemal-uddin Khogendi.

کمال الدین اسماعیل اصفهانی

Flourished in the eighth century of the Hejira, and died A. H. 792. He was buried at Tabriz. Sultan Hussain held *Khogendi* in great esteem, and loaded him with favours. *Abdal Basit* in the *Manâr-us-Suwâbit* states that most of the *Ghazls* contained in the *Diwan* of *Khogendi*, resemble in metre those of Hafiz; and remarks that, "the *Ghazls* of *Khogendi* (for which he is celebrated) though inferior to those of Hafiz, must nevertheless hold a high place among the productions of true poets."

Khogendi performed the pilgrimage to Mecca. He died in such indigence, that nothing but a mat and a rude stone, which constituted his pillow and bed, were found in the house at his death.

Khacani.

خاقانی

Or *Afzel-uddin Bin Ali Atishir Shirwani*, a celebrated poet whose compositions are remarkable for elegance of style, originality of invention and beauty of language. He died A. H. 583, and was buried at the *Mukbaret us Shora* at Tabriz.

He celebrated the two *Iraks*, in a poem styled, *Irakein**, and is author of two other compositions in praise of Sultan *Ala-uddin Bin-al Arslan Takash*, and *Khajeh Jemal-uddin Musuli*. The latter he sent to the *Khajeh* at Bagdad, who returned the compliment, not in kind, but by an ass load of "white gold," (silver). On its arrival, *Khacani* fancied the contents of the bags to be gold; but on discovering his mistake, petulantly exclaimed "take it back and return my poem with all speed, and I will send the *Khajeh* a satire in lieu." During the night the prophet *Khizr* appeared to the irritated poet in a dream and said—

مصراع

احسان اور دمکن کہ ولی نعمت مراست

Reject not the bounty of one who is my benefactor.

Khacani relented and sent some verses to the *Khajeh*, expressive of his grateful acceptance of the present.

* This poem, according to the author of the *Zuwâbit-i-Azim* is written in the measure *Huzaj Ajzab Mukbuz Mukhzuf Musaddas*.

Khacîni's native country was *Ferghaneh** in *Turkistan*. During the commencement of his career he became one of the courtiers of *Mauuckehr*, sultan of *Shirwan*, but having resolved to retire from the world, he quitted the court and put on the habit of a *Zahid* (a religious recluse). The Sultan, on *Khacîni's* refusal to return, ordered him to be brought back by force, and imprisoned seven months. Our poet, who was of a vigorous turn of mind, employed himself in the composition of a *Kassideh*, in which he treated religion with such apparent contempt, that his friend *Azûri*, thought fit to write a commentary thereon, in order to clear the author from the charge of infidelity.

Khacîni, after his release, made a pilgrimage to Mecca in company with *Khajeh Jemal-uddin Mussuli*, and wrote a poem descriptive of the countries through which he travelled, and the fatigues he underwent on his way to the holy shrine. A copy of his work on the two Iraks, entitled the *Tohfet-al-Irâkein*, is to be found among the valuable collection of Oriental MSS. made by Jonathan Scott, Esq.

Mention is made of *Khacîni* by *Addal Basil* in the *Manâr-us-Suwâbit*.

Khajeh Hatifi.

خواجہ ہا تفی

Nephew to the celebrated poet *Jami*, composed a *Khamseh*, taking that of *Nizâmi* as a model.

When *Shah Ismail* defeated and slew *Sheîbek Khan*, sultan of the *Uzbeks* prior to his taking possession of *Khorassan*, *Hatifi* went to visit him at the city of *Sam* in *Khorassan*, and was charged with the task of celebrating his victories in verse. The poet, however, had not composed more than a thousand couplets when "death placed the seal of silence on his lips," A. H. 900.

Khajeh Kermâni.

خواجہ کرمانی

Was born in the province of *Kermân* about 680 A. H. He died A. H. 742. Among his compositions are the *Rouzet-al-Anwar*, a *kemal-*

* "Farganah, nom d'une des contrées de la Transoxiane, dont la ville capitale porte le même nom. Le nom d'Andoghian et d'Andugian lui est aussi commun, quoi que ce soit proprement une de ses dépendances, aussi bien que les villes de Coha et de Nessa. Ce pays s'étend le long du fleuve Sihon ou Jaxartes quoi qu'il ne soit qu'à 22 degrés de longitude, et à 42 degrés, 29 minutes de latitude Septentrionale, selon les tables d'Abulféda dans le cinquième climat, quoi qu'Alfragan la place dans la fin du quatrième."—*D'Herbelot Bibliothèque Orientale*.

nameh, several *risâlehs*, and a *Diwan* comprising twenty thousand verses. The *Kitab Humai Humaiyûn* is also from his pen. It is an historical poem composed at *Bagdad*, *Kermani's* favourite place of residence. From *Bagdad* he travelled into *Khorassan*. He was a disciple of *Shaikh Ola*.

There are two other poets bearing the appellation of *Kermâni*. *Mir* and *Ahmed*. The latter was cotemporary with *Tamerlane*, and has left the histories of *Alexander the Great*, of *Genghis Khan* and of his patron *Tamerlane* in verse.

Khalis.

خالص

Author of a *Diwan*, flourished in the 12th century of the *Hejira*.

Khanzeman Bahâdur.

خان زمان بہادر

Was one of the nobles attending the court of *Shahjehan*. He died A. H. 1044, in the subadarship of the Deccan. He is author of a *Diwan*. *Khanzeman's* father *Zemanah Beg*, commonly styled *Muhâbet Khan*, is still more celebrated for poetical talent than his son. Some account of him is to be met with in the *Tuarikh-i-hind*.

Kudsi Mushahedi

قدسی مشہدی

Came into Hindustan in the fifth year of *Shahjehan's* reign. He was courteously received and treated with the highest esteem by this monarch. The following is one of his couplets:

بیت

من آن نیم کہ کنم سرکشی ز تیغ جفا

چو شمع زنده سرخویش دیدہ ام بریا

Beit.

I am not one to be driven away by the cruelty (of my mistress),
But like the burning taper, look on with erect head.

An Account of the Tribe of Mhadeo Kolies.—By Captain A. MAC-KINTOSH, 27th Regiment Madras Native Infantry, Commanding Almudnuggur Police Corps.

(Concluded from our last).

The Goturany.—The Mhadeo Kolies have an institution or tribunal termed Goturany, composed of six persons, the establishment of which seems to be coeval with the original formation of their caste. The judicial functions of the members of the Goturany are of a serious and important nature, being to regulate and watch over the moral conduct of all the members of their community; to check the spread of licentious manners, and the infringement of the rules of their caste; to legitimize natural offspring and to adopt children and females of other tribes into their own caste. The designation of the persons composing this court and the manner in which they conduct their proceedings I shall now relate.

1st.—Is the Ruggutwan or president.—2dly. The Mettall or deputy.—3dly. The Sablah or constable.—4thly. The Dhallia.—5thly. The Murkiah.—6thly. The Hurkiah.

The members of this court whose appointments were hereditary, acted under the authority of the chief Koly Naik of the caste, who formerly resided in Joonere. The Ruggutwan resided at Rajapoor, two miles from Joonere. He is a member of the Shesha Kool, one of the grand divisions of the tribe, and in addition to his juridical appointment, he was the Patell of his village. No transgressor of the rules of their caste is considered absolved and re-admitted into their tribe, until he has partaken of food from the same dish with the Ruggutwan.

It was the Ruggutwan's duty to issue instructions for the seizure and trial of such persons as were accused of having transgressed the rules and customs of their caste. However, previous to the trial, the Ruggutwan had either to wait on, or announce to, the chief Naik the particulars of the charge, and he then issued his orders for the assembling of a Panchaiut.

The Mettull assisted the Ruggutwan to the extent of his power, and was authorized to act for him in his absence. He is a member of the Reddar division of Kolies, and the president's deputy.

The Sablah is a member of the Kheersagar division, and may be considered the constable of the Goturany. It was his duty to be very much on the move, and to be constantly making enquiries respecting the conduct and habits of the people—particularly of such as were suspected of leading a licentious life; he seized accused persons and handed them over to the Ruggutwan. The Sablah when employed on a tour of duty was entitled to receive, from the village in which an offender resided, a perquisite of one rupee and a half, and a fowl.

The Dhallia is a member of the Shesha division; his designation partly explains the nature of his office, for Dhallia* means a branch. Therefore when a person, charged with having offended against the rules of the caste, refused in the first instance to obey the summons of the Ruggutwan, or he subsequently remonstrated against the decision of the Panchavit, and declared his determination of not submitting to it—measures were taken by the members of the Panchaiut to excommunicate him from his caste. The Dhallia therefore was directed to proceed to the village where the delinquent resided; upon his arrival there he announced to the inhabitants the intention of the Panchaiut to denounce the accused, for that he was about enforcing the preparatory measures for expelling him from his caste, unless he showed symptoms of repentance; otherwise it would be necessary for them to be on their guard and hold no communication with him: the Dhallia then taking a bough of the ombre or jambool tree, or of any other, if one of these was not procurable, he walked round the offender's house and afterwards placed the branch on the roof above the door.

The Hurkia is a member of the Shesha Kool or division, and his duty consisted in fastening the hurky, or bone of a dead cow, over the door of the offender's house; this proceeding constitutes the formal act of expulsion from his caste; for it completely debars him, and such of his family as may have remained in the house with him, from holding any intercourse with his other relations and friends; for such persons as dared to communicate with him, became involved in the same misery and were considered contaminated and no better than the most infamous and lowest outcast of the Hindoo community. As no more terrible calamity can well befall the Hindoo, than having the ban of excommunication fulminated against him, he will throw himself on the mercy of the Panchaiut to avoid it, or to remove it, if he has been placed under it, unless he is an inveterate rogue, or become desperately attached to some siren, who has persuaded him to abandon his family and kindred for her society.

The Murkiah is a member of the Shesha division or Kool—he forms one of the Panchaiut, and when a person has been readmitted into his caste, or a man's house and family have been polluted by some transgression against the rules of their caste, the Murkiah has to attend to see the place cleared out and the ceremony of purification performed. The Murkiah is entitled to take away with him all the murkees or earthen pots piled up in the corner of the house, probably containing a small

* Dhallia—the branch of a bush or tree.

+ All classes of natives invariably keep a small quantity of rice or rare grains, onions, salt, turneric, spices, &c. in earthen pots of various sizes, piled up one over the other in the corners of their houses, most commonly in the apartment allotted for cooking or near it. The largest pot is at the bottom and as they successively decrease in size, the one forms

quantity of fine rice, dall and other grains, spices, onions, salt, &c. and he replaces these with new murkies: he was enabled to purchase new ones as he receives a portion of the fine that had been levied from the offender.

I have stated before, that it was customary for the Ruggutwan to apply to the chief Koly Naik for his permission to have a Punchaiut assembled for the purpose of investigating the conduct of the accused; but, previous to his doing this, he consults with the offender to ascertain with what amount he will present him if he gets him readmitted into the caste, and gives him, or to his son or daughter, one of his own children in marriage; the accused will probably mention that he will give five, ten, twenty or fifty rupees. He pays this in addition to the penalty that may be awarded against him by the Punchaiut of which the Ruggutwan gets his share also—when he was brought before him by the Sablah, four or five Patells of villages in the vicinity were summoned, and these, with the members of the Goturany, constituted the Punchaiut—a Brahmun, or person who could write, was required to be in attendance to record these proceedings; and the accused was then called on to state if he was willing to abide by the decision of the court, in which case he gave them a paper to that effect. The testimony of the witnesses for and against the accused having been taken down, also what he had to urge in his defence, the members of the Punchavit convicted or acquitted him, according to their opinion of the evidence, bearing in mind at the same time the character of the offender, the consideration and influence he possessed in their community, as well as his means of paying the fine that they might impose upon him.

If he were acquitted, and it appeared that there were not any grounds for the charge, and little or no cause whatever to suspect he had committed any crime, his accuser having failed in convicting him, was fined by the Punchaiut, and sentenced to provide an entertainment for the caste.

A portion of the fine (about one quarter of it) was presented to the chief Naik as his perquisite, about an eighth of it went to the Ruggutwan; the other members of the Goturany received a share and the different Patells who attended the Punchavit, also the person who acted as secretary, received a few rupees each. The remainder of the fine was expended in providing an entertainment for the caste, on which occasion, the offender is permitted to eat from the same dish with

a cover for the other. There is a separate cover for the upper one, so that the contents of all are secured from the attacks of rats, mice and insects. A particular person, but almost always an elderly female, has charge of these pots, as well as of the rest of the grain, ghee, &c. required for the immediate consumption of the family, and she issues from the stores each day's allowance—should she be engaged or have gone outside for a short time, no person will touch the stores, they patiently wait till she returns or has leisure to supply them with what they may want.

the Ruggutwan, and by doing so he is looked upon as absolved from his sins, and re-admitted into his caste. Therefore when the penitent has been shaved and afterwards bathed in some sacred stream, or in water (supposed to be) consecrated for the purpose, he proceeds to the place of entertainment, accompanied by a friend who takes a new thally or brass dish and a new tambia or small copper or brass pot with him, also the money required, and having approached close to where the Ruggutwan is, they sit down, the man places the rupees on the floor and puts the thally on the top of them; upon this one of the attendants puts a little of the meat into it and some water into the pot, after which the Ruggutwan invites the penitent to join him, and they successively take five grasses, or mouthfuls of the meat, which is reckoned sufficient to re-establish his purity. He is then directed to sit in the Ruggut, that is with the other guests who are all going to partake of the feast. The thally and tambia become the perquisite of the Ruggutwan in addition to the rupees that were placed under the former.

In the event of the accused declining to attend the summons of the Goturany, the ceremony of excommunication was enforced against him—should he on this account complain to the government authorities, the government call on the tribe to explain the cause of their interfering with the complainant, and when the government have been informed it was on account of his having violated the rules and usages of the caste, he is told that he must abide by the decision of the Punchaiut. This generally led to his being doubly fined for the contempt of their authority, and thus complaining against them.

Should the fine imposed on the offender amount to a large sum, a portion of it was expended at times in repairing the village temple or choultry, and a few rupees presented to any sadhoo or holy character residing in the place.

When a person was convicted of a crime which was considered not one of the deepest dye, and he showed great contrition on the occasion, and was exceedingly poor, his friends urged him to entreat of the Punchaiut in the most submissive terms to forgive him. He then went to the spot near the entrance where all the shoes of the persons composing the assembly were placed, and would take ten or twelve pairs of them, tie them with a piece of string, and then place them on his head; after which he entered the room and appeared before the members of the Punchaiut in the humble position of a penitent. Seeing that he was sufficiently humbled and had not the means of paying a fine, they in general assented to his petition. The offender having obtained so much, he endeavoured to persuade the members of the court to partake of a moderate feast with him (for he would exert himself to raise ten or twelve rupees to defray the expense); the Punchaiut, aware of his poverty, would try to elude his invitation, so that he had to plant

himself in their way to prevent their going out until they gave their consent to dine with him. It was a great object for him to gain this point, otherwise, as he had acted in the manner described, and had not broken bread with the Ruggutwan, the stain would attach to his character.

A fine was required to be paid within ten or fifteen days, and the offender was not re-admitted into his caste until he had handed over the amount to the members of the Panchaiut conformably with their decision.

When a boy or girl, the offspring of an illicit connexion, was to be admitted by adoption into their caste, a feast was provided for the Goturany and a portion of the inhabitants of the village. The expense of this ceremony averaged from thirty to sixty rupees, but the amount was generally regulated according to the property the father possessed, for, if he wished to indulge his fancy, he expended a large sum. A man in very poor circumstances, who was anxious to have his child legitimized, would go about to all his friends and entreat of them to be charitable and assist him in getting the ceremony performed; some would contribute, and, when he had collected thirty or forty rupees, the ceremony was celebrated. An extremely poor and friendless person, who could not raise a sufficient sum in the above manner, would throw himself entirely on the mercy of the Ruggutwan. As the Goturany is assembled for the purpose of hearing his petition, he takes up their shoes, which he rolls up in a piece of cloth, and enters the court; he then represents to them his utter inability to conform to the usual practice of defraying the expense of having his children admitted into the caste, and he entreats of them to adopt them as paupers. A new pot filled with water, and some coarse sugar is brought, and the Ruggutwan gives the child a little of each and the ceremony is finished.

After the feast was over the Ruggutwan engaged to conform to the usual custom of bestowing one of his own children in marriage to the newly adopted one. If all his own children had been disposed of in marriage, he was bound to get one from among his kinsmen; failing here, he had recourse to the Mettull and the rest of the Goturany as they were in duty bound to see the young convert married into one of their own families.

When a grown up female was to be admitted into the Koly caste, a feast on a rather extensive scale was prepared, to which some of the inhabitants of the surrounding villages were invited. When they had assembled, the Ruggutwan or his officer asked the woman a few questions respecting her caste, and the family she belonged to, and if she was willing to relinquish her own tribe to join them. If the Goturany were satisfied that she was telling the truth, and that she had belonged to a caste superior or equal to their own, she was admitted among them, and when the men had finished their dinner, a small quantity was left

by the Ruggutwan on his dish to which a little more was added by three or four Patells, and the dish was conveyed to the convert for her to partake of it; she was surrounded at the time by ten or fifteen Koly women, who were to bear witness to her having eaten the contents of the dish that the Ruggutwan had sent to her. This was all the ceremony they thought it necessary to attend to. The expense in former days averaged from one hundred to four and five hundred rupees. If the woman had any children they were admitted into the caste at the same time.

The Ruggutwan was entitled to receive from large or moderate sized villages annually one maund of grain of sorts, one rupee in cash, a seer of ghee and one fowl. From small villages he received four seers of grain, a half seer of ghee, a fowl and half a rupee. A portion of this allowance from the inhabitants he divided among the other members of the Goturany.

The Ruggutwan was obliged to attend the jutra at Bhuma Shunker every third year, upon which occasion he had to shave off his hair and his mustachios, preparatory to his giving an entertainment to all the Kolies of the Mhadeo division that attend the jutra. This occupied him two or three days. The allowance he received from the different villages within his jurisdiction easily admitted of his incurring this expense.

As the duties which devolved on the Ruggutwan, in the country lying between the fort of Shogur and that of Hurreechundragur, occupied his time so much that he could not always proceed into the Kotool, Rajoor and Malldesh districts when his presence was required there, he therefore constituted three persons to act as his agents in those parts of the country. These were persons of three families of Goriah, Koon-da and Kondar, with a sablah attached to them.

It is necessary I should explain here that within these forty years past, the authority and influence of the members of the Goturany has greatly diminished, and little or no respect is shown to them now, in comparison to what was paid to them in former times. The people assign various causes for the change that has taken place, but chiefly ascribe it to the very great indifference with which the ex-Paishwah, Bajeerow governed the country. That the Desmookhs, the Brahmuns, Koolkurnees and Koly Naiks were permitted to do as they pleased in the hilly districts, provided they bribed the courtiers at Poona to their satisfaction. The disputes which arose between Bajeerow and his adopted brother, the late Amrootrow, withdrew for a time the attention of government from the management of the hilly districts; the Kooly Naiks and the zumeendars consequently began gradually to usurp the duties and the emoluments appertaining to the office of the Goturany. These Naiks and zumeendars frequently now adjust matters connected

with the infringement of the rules of their caste, accepting a trifling remuneration for the same, the sum being much smaller than the *Gotorany* and a *Punchiatut* would have decreed them to pay. This system has been going on for many years now. If a *naik* or *zumeendar* hears of a person having violated their rules, he or she is threatened with exposure and fine; this leads to a bribe being tendered to keep silence, some five or ten rupees or probably a cow; the accused will afterwards go to some other person of influence and ask him to dine in company with him, or he himself offers to become a guest at the *zumeendar's* or *naik's* house. A few rupees are offered to this influential person. This would seem to settle the business, but some third person remarks that he does not understand how the affair has been hushed up. The chances are that this will lead to a third bribe being offered—notwithstanding this patchwork mode of adjusting matters that has latterly obtained, all the respectable people look up to the *Ruggutwan* as being the only qualified person to restore offenders to their caste.

The dealings of the Kolies with the Bunniah and money-lenders:

In any account of the habits and present state of the Kolies and tribes residing in the hilly tract of country to the east and along the range of mountains termed the *Syadry ghauts*, it is impossible to overlook the distress and misery that have been caused more or less to every family in that part of the country, by the very exorbitant rate of interest charged for money, and the unjust and unfeeling proceedings of the Bunniah, who are the merchants and money-lenders settled in the villages in that part of the country. Although I am disposed to think that this misery was originally produced by the excessive exactions of the rapacious agents and underlings of a despotic government on the poor and destitute Koly farmers, which compelled them to have recourse to the money-lenders to satisfy in the first place the demands of the State; I am satisfied that I can show that the bitter complaints I have often heard the Kolies make of the odious, usurious system of the Bunniah is perfectly true. I shall confine myself to giving a full and ample explanation of the manner the Kolies, &c. and the Bunniah manage their affairs in *Rajoor* as I am better acquainted with the inhabitants of that district; but the same system extends along the range of hilly country. I am now giving an account of, as well as in many other places in the *Dukhun*.

The Bunniah settled in *Rajoor* are from *Guzerat*. There are four distinct families; they constantly keep up a communication with their relatives and friends in their native country, and retire there when they have realised a competency to enable them to live comfortably for the

rest of their lives. The four *Rajoor* shopkeepers by means of agents have each established three shops in various places to supply the forty villages of this *dang** and to purchase up from the cultivators whatever grain they may have for sale. It is well known that some of the *zumeendars* have a share in the affairs of one or two of the shops, and any person of rank countenancing or in any way lending their influence to the Bunniah, goes far to overawe and silence the poor Kolies, and make them stifle their groans, dreading that they may have cause to repent any complaint they might venture to make against the Bunniah. I am convinced that I state correctly in saying that their souls groan within them owing to the oppressions they have been subjected to and are obliged to endure; and that they are naturally eager to engage in any undertaking that will afford prospects of being revenged on their enemies, and obtaining toleration for the future.

These Bunniah exercise their influence to prevent the Kolies selling their grain to any persons from a distance that may come to collect and purchase it; and if a Koly takes his grain to another district bazar, to sell it there to some little profit, the circumstance is particularly noticed by the Bunniah, the first time the Koly comes to him to ask him for the loan of any money; he immediately declines complying with his request, telling him that if he is very much in want, his friend who purchased his grain will of course supply him with any reasonable sum he may require, so he had better go and ask him for it. The Bunniah even have expressed their displeasure at some Kolies accommodating a few of their friends at *Rajoor* with a small supply of grain at a trifle under the bazar rate.

The circumstances of all the Kolies, Thakoors, &c. are so well known to these Bunniah, that when any one of them comes to ask them for a loan, they treat him much in the same manner. Any remonstrance the borrower ventures to make respecting the inferiority of the coin, the high rate of interest, the heavy bonus and the rate of exchange, is immediately answered by the Bunniah remarking "you can of course please yourself, you came here of your own accord, if you are not contented you had better go away, and apply to those that will satisfy you on easier terms." It is to be recollected that these Bunniah supply the different inhabitants with clothes, spices, salt, tobacco, &c. besides money, and often seed-grain. They very often keep their accounts; this places the people unavoidably very much at their mercy, for there is no free market or competition to reduce articles to their proper valuation, and the management of all affairs is so controlled by these Bunniah, from the undue influence they possess, that they have established a

* *Dang*, a quarter or district, but occasionally applied to a wild, hilly, and jungly tract of country.

buying and selling measure. For instance, when they go to the Kolies' houses to purchase grain, they carry a measure with them which is considerably larger than the Kolies' measure, which is the regulation size. The Bunniah will listen to no remonstrance on the part of the Koly. The difference between the buying and selling measures varies from two to four seers in the value of one rupee's worth of grain.

The following is the mode the Bunniah in general pursue in charging interest on any sums of money they lend to the Kolies, Thakcoors, Kannaras, &c. They charge a bonus or premium of twelve or fifteen per cent. on every sum advanced by them—so they enquire of the borrower if he has brought money to pay the *munoty* (bonus), or if he is to include it in the receipt or promissory note. The Bunniah then will give the Koly eight and a half Bellapoory* rupees (these rupees vary from eight to eleven per cent. inferior to the Poona Ankooshy rupee) and takes his receipt for ten rupees, a rupee and a half being included as the bonus, and the poor man loses equal to a half rupee owing to the inferiority of the Bellapoory rupees. The Bunniah, having an eye to work, stipulates for having the money repaid to him probably in four months, and that he will receive the interest in khorachny† seed, at the rate of one paillie (four seers) for each rupee of the debt every month. At the expiration of the fixed time, if there is a demand in the market for khorachny, the Bunniah will send for the Koly to settle his account; otherwise he is not reminded of his debt. At the end of five or six months the Bunniah calls on him to pay up his debt (the truth is, the grain has risen in price); the account is drawn out, the interest of ten rupees a month is ten paillies of khorachny in five months; this amounts to fifty paillies. This grain is selling at the time (Akhar and Shrawun) it is dear, and only procurable in the Bunniah's shops for about six paillies for the rupee; therefore the interest is 8½ rupees the price of the fifty paillies, and as the Koly has no grain in hand he is under the necessity of having the interest added to the capital of ten rupees, which raises the debt to 18½ rupees. Should he not have money to clear off this amount, he is not allowed to return to his home until he has satisfied his creditor. To effect this a fresh promissory note is drawn out for the amount, including three rupees as a bonus on the new loan, which raises the debt to twenty-one rupees. The Bunniah now informs the Koly that he will receive the money payable in ghee in the course of

* Many of the Bellapoory rupees in circulation in the small villages in the hills are of a very inferior description, either much clipped or containing much alloy. A Koly Patel who came to Ahmednagar some months ago on business obtained a few rupees from his Bunniah for his road expenses; for four of these he brought on to this place, he could only get twelve annas each; in fact, only three rupees, a loss of 25 per cent. to the poor man.

† A grain of which they make oil.

three or four months, if he will let him have the ghee at the rate of four seers for the rupee. He will most probably remark that such and such a person had promised to supply him with ghee at that rate, and he adds that if he (the Koly) objects to do so, that he had better pay him his money. The wretched man being at a nonplus promises to comply with the demand of his creditor; when the time arrives for delivering the ghee, the Koly will send to say that he does not possess the means of fulfilling his promise (his cattle may have died, or ghee may have been spoiled, or he may have disposed of it, or the value of it, in some other way); the Bunniah sends again for him and tells him that as he has not got the ghee, he must convert the debt into cash at the rate of the market price of the article, or on more favourable terms. Ghee happens to be selling 2½ seers for the rupee; then we have the original debt twenty-one rupees, multiplied by four seers of ghee equals eighty-four seers, which, at the rate of two and a half seers for the rupee, gives thirty-three and a half rupees. The Bunniah says if you cannot pay me this money now, you must do so at the Hooly festival, when the accounts are usually adjusted. For the accommodation of the parties another promissory note is prepared, including a bonus calculated at fifteen per cent., which brings the debt to thirty-eight rupees. The Koly is informed that, if he will agree to pay the interest in rice or in khorachny, at the rate of four seers or one paillie for the rupee each month, he may go away to his home, but that he must be prepared to give some articles, ornaments or cattle, in pledge, as security for the payment of the debt. At the expiration of the four months the account will be as follows. Thirty-eight rupees, one paillie interest, equals thirty-eight, which in four months equals one hundred and fifty-two paillies; at the Hooly, khorachny sells six seers for a rupee, therefore the interest will amount to 6)152(25½ twenty-five and one-third rupees being added to the principal raises it to sixty-three and one-third rupees. Should the Koly, either from improvidence or some misfortune, or unavoidable expense, be unable to discharge any part of the principal or interest from the time he incurred the debt, the Bunniah will now remonstrate with him and tell him that he must either pay the money, or pledge some of his cattle, as security for the debt. This being agreed to, he selects some of the Koly's best cows and buffaloes, but will only consent to them at a fifth or sixth under their value, observing, very likely, at the same time, that he does not wish to be troubled with his cattle. The unlucky debtor sees no alternative but complying with his creditor's terms. This time the promissory note is written out on stamped paper; a fresh bonus is included, and a further term of four months is agreed on for the payment; the interest to be paid in rice, ghee, or khorachny, as may best suit the Bunniah, who tells the Koly that unless he fulfils his engagements, he will lodge a complaint in the court for the purpose of recovering his money. In the

promissory note on stamped paper the interest charged is the Dohotary, or twenty-four per cent.

If the man who has got himself thus entangled in debt is a person of considerable energy, spirited and litigious, he will attend the court in the hope of being able to obtain some redress; but in this he often fails. The vakcels (agents) employed by the plaintiff preclude his having any chance of justice done him, so the scene terminates by having his property sold to satisfy the rapacious Bunniah.

In fact the Bunniahs, before they come to the resolution of prosecuting a man in our courts, adopt every precaution to ensure his being completely ensnared before they lodge a complaint against him. Bonds, receipts &c. are all forthcoming, and duly attested; such other evidences, oral and documentary, as may be required are at hand; the victim to be sacrificed and lodged in jail is carefully selected for the purpose, in the expectation that the trial and sentence may make a more forcible impression on the other Koly debtors.

Many of these men surrender their cattle or pledged property at once to the Bunniah, rather than submit to the vexation, inconvenience, and expense of being dragged from their families and homes to attend the court at a distance, which may decree them to be imprisoned. Others of the Kolies fly to a distance from their homes to escape the tormenting calls of their creditors. Those who abscond, not unfrequently change their names, and too often subsist by leading an idle and thievish life—several of those who joined the formidable gangs that assembled in the Rajoor hills in 1828-29 & 30, were men who had become desperate from being inextricably plunged in debt. They told me, after they were captured, that they joined the gang in the hope of being able to secure some money or ornaments by plunder, to enable them to pay off their debts and reside in peace in their own village.

The poorer classes of Kolies and Thakoors are in some seasons obliged to borrow seed grain from the Bunniahs; for one maund of rice or khorachny borrowed, they return two maunds at harvest time in ordinary seasons; but in dear years, the Bunniah gives one maund on the promise of receiving three in return. For other inferior grain a half or fifty per cent. is given to the lender. I may add here that such of the Kolies as were of a turbulent disposition and unsettled habits, not unfrequently endeavour to realize by robbery money to pay their arrears of revenue and to settle with the Bunniahs; at other times, the rogues adopted what they considered an indemnifying system, with the Bunniahs, that could be neither profitable nor agreeable to the latter.*

During a dark night ten or fifteen Kolies would attack the Bunniah's house. They made a point of destroying his book of accounts or any papers they could lay their hands on, by putting them in water and tearing them to pieces. They would, if greatly exasperated, take the Bun-

niah and one or two of the inmates of the house to a thicket, and pressing a naked sword on their throats, demand money. To expedite the matter, a Koly would probably give a gash to the Bunniah's ear who would instantly make an offer of all the ready money, &c., in his house. One of the party, being previously warned about not giving the alarm, on pain of death, to his comrade, is permitted to proceed to fetch the money. The Kolies cover their faces on such occasions to prevent detection. If one was recognized, it was seldom the Bunniah dared charge him openly with the crime; but some of the ill-paid and corrupt police agents would endeavour to gain the necessary information and avail themselves of the circumstances of the case to obtain a portion of the plunder, for a compromise is frequently entered into on such occasions between the robbers and the police. To guard against fire and other contingencies, the Bunniahs keep now several copies of their accounts with the Kolies. One is lodged with their partner at Rajoor. The only stone-built house and covered with tiles in the Koly villages is that belonging to the Bunniah.

I have been credibly informed that during the Paishwah's government the Bunniahs used to be occasionally warned against being too rapacious in their dealings with the inhabitants of the hills. It is said that when the Bunniahs lodged a complaint against any of these people in consequence of their refusing to pay their debts, that the government officers were directed to investigate the affair, and that, if the claim appeared to be just, an order was issued, directing that the debt was to be liquidated within a fixed time. The government officers always paid themselves twenty-five per cent. of the debt, as a remuneration for the trouble of adjusting the affair.

The above is a specimen of the mode of charging and calculating, the rate of interest for money lent by the Bunniahs; but the Koly's account is frequently a much more complicated affair than the above will give a full idea of. We may suppose that eight and a half rupees or three times that amount has been borrowed to aid in defraying the expense of a marriage ceremony, or pay up his rent or share of the revenue for the current year; the chances are that there is a small balance* of revenue for two or three successive years: then most probably follows a charge of half a rupee for a turban, also one or two rupees for a piece of cloth for himself, or a sary, for his wife. Again a charge of one or two rupees for salt, spices, oil and tobacco for six months. Then a few rupees of very inferior value may have been paid by the Koly, and a consequent deduction made, and a

* There are many lacs due of arrears of revenue for these eight or ten years past, the balance of each year distinctly recorded and annually or more frequently a small portion is paid off, but this leaves the revenue of the current year partly unpaid.

few maunds of ghee, rice or some other grain may have been tendered in part payment, and accepted at the Bunniah's price. In fact the account becomes so extremely intricate that it would require a person of considerable talent and experience in such matters to comprehend it. What is an ignorant and unlettered Koly to do in such case! Although many of these people are very simple and ignorant, they are not by any means indifferent to the difficulties they are likely to be plunged into in consequence of their dealings with Bunniahs. Not unfrequently a poor man who is very anxious to come to a settlement with his creditor, is desirous of having his account previously examined, by hearing all the different items of which it is composed read over, and the calculations of interest explained. He will signify, to the Bunniah that he intends to wait on him on such a day for the purpose and that he will bring the Patell or some intelligent friend with him, that he may be better able to understand how much he is in debt. The Bunniah contrives to defeat this plan, by probably saying, that he will be too much occupied on such a day or that he is going from home, but that if he will come alone some other day that he will explain his account fully and satisfactorily to him.

My anxiety to expose the iniquitous system of dealing that exists between the Kolies and their creditors, induces me to add a few lines more to what I have already attempted to explain on this subject. When I was in the Rajoor hills in April 1829, a very poor Koly came repeatedly to me, urging me to listen to a complaint he had to make, for that the Bunniah of Mootkell, a village in the Rajoor district, had ruined him. At length I received his petition, and forwarded it to the proper authority, intimating to him at the same time that I had not authority to interfere in such matters. The substance of the petition was this: "the Mootkell Bunniah claims ninety seers of ghee from me, although it is only five years since I settled my account with him, at which period I was five seers of ghee in his debt, but by various ways he has raised his claim in five years to ninety seers." Now these five seers would sell for two rupees when ghee was dear; so that a debt of two rupees by charging an exorbitant interest, payable one day in money or ghee, and another day in rice or khoorachny, amounted to thirty five rupees in five years. Unfortunately this wretched man's case was not a singular one.

History of the Kolies.—We cannot expect to glean much authentic information of an historical description from an ignorant and unlettered people like the Kolies. The few traditions they possess relative to their first settlement in their present locations, and of subsequent events until within the last century, appear to be involved in much obscurity and confusion. However, there is reason to believe that they have oc-

cupied their present habitations for many ages; for we find that Ferishtah, the Mahomedan historian of the Dukhun, mentions that Ahmud Nizam Shaw, the first king of Ahmudnuggur, employed a body of Kolies in his army, and when Ahmud's grandson, Hoosain Nazam Shaw, retreated into the hills near Joonere in 1562, at the period his capital was attacked by the confederated Mahomedans and Hindoos, he was joined there by Sabajee one of the Koly naiks.

There is a popular tradition among the people in this part of the country, that the Gursees were the original inhabitants of the Dukhun, and that they were displaced from the hilly tract of the country by the race of Goullies or cow-herds. These Goullies it is said, subsequently rebelled against their lawful prince, who detached an army that continued unceasing in their exertions until they exterminated the entire race of Goullies; and it is concluded that the very few who escaped the sanguinary measures that had been carried on against them, were adopted ultimately by the Kolies into their tribe and founded the Kool that bears their name. Be this as it may, there is no family in existence of the original name, but there are two (not very numerous) clans who are the descendants of the Gouilly Kool: namely, the Damsahs and Waghmoriahs. The Poriah family of the Kuddum Kool, and the Patkoollah clan of the Aghassy Kool, are considered to be the descendants of the Gursees.

With regard to the overthrow of the Goullies and Gursees, the Koly traditions say that these people, having been in open rebellion and plundering the country, an army from the northward advanced through Kandeish by the Kassarbary ghaut to subdue them, but that the rebels having assembled near Kassarbary, they attacked and put to flight the royal army. The king of the country, greatly incensed at this discomfiture of his army, held out prospects of high reward to the person that would head an army which would inflict condign punishment upon the rebels; the country being wild and unhealthy none of the officers in the pay of government would offer their services for this duty; but a man named Sonejy Gopall, said to have been an inhabitant of the Mahratta territory, volunteered his services. An army was then employed under Sonejy who appears to have been joined and ably supported by an active and intelligent Koly named Wunkojee Kokata, whose name and exploits are quite familiar to the Kolies of the present day. The Goullies who had resided in the hilly tract of country were attacked and completely exterminated; and Sonejy Gopall was rewarded by being appointed Desmook of fourteen hundred villages; and the Koly Kokata was presented with the Mokassa dues of the same number of villages, but as the country previously occupied by the Goullies along

* The descendants of Wunkojee Kokata are now in possession of some right at Joonere; they have always taken a great share and interest in the Koly transactions.

the ghauts was completely depopulated, for the purpose of restoring it to prosperity, a number of Kolies from the Ballaghaut* and the Mhadeo hills were assembled and taken to the deserted dwellings of the Goullies, and invited to occupy them and cultivate their fields.

It is a common practice with such of the inhabitants of the plains as bury their dead, as well as the hilly tribes to erect thurgahs (tombs commonly of a single stone), near the graves of their parents. In the vicinity of some of the Koly villages and near the site of deserted ones, several of these thurgahs are occasionally to be seen, especially near the source of the Bhaum river. The people say they belonged to Gursees and Goullies of former times. The stones with many figures in relief roughly carved upon them, and one of these holding a drum in his hand, and in the act of beating time on it, are considered to have belonged to the Gursees who are musicians by profession. The other thurgahs with a Saloonka (one of the emblems of Mhadeo) and a band of women forming a circle round it, with large pots on their heads, are said to be Gouilly monuments. This might be reckoned partly confirmatory of the tradition.

This account of the Kolies having come from the Ballaghaut and Mhadeo hills is certainly quite the reverse of what might have been expected; it was natural to suppose that they had migrated from the northward, as the tract of country occupied by them is bounded, both on the western and northern sides, by districts in which the Koly population is numerous, and it is quite evident that those Kolies have advanced from the northward. It is to be remarked that the Mhadeo Koly holds little or no intercourse with the other tribes in the adjoining districts. They are considered a more pure and respectable class of people. The Koonbies in the Joonere districts drink water from the hands of a Koly, and will also eat food prepared by them; the few Koonbies in the Kotool and Rajoor districts will do the same, but I believe they have some scruples on this score. However the Koonbies in Malldesh will not partake of water or food from the Mhadeo Kolies in that part of the country; this is said to be in consequence of the vicinity of the other tribes of impure Kolies, in the Nassick and Wunn Dindory districts and in the Attaveessy. If a Koonby has been working for a Koly in Malldesh he will receive rice or flour from the Koly and prepare his own victuals. Tradition says that Bhoregur, Phoolgown, &c. in the Ghorenahir, were the first villages established by the Mhadeo Kolies, and the inference we are to draw from this is, that they gradually advanced northward; to which is to be added the tradition of their having attacked and exterminated the Sombatta and Gurse inhabitants of Malldesh. Another circumstance that would tend to corroborate the

* Ballaghaut is the hilly tract along the western boundary of the Hyderabad territory.

tradition of the Kolies having come from the eastward is, that in former times all ceremonies connected with their marriages, births, and funeral obsequies were conducted by the Rawoull Goossynes of the Linggait persuasion—we know that the people of the Ballaghaut are staunch worshippers of the Ling of Mhadeo, and these priests may have accompanied the Kolies in their journey to occupy the valleys of the western ghauts. When the Paishwah attained supremacy in the government at Poona, some Brahmuns intruded themselves among the Koly habitations: these have completely usurped the duties and emoluments of the Rawoulls for seventy or eighty years past. The descendants of some of the Rawoulls are settled at Chauss and Murchur.

During the wars that were carried on in the Dukhun while the Bhaumny dynasty of kings reigned, also by the Nizam Shawhy kings of Ahmudnuggur, and subsequently by the emperors of Dhelhi in re-establishing their authority over the Dukhun, the Kolies, being a poor people and occupying a strong country, very possibly did not suffer so much from an invading force, or from the governors of provinces, as the inhabitants of the open country.

It is said that, with the view of preserving order among the Koly inhabitants, one of the kings of Bedur established a local police in each of the fifty-two valleys; a Naik and a certain number of Kolies were nominated for this duty, and the Bawun (52) choury at Joonere was fixed on as the head quarters of the police establishment. The Naiks were styled sirdars, and several of them had the title of munsudbar conferred upon them. A Mahomedan* styled munsudbar was placed in charge of the police, as a general superintendent or Sir Naik (chief Naik). However sometimes after this the Kolies from some unknown cause became very discontented, and they assembled to the number of many thousands for the purpose of demanding redress of their grievances from the king, who was passing in the vicinity of the hilly country, arranging the affairs of his government. The Koly force is said to have extended from the vicinity of Ekdurrah near the Puttah fort south and close to the Bolleshwur hills; but, as there was no person of acknowledged ability or experience among the Naiks, whom they could implicitly intrust and depute to the court as their agent to get their affairs satisfactorily adjusted, all seemed to agree that none of them could fulfil the duty so effectually as a poor Koly labourer, surnamed Pauperah, in the employ of the Awary Patell of Khirlay, and who was noted for his intelligence and sagacity. He was consequently requested to act as their chief and representative on the occasion, on which account he was presented with new clothes

* There has been no Mahomedan Sir Naik for these 120 years; Mahomud Lattief was the last.

and such few necessities as his new situation demanded, and all the Kolies engaged to be faithful to him and to obey him. The negotiations did not terminate favourably for the Kolies, as the prince gave orders shortly afterwards to attack them in token of his dissatisfaction. However, Pauperah, by his great activity and vigilance, continued for a series of years to defy the king's troops, and prevented them gaining any advantage over the Kolies, and so completely disgusted the officers of the royal army, by misleading and counteracting all their attempts and plans to punish the rebels, that the king ordered the troops to be withdrawn from the hilly country.

The Kolies having for such a length of time been engaged in hostilities in defending themselves from the attacks of the royal army, and finding nothing to occupy their attention at home, after hostilities had ceased, were allured to plunder the people who inhabited the Malldesh, lying between the Rajoor district and Trimbuck. The inhabitants of this tract Gursees, Sombattees, &c. were attacked and driven away and the country left desolate; however it is said that Pauperah subsequently settled for some time at the village of Mookny near the Tallghaut, where he erected a small mud fort. Having one day proceeded to pay his devotions at the shrine of the deity at Pumpury, he met five holy fakeers; one of these, placing his hand on Pauperah's head, bestowed his blessing on him and said, go down to the Konkan, take possession of Jowair and seat yourself on the Gaddy* there. The Koly replied that it could not be his destiny to be ever elevated so high; besides a Warley Rajah occupied Jowair. The saint remarked, what proceeded from his lips would be realized. Pauperah assembled a body of Kolies and proceeded northward and descended into the Attaveesy; the country around Peint and Dhurumpoor acknowledged him as their master. From this time he was saluted by his followers as Rajah Mookny Kur; and the term Mookny has been continued as the surname of the family ever since. It is said Rajah Mookny paid a visit to Guzerat, and that he prolonged his stay in Katywar for seven years; at the termination of which period he proceeded to Jowair and asked the Warley Rajah to give him as much land as the hide of a bullock could embrace. The Warley Rajah, seeing it would be impolitic on his part to offer resistance to a person of such power and influence as Rajah Mookny, consented. The hide was cut into very fine shreds or strips, and when all were united and extended along the ground, the Warley Rajah saw his small fort and dwelling embraced within the space fixed upon by Rajah Mookny. The Warley, much disheartened, remarked, as you have included my dwelling in the part you mean to occupy, it is incumbent on you to give me some place to reside in. Gumbergur and the surround-

* A seat of honour—a throne.

ing pergunnah were given to the Warley Rajah, where his descendants continue to reside. The king of Bedur had been encamped some time at Gungapoor near Nassick when fourteen different rajahs repaired to Gungapoor to pay their homage to the prince. It is related that the Mahomedan prince ordered a sumptuous entertainment to be prepared for these rajahs, but all of them, with the exception of Rajah Mookny of Jowair, declined sitting down, as they were Hindoos. The Jowair Rajah endeavoured to remonstrate with some of them, remarking that although the king was a Mussulman he was their master. The king was much gratified with the Jowair Rajah's conduct, and ordered the covers to be removed from off the trays; to the great astonishment of all present, the dishes, which were composed of various descriptions of meats, had been miraculously converted into bunches of beautiful white jasmine flowers. The Jowair Rajah had the title of Patungshaw conferred upon him, and he was presented with dresses and seals of office, and sunnuds or commissions were granted to him, by which he was permitted to retain possession of twenty-two forts, and country yielding nine lacs of rupees of revenue. The Kolies mention that while Pauperah was in the employ of the Patell of Khirlay, a Naikwary sepoy from Akolla, who had been to Khirlay on duty, asked the Patell to allow his servant Pauperah to convey some things belonging to him to Akolla. During the heat of the day both lay down to rest themselves in the shade of a tree; the sepoy fell asleep, and when he awoke he observed Pauperah was sound asleep and a very large snake bending over him with his hood expanded. On seeing the sepoy move, the snake went off; when the Patell heard of this circumstance, he altered his conduct to his servant; he treated him much more kindly, and they ate their meals together; and when it suited him he told Pauperah if he was ever particularly fortunate in this world, and if the umbrella of royalty ever shaded his brow, he hoped he would, not forget his old friends. Eventually Rajah Mookny nominated the Patell Awary to the Patellship of the village of Mookny, and constituted him the chief manager of his domestic affairs, and his descendants are so now at Jowair.

Owing to a quarrel that took place between some members of the rajah's family about the year 1760, which led to a reference being made to the Paishwah at Poona, the Paishwah's government continued to interfere with the Jowair affairs until about 1766, when the rajah was deprived of the greater part of his country. At present he has only eighty three villages, and many of these very small. His income last year was estimated at ten thousand rupees; of this sum six thousand were realized by the customs (transit and excise duties) within his jurisdiction, and the rest was land revenue. Jowair is under the collector and magistrate of the Northern Konkan.

For a period of several generations the eldest of the family of the

Kheng clan, a member of the Wunnukphull Kool, held the Sir Naikship or chief rank among the Kolies, and was the principal authority under whom the members of the Goturany adjusted their civil and religious affairs. The Kolies speak of a very great innovation having been introduced in the mode of collecting the revenue of the Koly villages; that in some places their fields were minutely measured, and the value of each fixed, and many other matters investigated, all of which led to much oppression among them, and they resolved on resisting the establishment of the new system. There can be little doubt but that the Koly tradition here either alludes to the measures of reform that were introduced about 220 years ago throughout the kingdom of Ah-mudnuggur, by that able and celebrated financier Mullik Umber, or the financial system of the famous Todur Mull, which was established in several parts of the Dukhun by the emperor Shaw Jehan. The Koly Sir Naik Kheng and all of his clan, with many other influential Naiks, thought the time favourable to make an effort to throw off the Mahomedan yoke. We know much dissension reigned among the Mahomedans of the Dukhun at the above period, but the Kolies were dreadfully punished for their temerity. The Mussulmans were highly indignant and enraged at the Koly conspiracy, not only to resist and thwart the orders of their rulers, but to endeavour to establish their own independence, or to transfer their allegiance to a person of Hindoo origin. The insurrection took place during the reign of the emperor Shaw Jehan, and the Kolies may have wished to transfer their allegiance to young Sivajee. An army was marched into the hilly country, and the inhabitants slaughtered wherever the troops could overtake them. With the exception of one or two Kolies of the name of Kheng, who contrived to conceal themselves, the Sir Naik and his kinsmen of the Kheng clan were annihilated. All the hill forts were thoroughly repaired, and a large body of troops left to garrison each, for the purpose of controlling the Kolies more effectually, and with the view of making a more lasting impression on them; all of those that had been apprehended were executed, their heads heaped together, and a platform built over them at Joonere. The place known by the name of the Kalachubootra is said to be the identical spot. After the recollection of this disturbance had passed away, Loomajee Bhokkur, Naik of Peeplegown Mhur Korha, wished to get the people to elect him their Sir Naik; and he was also desirous to obtain the approval of the government authority for his assuming it. To secure the favour of the latter, he reported that the rebels in the fort of Koary had a singularly handsome horse of a noble breed in their possession, which he would try to capture for the emperor, provided he could be furnished with a supply of money from the royal treasury. A large sum was sent to the Koly Naik, Loomajee Bhokkur, who assem-

bled the Naiks of the fifty Mawils with their retainers, and all of them marched and invaded the fort. A year and upwards having elapsed, and there being no prospect of obtaining possession of the horse, the Kolies were told that they were such faithless and such an extravagant set of people, that they could not be depended on, and, unless they captured the fort in less than one month, a number of the Naicks and followers should be put to death in a very disgraceful manner. This threat frightened the Kolies; numbers of them fled to the jungles during the night, and only the Naicks of twenty-two Mawils and their followers remained with Bhokkur, who gave his people orders to prepare their ladders of the Maryelloo, remarking that, as a sentence of death was impending over them, they had much better try to capture the fort, and die in the attempt, than submit to be disgraced. Bhokkur and his confidential friend Bhoirjee Istah, disguising themselves as dhobies, sellers of firewood, ascended the fort, and succeeded in bribing one of the garrison to assist them. At the appointed time, this man drew up the ladder and secured it at the top, but when the Kolies reached the place where they were to begin to ascend by the ladder, they discovered it was four or five cubits short. Bhokkur now despaired of succeeding, but Istah cheered him on, and remarked that they both together measured much more in height than the extent of the vacant space. "We shall manage it between us; so you get up on my shoulders, and a third person can reach the ladder from off your back." They soon lengthened it, and seventy or eighty of them ascended the hill. They attacked and overpowered the guards, and were moving off with their prize, when an officer satisfied that to obtain possession of the horse was the cause of the fort being captured, fired and killed the beast on the spot. One of the Mahomedan princes being in the vicinity, expressed his great approbation of Bhokkur's daring spirit, and gave orders for his being brought to court, that he might be rewarded for his services. It is said that owing to an accident that had befallen Bhokkur, which had much disfigured his face, he was most anxious to avoid making his appearance at court; and that he dressed out a friend and despatched him, with directions to say, that he was Loomajee Bhokkur. The deception was detected and Loomajee was obliged to attend himself. When he was introduced to the prince, one of the attendants placed a shield on the Naik's head, and it was filled with as many gold mohurs as he could carry away with him. Loomajee had the title of munsudbar conferred upon him. Moreover it is stated that he built a large house at Joonere under which he had a subterraneous passage or cellar. Superstition and tradition united, maintain that all the riches Loomajee* secured at

* It is the general belief, that whoever attempted to descend into the cellar was destroyed. Some fifty years ago Dussajee Bhokkur (who was killed at Hursh) had a son

Koary and his present of gold mohurs were lodged in this underground vault, and that it remains there to the present time.

Shortly after the death of Rajah Shahoo, when the Mharratta power was in its plentitude, under the Paishwah Ballajee Bajeerow, the Poona government was anxious to obtain possession of all the hill forts in the Syhadry range. The Kolies of the Kotool and Rajoor Dangs were urged to capture the fort of Trimbeck; the clans of Kharay and Bhauggrah took the lead in this expedition, with the able assistance of the five brothers of the Puttykur family, who were all distinguished soldiers, noted for their great activity and gallantry, as well as their singular dexterity in climbing up rocky hills that were inaccessible to most men. They secured the friendship of the hereditary Kolies, the guardians of the approaches to the Trimbeck hill, and they bribed a servant belonging to the killadar; then, having sacrificed a sheep to secure the favour of the tutelary spirit of the hill, by means of their rope-ladders, five hundred of them ascended to the top of the rock, forming the scarp on the western side, and without being discovered they obtained possession of the summit of the fort; upon which they winded their horns for the information of the Moghul garrison. These were completely surprized; a few only attempted resistance; others ran about with grass in their mouths, entreating quarter; while others more frightened tried to lower themselves over the precipices, and such as were not killed were sadly mangled. Previous to approaching the fort, some of the Kolies, doubting the possibility of escalading the place, two of the Puttykurs volunteered to prove with what facility it could be done. They started and returned in a few hours with the killadar's silver hooka to convince the Kolies of the ease with which it might be seized. The Paishwah sent the Kolies forty-thousand rupees to defray their expenses. The eldest of the Puttykurs was presented with a palankeen, and Kheroojee Naik was presented with a palankeen, and the village of Barrah was conferred on him in enam (freehold) to support his dignity. Kheroojee's descendants continue to hold this village in enam under the British government; as the family are involved in debt and the Naik was a boy at the time, I suggested some years ago, that the village should be taken charge of by the collector, for the purpose of establishing the best measures to get rid of the claims against the young Naik, as he was surrounded by usurers and persons who plundered him.

whose name was Loomajee. After his father's death, and when he was about twelve years of age, it occurred to several of the friends of the family that it must have been intended that this boy Loomajee should succeed to his ancestor and namesake's treasures, and that, if he would exert himself to obtain the property by descending into the cellar, he would undoubtedly secure it. The poor boy was persuaded to try his luck by entering the vault, but he never returned to relate what he had encountered. There can be little doubt but the mephitic air destroyed him.

But to return to the subject of the hill forts. The Paishwah now expressed a wish to obtain possession of the forts of Kullurgur, Ruttungur, Allung and Koorung, which belonged to the Koly Rajah of Jowair. The same Naiks that captured Trimbeck commenced operations against Ruttungur. The Jowair Rajah and his family were at the time on this hill, but the Kolies being acquainted with one of the Mussulman jemadars of the fort, whose family was residing in one of their villages, they got him to fix the rope ladders* for them on the hill, and two hundred of them ascended to the top, but they had to fight a tough battle with the men composing the garrison, before the latter surrendered; including the loss on both sides, there were two hundred men killed and wounded. The Kolies got possession of the other forts also, and the Paishwah sent them thirty thousand rupees to pay their expenses, and Yeemajee Naik Bhauggrah, of Sakurwary was presented with a palankeen, and the village of Sakurwary was conferred in enam on him,—his descendants possess it now.

The circumstance of so many of the Koly inhabitants being either employed on the hill forts or to guard the approaches leading to them, gave the relatives of these people many opportunities of negotiating for the surrender of the forts to an enemy; for the Kolies acted frequently a very treacherous part on such emergencies. At the time of the struggle between the Mahrattas and the Mahomedans for supremacy in the Dukhun, and especially during the decline of power of the latter, and the factious and unsettled times of Raghoba Dada, it was not unusual to hear of the Kolies tendering possession of a hill fort for a bribe to a different party to that which had advanced them money to capture it, while the place continued in the hands of the Kolies; and, previous to their handing it over to the highest bidder, they carried off all the grain that was stored in the granaries.

In the year 1760, upon the occasion of the death of Heerojee Naik Baumlay of Bhoregur, one of the Koly Naiks, who retained the rank of munsabdar, which had been conferred upon one of his ancestors by the Mahomedan kings of Bedur, Jowjee Naik his son, then doing duty at Joonere, applied to the soobahdar of the province to get him nominated by the Paishwah to the situation vacated by his father, and to allow him to assume charge of the freehold lands and different emoluments that he had enjoyed. Jowjee Baumlay was of slight figure and about the middle size, with a fair complexion. He was very active and intelligent, and possessed a bold, restless and enterprising spirit; very ambitious; of irregular habits, and conniving frequently

* The ladders are made of the roots of the creepers *marr yellow* and *yeotah yellow*; these are twisted together, and at every cubit or so a piece of wood is fastened to be used as a step.

at his friends committing robberies in different parts of the country, while he was employed in the pay of government, before and after his father's death. I may add here an anecdote connected with the birth of Jowjee, as an instance of the superstition of the Hindoos, as they prognosticate much evil resulting from such and similar events.* It is stated that, when Jowjee was born, he came into the world reversed, or back uppermost. Such an event is reckoned not only unlucky for the infant, but likely to entail heavy misfortunes on his family. Therefore with the view of removing the evil consequence arising from such an occurrence, the customary offerings were presented to their household gods; and when the child was six months old he was taken to the banks of a river, where the roots of an oombré tree (*Ficus glomerata*) were much exposed from the water having washed away the earth. The infant was passed under one of these roots and then taken home. This ceremony is always performed on the anivass or last day of the lunar month. The fruit of this tree bears a great resemblance to the fig, and, as it is very prolific, the people draw a favourable omen from the circumstance, and hope the parents of the child may continue happy.

Jowjee Baumlay was not much liked by the people in authority at Joonere, especially by the family of the Sawunts, &c., and these persons pressed the soobahdar to reject Jowjee's claim; and, as he did not receive any reply to his petition, he felt much mortified and disgusted with the conduct of the soobahdar, and consequently quitted the place, and retired to his village, with the determination of busying himself with agricultural pursuits. But, after a lapse of a few years, his farming speculations proved unsuccessful, chiefly owing to his improvident habits; he consequently had no wish to discharge his dues to government. The Patell was aware of Jowjee's declaration of his inability to pay the rent of his farm; and, when the collector's sepoy came for it, the Patell told him he could not get Baumlay to send his share, and he had therefore better demand it himself. The Patell sent the village beadle along with the sepoy to Baumlay's house. The sepoy told him that, unless he paid his rent, he would be obliged to take him to Joonere. Jowjee managed to satisfy the sepoy, but he could not refrain from expressing his indignation and rage at the Patell's conduct in having sent a mes-

* A person that has come into the world feet foremost, is considered to be very unlucky, and in imminent danger of losing his life by lightning, and in consequence shows great symptoms of alarm during a thunder storm. Rings, made of the metal of old guns and of nails used in fastening the timbers of boats, are supposed to possess some counteracting influence, and are worn by such persons on their arms above the elbow joint, and on their toes. The Mahomedans in India, as well as the Hindoos, have a firm belief in such things. The Kolies throw their iron crow-bar outside the door of the house during a thunder storm, to prevent the house being struck by the lightning.

sage by the village dhore to him; and at the sepoys having so unceremoniously threatened him. When the Patell heard of Jowjee's saying "that the Patell had insulted him," and a few days afterwards that he had quitted his house and proceeded to the jungles, he got seriously alarmed, dreading much that Jowjee would be revenged on him. He consequently proceeded to Jeonere, and communicated all that had occurred to the soobahdar. It was very well known that the numerous robberies, committed in different parts of the country at this period, were chiefly perpetrated by Jowjee Naik's partisans, and the soobahdar, fearing a serious disturbance if Baumlay was allowed to remain in the jungles, deputed three Naiks for the purpose of explaining matters to him, and to prevail on him to return to his duty at Joonere. He was reluctantly persuaded to adopt their advice, and to accompany them. Jowjee was much thwarted in his expectations at Jeonere, and became greatly discontented. A year had scarcely elapsed when the Sawunts, Sindhys, &c. communicated privately to the soobahdar their opinion of Baumlay, stating that he was an unsettled, intriguing and dangerous person, and that his dependants committed all the robberies that took place; and the only effectual mode of checking such irregularities, would be to destroy the root of the evil, and this could be executed in no other way than by imprisoning Jowjee Baumlay, and making an example of him. If instead of this they advanced him in the service and invested him with the title of munsubdar and conferred lands on him in freehold, that he would be rendered all-powerful, and the result would be that he would not rest, till he succeeded in destroying all those who discharged their duty with fidelity to government, and opposed his advancement. The soobahdar, perplexed and undetermined as to the measures to be pursued towards such a very untractable and insubordinate character, was waited on by four staunch friends (one of them a Brahmun) of Jowjee's, who had become acquainted with the advice his enemies had been instilling into the soobahdar's ears. These men pledged themselves in the most solemn manner as securities for his good behaviour, entreating that his life might not be endangered on account of the false accusations of his jealous enemies.

About this time two of the soobahdar's officers (Brahmun) were preparing to proceed to join the Paishwah's army in the Konkan, when they were waited on by a Brahmun who had a great antipathy to Jowjee and had been plotting his destruction; he informed these two men in confidence what his plans were, and requested them to communicate them to the Beenywalla, or quarter master general of the Mahratta army, who would finally arrange matters; he further mentioned that he intended to follow in a few days, and that he would contrive to bring Baumlay with him. It so happened one day that when one of the Joonere officers was settling, with the Beenywalla (also a Brahmun),

the manner in which it would be most advisable to dispose of Baumlay, one of Jowjee's emissaries overheard the consultation, and immediately proceeded with all speed to communicate to him the danger impending over him, and convinced him that their object was to deceive him, when they pressed him to join the army with his Kolies, as they would greatly aid in recapturing some of their forts; but that their real intentions were for his destruction, as they had determined to persuade him and his Kolies that their services would be required in the attack of the Seeddie of Junjeera; and, under this pretext, they were to embark Jowjee and his friends, and when the vessel was out some distance at sea they were to sink her. The instant Jowjee learnt the particulars of this plot against his life, he fled again to the jungles (Raanburry), being satisfied that, if he continued longer at Joonere, he would be assassinated. Therefore to protect himself against the attacks of his enemies, and to force the government to comply with his wishes, he began to assemble his followers for the purpose of levying contributions from the inhabitants and to plunder travellers, &c. When the Joonere soobahdar heard this, he lost no time in detaching a party of Sibundees to seize his family, which they succeeded in doing, and brought them to Joonere, where they were placed in confinement. The troops in pursuit of Jowjee pressed him closely, and rather than exasperate the soobahdar too much, and thinking it might be of service to his family were he to remain quiet for some time, he quitted the district and went to Candeish. When a considerable length of time had elapsed, he determined to send some of his kinsmen to the Joonere jungles, to gain some intelligence of his family; accordingly seven Kolies set out secretly for their homes to pick up information for their Naik, and learn something regarding their own families. In this party there were two brothers of Jowjee, Dadajee and Soorajee Baumlay, also a cousin. The seven friends had arrived within a few koss of Joonere, when they unluckily encountered Rowjee Sawunt, who had been employed with a detachment to capture Jowjee Baumlay, and was consequently moving about the country at the time. Sawunt seized the seven Kolies, and sent them prisoners to Joonere. The people in authority, wishing to separate the brothers, Soorajee Baumlay was imprisoned in Herst, and Dadajee, and the other five Kolies, in the fort of Chaound. When Jowjee was informed of his friends having been seized and thrown into prison, he immediately advanced to the banks of the Moull river in the Kotool district, where he remained concealed; but exerted his best endeavours to rouse his friends to use their influence to obtain the release of his family, and those that had been seized by Sawunt. As Jowjee was persecuted by the Sawunt family, he watched every opportunity of striking a blow at either of the brothers, for he had latterly discovered that the Sawunts were urging the soobahdar to put

his own brothers, who were confined in the hill forts, to death; otherwise that they would contrive to effect their escape. The soobahdar at length gave his consent to the Koly prisoners being tied up in leather bags and thrown over the most precipitous part of the hill; the order was punctually carried into execution, except in the case of Soorajee Baumlay and his cousin, both of whom stated to those appointed to superintend their execution, that they were soldiers, and solicited, with the most earnest importunity, that they might not be tied up in leather bags. They asked that swords might be presented to each of them, and that, after they had excited themselves some time by fencing, they would leap over the precipice of their own accord. The demand could not, they were told, be complied with, as it was uncertain what persons placed in such desperate circumstances as they were, would be tempted to do, were they armed with swords. However they were supplied with two sticks, and the poor fellows amused themselves playing at single stick until their blood became heated, and the one sprung down the tremendous precipice after the other and were dashed to pieces. This was most distressing intelligence for Jowjee, and it was some time before he recovered from the grief and melancholy which overwhelmed him. His great friends Dewjee Bhauggrah and Dharrow Sablah consoled him with the hope of their getting his family restored. They accordingly went to Joonere, and became securities for Jowjee's family, and had them set at liberty; both of these Koly Naiks engaged to prevail on Jowjee to return to his duty at Joonere, but, owing to the impatience of the authorities there, and Jowjee's being much exasperated and having no confidence in their faith, there was little prospect of his remaining quiet. It was discovered that Jowjee was in the habit of frequently visiting Dewjee Bhauggrah, and the Joonere people sent a party of horsemen to watch his movements, and if possible to capture him, but the horsemen failed in their attempt, seized Bhauggrah and took him a prisoner to Joonere. Jowjee was now on the alert again, and having assembled some of his followers, moved in the direction of Kullumbaie, where he learnt that one of the Sawunts had erected a small wooden building on the boundary between Pakry and Kullumbaie, where he was occupied with a celebrated Goossyne in rendering himself invulnerable to the infliction of wounds by means of incantations. Jowjee was determined to avail himself of the circumstance, and instantly repaired to the spot, and attacked Sawunt and the Goossyne and put them both to death. Rajah Sawunt more enraged than ever with Baumlay, when he heard of his brother's death, went immediately to Poona, and represented at court the disturbed state of the Joonere district, and declared that there would be no peace while Jowjee Baumlay remained at large. This induced the Poona government to place between five and six hundred men at Rajah Sawunt's disposal, for the purpose of

apprehending Baumlay. When Rajah Sawunt reached Joonere and commenced operations against Jowjee, the latter retired to some distance, and he then informed his followers that the most prudent plan would be for them to disperse while Sawunt could employ so many men in pursuit of them. They consequently separated for the time, and Jowjee retained twelve of his most active, tried, and confidential friends with him. With these he secretly resolved on striking a deadly blow at Rajah Sawunt. He got his friends and emissaries to spread such reports through the country as suited his purpose. One day it was rumoured he had been seen with a large body of followers; another day that he had gone to a distance to escape the enmity of the Sawunt; and, on another occasion, it was said that Jowjee's spirit was broken, and that he was going about asking for protection from any friend that would grant him an asylum. Rajah Sawunt divided his force into several detachments, and they frequently scoured the jungles that were Jowjee's usual haunts. On these occasions they adopted for some time every customary precaution to prevent surprise at night. Rajah Sawunt was encamped on the Ombygown Puthar, and by all accounts his sentries were very vigilant; notwithstanding this, Jowjee had the ground reconnoitred, and ascertained the spot Sawunt occupied, and at midnight he advanced to the place where he slept and instantly secured him. The troops were panic-struck and hid themselves among the bushes and in ravines. Although Rajah Sawunt had no reason to hope for pity or sympathy from his enemy, yet the spirit of parental love roused him in his distressed situation to beg and implore of him to spare his son's life, as he was a boy only twelve years old. The terrified lad had concealed himself in a bush, but Jowjee spared the life of neither. Both were put to death, with several of Sawunt's men who came in the dark to his assistance. The first intimation Sawunt's family had of this distressing adventure, was the following day, by the arrival of Rajah Sawunt's fine grey mare, which came galloping home covered with blood and without her tail. Baumlay, much delighted with his success, retreated to the fastnesses of the Hurrychunder hill fort. This exploit raised him much in the estimation of the Kolies.

After Rajah Sawunt was killed, his eldest son went to Poona to urge government to carry on more vigorous measures for the apprehension of Jowjee Baumlay, and to suppress the disturbances among the Kolies. To prove how desirous the court at Poona was to punish the rebels, young Sawunt had the rank of soobahdar conferred on him, and he was placed in charge of the Joonere district. He proceeded with reinforcements to take charge of his office, but the accounts of his sudden elevation excited the envy of some of his kinsmen. One of his cousins could not control himself on the occasion, and preferred joining Baumlay to acting a subordinate part under his relative. This man com-

municated the state of affairs to Jowjee, and mentioned that Sawunt had arrived at Joonere, but, as the day was not propitious for him to return to his own house, he was putting up with a friend. Jowjee, always on the *qui vive*, repaired in the evening with seven of his men to the vicinity of the house, occupied by Sawunt. They saw him looking on at a procession that was passing near him; they watched a convenient moment, rushed upon him and killed him.

Some time previous to this, he met a man who was in the confidence of Raghobah Dada; Jowjee persuaded him to represent to Raghobah Dada that he could be of great service to his interests among the hills, if His Highness would only issue his orders to him.

About this time Nana Phurnavees was very anxious to get Jowjee Baumlay apprehended; he sent for the mokassdar of Joonere, Dadjee Kokata, and explained his wishes to him, adding that, as he was one of the pensioners of government, it was a part of his duty to aid in preserving peace in the country. Dadjee expressed his readiness to afford such assistance as he could, but said that, to enable him to succeed against such an enterprising and influential person as Baumlay, the government must furnish him with two orders. The first must be to call on him to exert his influence with his Koly kinsmen to restore order in the country, and authorising him to offer any of the discontented Naiks to get their affairs adjusted at Poona, and that he had sufficient interest to obtain service for them, provided their claims should appear satisfactory. The second was an order, authorising him to destroy Jowjee Baumlay if he could in any way contrive to entrap him. Kokata was furnished with the necessary documents to assist him in executing the villanous plot he had in contemplation. A few days afterwards Kokata and his three sons accidentally encountered Jowjee Baumlay with a few followers in the jungle of Muddossy in the Ghorenahir; it occurred to Kokata to try to gain Jowjee's confidence, and he accordingly joined him; both he and his sons talked in a grumbling disaffected manner to Baumlay's people, and seemed to sympathise with them, regretting that none of Jowjee's friends had shown more zeal in his behalf in petitioning government to investigate the subject of his grievances. When they had been sitting some time conversing together, Baumlay proposed going to the river to bathe. Kokata took off his clothes and hung his *jholna* (bag used by natives for keeping beetle, &c.) on the branch of a tree, as there were no persons near the spot but some of Baumlay's men. One of these from curiosity peeped into the *jholna*, in which he saw some papers having the impression of the government seal; he took one of them out, and as Jowjee's man of business, a Mahratta, besides his cousin Black Baumlay, were near, they read the paper and discovered that it was the order authorising Kokata to put Baumlay to death. They replaced the paper

in the bag, and availed themselves of the first opportunity of communicating to Jowjee the very fortunate discovery they had made. Jowjee, in his usual firm and decided manner said, "very well, this information confirms me in the suspicion I had of these villains. We shall easily forestall them by treating them in the manner they intended to treat us." When they were asleep at night the father and three sons were put to death.

When a few weeks had elapsed Raghobah Dada sent Jowjee Baumlay letters, desiring him to capture the hill forts, and prove his zeal and capability of serving the sarkar. Jowjee had for a long time been ambitious of carrying on operations on an extended scale, but he wanted to be patronised by some person in authority to justify the Kolies in joining him. Raghobah Dada's orders were therefore hailed with joy by these people. We have the names of twenty-one Naiks who joined Jowjee with their adherents. They lost no time in descending into the Konkan, and captured the hill fort of Sidghur. The commandant of the fort had a fine gold bangle, which Jowjee deprived him of and placed on his own wrist. The fort of Bhyregthur was attacked and captured in a few days, and the fort of Kotla was also soon mastered by Jowjee; just as Kotla had surrendered, a detachment from Joonere descended the ghauts to raise the siege. Jowjee with his usual activity advanced on this detachment, attacked and put it almost immediately to flight. He had captured the fort of Gorekba, when he was informed by one of his staunch friends that Dewjee Sawunt had engaged eight Berdurs (men who resemble the Ramoossies) to put him to death, that he made a promise of rewarding these men handsomely if they accomplished the object for which they were engaged, and, to excite their cupidity, and as an earnest of his intentions, he presented each of them with an ornamental gold ring. Jowjee's vigilance, and the zeal and fidelity of his followers, prevented the assassins succeeding in their attempt on his life.

Jowjee having been so very successful below in the Konkan, determined on trying what he could effect above the ghauts. He surrounded the fort of Ruttunghur, and, having threatened the havildar Govindrow Khary, he offered him, through a friend, six thousand rupees, if he would surrender the place—the garrison got alarmed and the gates were opened for Jowjee's men. Allung was captured and Muddungur surrendered. Nana Phurnavees, who was supreme at Poona, vowed vengeance against Baumlay, and declared he would have him blown from a gun the instant he was caught. A detachment from Poona arrived to retake the forts; Jowjee was in the Konkan at the time, but ascended the ghauts and commenced skirmishing with the Poona detachment which suffered some loss. Another detachment advanced from the Konkan, commanded by Ghorebollay, and Jowjee skirmished

with it while advancing. As Jowjee was now getting surrounded by the government troops, he informed Dada Saheb (Raghobah) that he had captured a number of the forts, but, as the Poona government had sent troops to retake them, he hoped he would receive some orders and assistance from him; all he received were letters from Dada Saheb, extolling his services and exhorting him to continue active and zealous in this cause. He sent a few things to present to those who had been most active and useful in assisting him; he added that the English had abandoned their original plans, but he did not mind this; and finished by telling Jowjee not to despair. As Jowjee had greatly excited Nana Phurnavees' wrath against him on account of his having favoured Raghobah's cause, he was now anxious to secure the friendship of some persons of rank and influence to protect him from the minister's vengeance. Jowjee was on this account more desirous of holding the forts, until he could obtain safe and secure terms for himself and his followers. He sent two of his friends to Dhondoo Mhadeo, the agent of the soobahdar of Nassik, who was his most intimate friend, to ask his advice and assistance, and Bhauggrah the Patell of Mullarpoor, a great friend of his, was applied to on this occasion, as Bhauggrah was a horseman in Tookajee Holkur's army, and a favourite of Holkur. In the mean time Ghorebollay was exerting himself to seize Baumlay and capture the forts. On one occasion Jowjee was seen ascending the Ruttunghur fort, and Ghorebollay ordered all his men to advance round the hill to stop all communication with the fort, and to prevent any person escaping. Some time after it became dark, Jowjee descended the hill by himself, and, notwithstanding every precaution that had been taken, he proceeded to join some of his friends on an adjoining hill; and Ghorebollay, to his great astonishment, heard two days afterwards that Jowjee had gone off to the northward, levying contributions, and plundering and burning the villages that refused him supplies. Ghorebollay was in the habit of severely chastising the Kolies, for not showing greater zeal and activity in aiding the troops, and not making known to him where Jowjee and his rebels were in the habit of concealing themselves. When Jowjee and his followers were moving along the summits of a high range of hills at some distance, the people occasionally ventured to point them out to the troops. It appeared doubtful whether Ghorebollay would succeed in recovering the hill forts, or in capturing Jowjee Baumlay, government gave their assent to settling the Koly disturbance by negotiating with Baumlay for the surrender of the forts. Dhondoo Mhadeo sent a confidential message to Jowjee, recommending him to continue quiet, and if possible to join Tookajee Holkur's army, and in the meantime he would not forget his interests; that he must surrender the forts to him and that this would enable him to obtain favourable terms hereafter, but that he

durst not mention the home of Baumlay to Nana Phurnavees at present, as he seemed fully resolved on punishing all the rebels but particularly himself. Jowjee made up his mind to follow Dhondoo Mhadeo's advice; he joined Holkur, who readily promised to speak to Nana Phurnavees in his behalf, which he did, and suggested that Jowjee should be directed to assemble a body of Kolies and join the army before the fort of Logbur. The Kolies joined the army, and Jowjee was called upon to exert himself now in the cause of government; he had some capital rocket men, and he advanced one of these to a favourable position, and pointed out to him the direction in which he was to fire his rocket. Most fortunately one of the rockets fell among some powder, near the door of the magazine on the hill, which caused an awful explosion, and obliged the garrison to surrender. Jowjee was so delighted with the rocket man's conduct, that he took his bangle off his own wrist and placed it on the others.

Holkur, it is supposed, had been in the habit of secretly providing Baumlay with ammunition and stores, to give him a better opportunity of annoying the government; this was to serve his own aims at the time. When Holkur quitted Poona for Hindoostan, Jowjee accompanied him to Chandoor, where he remained till Dhondoo Mhadeo had obtained an act of oblivion for him from Nana Phurnavees. It was represented to government that the best policy it could adopt, would be to conciliate Jowjee and retain him in the interest of government, by giving him a permanent appointment; that it seemed a most desirable and important measure to preserve order in the hilly country, and, as no one seemed better calculated for controlling the Koly Naiks in the Rajoor districts than Jowjee Baumlay, it was ultimately determined that a new soobah should be established at Rajoor, under the designation of the Rajoor soobah; the forty villages of that district, twenty-two of Malldesh, and in the Konkan sixty villages of the Sakoorly district, twelve of the Baryajnoop, and sixteen of the Jurry Seroosy districts, constituted the new soobah. The soobahdar was to collect the revenue and pay the men employed in the hill forts, as well as the other police of the district. The revenue of the soobah was not always sufficient to cover the expenditure; four or five thousand rupees were almost annually drawn from the pergunnaahs of Sinneer or Sungumnair. The soobahdar in his magisterial character had only authority to punish Kolies guilty of theft and gang robberies; but this was equivalent to the power of life and death, as the punishment inflicted was chopping off their feet or hands, and in consequence they frequently bled to death, their friends being afraid to approach, until it was too late, to afford them necessary assistance. Persons who had committed capital crimes were kept in confinement, until orders regarding the disposal of them

were received from Poona; the usual punishment for such men was to blow them from a gun.

Jowjee Baumlay was nominated Naik munsabdar of the Rajoor soobah, and sixty men placed immediately under him; a portion of these had the rank of Naiks, the rest were sepoy. They did twelve month's duty for eleven month's pay; they received one or two rupees advance of pay every month, and their account was settled every six months, or once a year; one month's pay was deducted on account of durbar khureh or court expense. Jowjee had the village of Takced, in Malldesh, worth eight hundred and fifty rupees annually, conferred on him in Jahaageer, and he received additional pay yearly five hundred rupees; in all 1350 rupees from government, besides which he was presented with a bhett rupee from each village in the soobah, and also received some ghee and a small quantity of grain; when he moved about the district on duty, each village was obliged to furnish him and his followers with provisions.

Bhauggrah of Sukkurwary and Khoray of Barray, with their quota, were placed under Jowjee Baumlay's superintendence. The pay of the different grades of this police establishment was fixed and paid at the above period; it had not been altered for upwards of forty years; a few years after the British took possession of the country a very considerable reduction was made in the pay of each quota; this led to much discontent among the local Koly police, but they were restrained from showing openly their dissatisfaction, from the large number of Sibundeas stationed as police guards over the country; this will be partly alluded to hereafter. It will suffice here to state, that Jowjee was drowned when crossing the Mool river near Kotool. It is said he was not very sober at the time, and it is supposed that Istah, one of the Koly Naiks, led him to a deep part of the river and then shoved him forward, when Jowjee fell off the rock into the pool, and, when he was struggling in the water, Istah, who had a dislike to him, took advantage of the circumstance, and struck him a blow on the head, which made him sink immediately; this was in July 1789. At the time Jowjee was drowned, he was proceeding to Poona, with one of the Ranees from Jowair, whose cause he had espoused, and he entertained hopes of getting her affairs favourably settled and forwarding his own views at the same time. Jowjee was succeeded by his son Heerojee Naik.

In the year 1776 several of the Silkunda Kolies, of the village of Ootoor, had a quarrel with the Patell respecting their right to some ground in the village; and, as the Patell and district authorities refused to do them justice, they assembled a large party of their friends and others and commenced plundering the surrounding villages, and pursuing other violent measures, in the hope of obtaining redress. Troops from Poona were employed in pursuit of them, and by some lucky chance

(through the management of the widow Rukmabair of Chass) these surprised the Kolies and killed and wounded many of them. The Koly leaders were consequently forced to disperse their followers. The government officers, having learnt that Suttoo Silkunda and Kokata, the two chiefs of the insurgents, were wandering about the jungles by themselves, made the villagers of the Ambygown district promise to capture the robbers. The better to ensure this, they obliged them to enter into the Sunkly zammecny, or chain security, (one Patell going security for two or three cultivators, another respectable Patell for five or six poorer Patells, and a Desmook for a number of the Patells, &c). Silkunda and Kokata, hearing of the measures the government officers were adopting, moved off to another quarter; this was partly for their own safety, and partly to save their friends from being harassed and punished for not fulfilling their promise of apprehending them. After the troops retired from the jungles, the Kolies recommenced their operations. Several seasons were passed in this way; however when Jowjee Baumlay was settled at Rajoor he was ordered by government to prepare to proceed in pursuit of the rebels. These did not wish to come to blows with Baumlay, and it appeared to be a more prudent and politic plan to enter into some terms of accommodation with those in power, and they effected this through the aid of a Brahmun acquaintance. Circumstances compelled these Kolies to remain quiet for upwards of four years, when Santtoo Silkunda repaired again to the jungles, in consequence of the dispute about his hereditary rights not having been adjusted.* The troops employed against the Silkunda gang this time, soon forced them to disperse, and the chiefs were induced to go in the direction of Aurungabad. They had taken an oath that they would cut off the Patell of Ootoor's head, unless government afforded them redress. Nana Phurnavees was resolved on making a severe example of these Kolies. He declared that he would not pardon them again, as they were such a treacherous race and as no faith could be reposed in them. At length one of their friends consented to be-

* In adjusting boundary disputes between the Kolies during the Mahomedan supremacy, they were in the habit of making the Kolies swear on the Koran. There are some documents several hundred years old, detailing the adjustment of boundary disputes, by which some idea may be formed of the Patellships that have been sold, otherwise transferred, or become extinct, &c.

No subject of quarrel is more necessary to be attended to by us than the settlement of boundary disputes and hereditary claims to dues; more especially when such occur in a hilly or jungly district. No pains ought to be spared on such occasions to ascertain the original cause of the quarrel, and all the merits of the case. The greater the number of the most respectable Patells and other persons associated in the investigation, the greater is the prospect of the disputants being satisfied with the decision, and, in the event of one of the parties being discontented, there is less chance of his adopting violent measures to gratify his revenge, aware that such a large portion of the most influential number of the community would be opposed to his wild scheme.

tray them; this man detached a few Kolies disguised as Goossynes, who gained information respecting the place of their retreat, and a detachment that marched to apprehend them was so fortunate as to bring them all prisoners to Joonere, where the five Silkundas were executed. Bulwuntrow Beriah, brother-in-law to Nana Phurnavees, was soobahdar of the district at the time, and it is asserted Beriah became very unhappy after the execution of these men; that either from remorse or some other cause he had no peace of mind. Therefore in the hope of re-establishing the tranquillity and happiness that he had enjoyed, and of which he had been latterly deprived, he erected a temple on the banks of the river near Joonere, in which was placed as the object of worship a Punah Lingh, or five stones representing the five Silkunda Kolies who had been executed under his instructions, expecting that the sacrifices and prayers that might be offered at the shrine would tend to render him happier.

At the above period there was one of the females of the Silkunda family of Ootoor (Taie Silkunda) a clever, bold, and enterprising woman* who had her name enrolled as one of the police sepoy of Joonere. She never avoided her tour of duty, and when she appeared in public, she always had her bow and arrow in her hand, and a couple of well filled quivers strapped cross-wise on her back.

The circumstance of seeing the son of Jowjee Baumlay settled comfortably at Rajoor, led to some discontent and jealousy among the Koly Naiks of the district. The family of the Bhangra Patell of Deogowne near Rajoor at the above period (the end of the year 1798), consisted of three brothers, Govindjee, Myajee and Walloojee; they were all bold, active, and enterprising men, especially Walloojee. They availed themselves of the general feeling to assemble some Kolies, and

* In 1831 at the time I was engaged superintending the operations carried on for suppressing the insurrection of the Ramoossies in the Poona collectorate. The civil authority of the district granted passports to various persons who expressed an anxiety to obtain leave to go in pursuit of the notorious Oomiah, in the hope of being able to capture him and to secure the reward tendered for his apprehension. One of the most noted of these was a widow named Luchmy Ghanthighy; she was a tall, stout woman, with coarse features marked with the small pox, and of a daring and enterprising spirit. At the above period she left Poona with a detachment of Sibundees or irregular sepoy, armed with matchlock guns, and accompanied by a Brahmun accountant or man of business. Luchmy having discarded her sarby, attired herself in a pair of trowsers, an angrika (a long jacket) and a waistband and turban. Like a native chieftain or soldier she had a sword stuck in her waistband, and her shield fastened on her back. Thus accoutred she led her heroes forth and lost little or no time in commencing operations, conformably to the good old Mahratta system of accusing and then extorting fines from suspected persons, and such as were said to favour the Ramoossy insurgents. Those who were thus oppressed by her fled to me at Sassoor to entreat for protection; Luchmy, uncertain what these complaints might lead to, repaired with her followers to Sassoor, and, by way of excusing herself, said she could not control the persons that had engaged to serve her, and who, it seemed, had unjustly levied some money from the villagers.

commenced plundering in the Konkan. At the termination of a few months Govindjee Naik was seized and confined in the hill fort of Koorang; Myajee fled to a distance and shortly afterwards died, and his son Ramjee remained with the uncle Walloojee for the two seasons that he continued his marauding system. Govindjee was executed, and it was hoped this would have sufficiently intimidated Walloojee, and forced him to abandon his predatory schemes; but it had an opposite effect. Walloojee became outrageous, and increased his gang to upwards of a thousand men; with these he used to march into the Konkan, drums beating and flags flying. The inhabitants of the low country were always panic-struck when they heard that the Kolies were descending to ravage their homes. Walloojee was in the habit of dividing his gang into three or four parties, and little or no resistance was offered to his men, except those villages in which troops were stationed. On a named day they re-assembled at a particular place in the ghauts; divided the plundered property, and retired with all rapidity and secrecy to their homes. Walloojee kept a few active and trust-worthy men with himself, while he remained in retirement near Inchore; for the Jahageerdar of that place, greatly befriended him. However the Koly munsudbar, Heeroojee Naik, at length succeeded in capturing him, and, after some difficulty, brought him to Rajoor, where he was blown from a gun.

Shortly after the death of Jowjee Baumlay, the inhabitants of two villages in the Kotool district had a quarrel about the division of the land of a deserted village, and the appropriation of the offerings made at the shrine of the idol of the deserted place. This led ultimately to the Bheels in the neighbouring hills being called in by one of the parties; however, as some Bheels had about the year 1800 plundered some travellers, the circumstance brought on a skirmish between the Koly watchmen of Ootoor and the Bheels, in which the latter had one of their Naiks killed; the following season the Bheels* assembled in force and plundered the koly habitations around Joonere, Ootoor and Kotool. A large body of Sibundees was sent in pursuit of them, under one of the Koly Naiks, who punished them

* The Bheels put in a claim about six years ago for the kulkwardship of the Kotool district, which was of course rejected, and the hereditary Koly watchmen were re-appointed. The Bheels for many years past have been gradually encroaching and usurping from the Ramoossies and the Kolies the office of village watchmen. It would seem good policy to prevent the advance of the Bheels to the hilly country. The residence of those at present settled in the Ahmudnuggur district is confined to the open country, and as they are a more hardy and robust people than the Kolies, and partake of all kinds of animal food, were they to secure a residence in the hilly country, the probability is, that it would be a more difficult matter to quell a disturbance among them than among the Kolies.

severely, and forced them to ask Heeroojee Baumlay, the Koly munsudbar, to afford them an asylum, tendering him an offering at the same time of four thousand rupees; but the government agent directed Heeroojee to attack the Bheels with his Kolies, and that he should be re-enforced by some of the men of the hill forts. The Bhauggrah Naik of Sakurwary determined to degrade or destroy Heeroojee, thinking the opportunity favourable for getting rid of him, as the Bheels were encamped only a short distance from Sakurwary. Bhauggrah prepared a feast for Baumlay, and made him partake copiously of the spirits sent round, and by talking of the exploits of their fathers, Baumlay became excited and was induced to march at night to surprise the Bheels. Bhauggrah sent to warn the Bheels of the munsudbar's approach, and he employed various means of dispersing Baumlay's force, so that at dawn there were only a few men with the munsudbar; they were all killed or wounded; Heeroojee himself fell under fourteen wounds. The Bheels restored him after his friends agreed to pay several thousand rupees as a ransom for him. The Bheels now established thannas at Kotool, Akolla and Sungunnair, as the wealth of the village of Kotool, &c. had been placed in the fort of Koonjurgur. The havildar of the fort named Sawunt wished to secure it to himself; and had, as he thought, planned a scheme that would satisfy every person, that the property had been seized and plundered by the Bheels. To serve his purpose a few of the Bheels were admitted into the fort, but these fellows outwitted Sawunt, for they instantly put him to death, and carried the valuables off with them. Troops from Poona and the Konkan, &c. were marched into the hilly country, against the Bheels, who were, after a few skirmishes, obliged to disperse in all directions; after which, offers of pardon were held out to them, and, shameful to say, the government took advantage of these treacherous means and put hundreds and hundreds of the Bheels, their women and children to death by massacring them in cold blood, and throwing them in deep wells, &c.

When Walloojee Naik was executed, his nephew Ramjee Bhauggrah fled into the Konkan, and took refuge with a maternal uncle then employed at Kullian; but this man also turned a great robber, and was pursued, seized and executed, and young Ramjee ascended the ghauts and joined the Bheel insurgents. He acted a conspicuous part in all their subsequent measures; and as he continued turbulent and very troublesome, long after the Bheel disturbance was suppressed, the government officers thought it would be good policy to engage him in the interest of the state, and as he was now Patell of his village, and had become a formidable person among the Kolies, he was placed in charge of the police of a district in the Konkan, under the impression that he could check the inroads of his Koly kinsmen above the ghauts into the

villages of the tract he had charge of. Bhauggrah proved himself a very able police officer. Some time after the Konkan was transferred by treaty to the British government, Bhauggrah waited upon the collector. This gentleman employed the Koly as a peon but subsequently advanced him to the situation of jemadar of police in one of the purgunahs near the ghauts. The Koly jemadar received a bhaut rupee and a fowl annually from every village within his range. Some of them presented him with a little rice, and he was entitled to a sheep from every flock that passed through his district to the coast. A few years had only elapsed after the cession of the country, when our government issued orders prohibiting persons in the service of government receiving any presents or perquisites of office beyond their fixed salary. Unfortunately in many instances these orders interfered much in abrogating the long established usages of the country; the abolition of which if deemed necessary it would be advisable to effect in a more gradual manner. In fact the order was a distressing blow to many a man, for they considered their dignity and consequence not only seriously affected by their not being permitted to accept of that mark of respect which their predecessors and ancestors had always received, but their income was most materially affected by the prohibitory mandate. I recollect having some years ago estimated Ramjee Bhauggrah's loss on the above occasion at nearly two hundred rupees annually. The jemadar presented several petitions to the constituted authorities, begging that he might be allowed to retain the perquisites that had been withheld, as it has always been the custom of the country for persons employed as he was to receive such dues. Unluckily for him he appealed in vain, and being rather disgusted and mortified with the treatment he experienced, he asked for his discharge. There appeared to be very great objections to giving him leave to retire from the service, for he possessed great local knowledge, and was a most active and useful police officer. Six months leave of absence was very reluctantly granted to him, and he proceeded to his village; however he had no intention of returning to his duty, unless his pay was increased, or permission given to him to receive the perquisites that had been withheld. It was soon discovered that Bhauggrah's services could not conveniently be dispensed with; and a peon brought him a letter from the magistrate calling on him to return to his duty. He proceeded to the Konkan full of hope that his salary would be increased, or that he would be allowed to resume his dues; but after a lapse of many months he received no satisfactory answer to his petition. Bhauggrah became now extremely discontented, and was ready for any mischief. The better to understand subsequent events I must refer to the arrangement of affairs in the hilly country in the year 1818. In March of that year, the Koly Naiks and their followers, forming the

police of the Rajoor district, were taken into the British pay, but the Koly Naik Govindrow Khary, the hereditary havildar of the hill fort of Ruttungur, a very old man, declined entering into the British service, under the pretext that he was old and superannuated; though it is well known that he refused the offer of employment under the impression that the Peshwah's government would be soon re-established. The havildar had twelve of his kinsmen (sons, brothers and nephews) employed as sepoy's under him on the fort, receiving pay from government, besides various perquisites from about sixty villages presented annually. The aggregate of their yearly pecuniary allowance was 1,230 rupees; in this sum was included the revenue of the small village of Bhandurdurra, amounting to 250 rupees annually, of which place the Kharies were the hereditary tenants. Most unluckily for these poor people, the havildar's refusal of service plunged them all into great and unexpected difficulties; as they no longer received any pay, and the revenue of the village was resumed by the British authorities. The Kharies were sadly mortified, and continued in utter despair. In the course of the following year they became more embarrassed in their pecuniary affairs, as the Rajoor Koolkurnies discovered that they (the Kharies) had been plotting, and some of them were disposed to join Narrain Row Holkur's gang, who were at the time (October 1819) plundering in the Nassik district. The rapacious and overbearing Koolkurnies extorted the sum of three hundred rupees from the Kharies on this occasion, and it is worthy of notice that the last instalment of the money was not paid until March 1828. In various parts of the country there were many persons suffering much distress and inconvenience from having lost their employment in the hill forts: however, the large establishment of regular but more especially of irregular troops in the pay of government, overawed the discontented and kept them in a state of subjection. Yet, as the troops decreased in number, the conduct of many of the unemployed and displaced soldiery, and that of the predatory classes, became more conspicuous and more daring. For a series of years the persevering exertions and enterprising spirit of the Poona Ramoossies were closely and most anxiously watched by all those people, and as the efforts of the Ramoossies were ultimately crowned with considerable success, notwithstanding they were guilty of the most atrocious and violent measures during the years 1825-26, and 27, all their crimes were pardoned, as it appeared from the information before government that they could not be put down. They were consequently taken into pay and employed as the local police of the hilly country, and some lands conferred on them. The Koly population unfortunately thought they could not do better than follow the example of Oomiah and his Ramoossies. Many consultations were held by the Koly Naiks on this subject.

Jemadar Ramjee Bhauggrah and the Kharies were the chief leaders; but the Koolkurnies of Rajoor were aiding and abetting in the plot; so were the police Naiks of Rajoor (for their pay and allowances were considerably reduced under our government, which rendered them extremely discontented). It was finally determined that the Khary family should send in a petition to government, claiming a restoration to their rights and employment, either in the police of the district or on the hill fort of Ruttungur; but they were of opinion that their petition would be more readily listened to, were it known that they were in arms, and had taken up their residence in the jungles when it was forwarded. Accordingly Kassybah Khary, the youngest son of the late havildar of Ruttungur, proceeded to the hills with several of his relatives and forwarded their petition to Ahmudnuggur.* Kassybah Khary was joined in a few days by jemadar Ramjee Bhauggrah, who deserted from the Konkan with two of the Koly police men; this was in the latter end of the year 1823. In January 1829, I proceeded to the western ghauts, taking with me a small detachment of the police corps; for letters had been received by the magistrate, from the mam-ludars of the Akolla district, reporting that the inhabitants had become greatly alarmed, as several hundred Kolies had assembled in the hills, for the purpose evidently of plundering them.

Although the gang was chiefly composed of the people of the district, there being nearly one, two or three persons from every village, yet, for the first two days after we had entered the hills, no satisfactory information could be obtained respecting the insurgents. The Brahmun Koolkurnies of Rajoor and some of their friends strongly recommended that the troops might not be employed, and that the leaders of the gang should be assured that, if they refrained from plundering, and remained quiet, government would make some provision for them. Those Brahmuns further asserted that, if the troops attempted to follow, they would have no chance of overtaking them; and that, if the Kolies were once fired on, they would immediately begin to plunder and burn every village they approached; that when the troops neared them, they would plunge into the ravines covered with jungle, and, at the moment they imagined they had succeeded in surrounding them, they would shortly be seen passing over the summits of some of the highest hills. In fact they had settled that the sepoys could never penetrate the tangled thickets of brushwood, or pass along the rugged and difficult footpaths* they alone travelled by.

* They were much astonished the first time they saw a detachment of the police corps cross a range of hills by one of the most difficult tracks, and which was considered by them impassable to sepoys. The men on the above occasion were dressed every one after his own fashion, the only thing they were required to attend to was that they had abundance of ammunition, and to be careful of their muskets. This event tended much to depress the spirits of the Kolies, while the enthusiasm and confidence of the troops were proportionally increased.

As troops employed to suppress a disturbance in a hilly and jungly country, can seldom or never accomplish in a successful manner the duty they may be detached upon, unless they obtain the cordial co-operation of a portion of the inhabitants of the district, several smart and intelligent men of the police corps had been previously instructed to exert their best endeavours to gradually conciliate some of the Kolies, and to obtain from them the information we were so much in want of. These men had been frequently employed on similar duty and succeeded extremely well in the present instance.

Information on the following points was communicated to government. The number of the insurgents; the wish and hope of the population of the hilly tract that they might succeed in their object (obtaining service and additional pay from government); the strong nature of the country, and the very great advantage of acting promptly and with decision, at the same time employing an adequate and overwhelming body of troops. In the mean time little notice was taken of the Bund (the insurgents), a detachment having been merely advanced towards them for the purpose of gaining information, but with strict injunctions not to molest the Kolies, and not to mind any threatening messages sent by them. A proclamation was sent to the leaders of the Bund, telling them to disperse their followers and to present a petition to government respecting any grievances they had to complain of; but that no letters or petitions from them would be attended to while they continued in arms.

The names of nearly all the persons composing the Bund were now ascertained, also that of the relatives and friends of the chiefs and other Koly Naiks, and of the villages where they resided. The names of such persons, male and female, as were likely to assist the Bund with supplies, and communicate intelligence respecting the movement of the troops, were noted down; also a description of the most noted hiding places, and of the footpaths leading over the different ranges of hills; with an account of the spots where water was procurable, in ravines or beds of nullahs, and on the tops of hills. The detachment from Bhewndy was stationed at the bottom of the passes leading into the Konkan, and the other detachments that arrived from Mallygown, Ahmudnuggur and Poona, were posted in the situations considered most desirable for them to occupy, while lightly equipped parties were selected to be employed in constantly searching the haunts and lurking places of the Kolies.

The insurgents, a few days previous to the arrival of the troops, had begun to levy contributions from the inhabitants; they also plundered at different times three small villages; but all these irregular proceedings were soon put a stop to, and it became necessary for them to separate into small parties. The few Bheels that had joined them returned to their homes, and many of the Kolies fled to a distance; therefore, to ensure the capture of the chiefs and those that remained with them,

detachments, with a certain number of the inhabitants, were posted near the different tanks and pools of water in the hills. This arrangement greatly perplexed the Kolies, and, as many of the inhabitants espoused our cause very warmly, the two chiefs and upwards of eighty of their followers were captured in about two months, and marched to Ahmudnuggur. The early and successful termination of the service must be chiefly ascribed to the great zeal and unceasing exertions of all the officers and men engaged in the service, which was one of a most fatiguing and harassing nature.

One of the most enterprising characters, in the Bund of which I have just given a short account, was a Koly named Ramah Keerva. He was a stout and powerful man with an extremely fine figure and good features; of a very unsettled and daring spirit, and noted among the Kolies for excelling them all in agility. Keerva quitted the Bund when they began to be much pressed by the troops; he moved to the southward accompanied by about twenty-five men. He meditated on several occasions attacking some of the detachments when they appeared fatigued from searching the jungles. He had been for some ten or twelve years concerned in many robberies, and persuaded four or five of the Kolies who had quitted the late Bund to remain with him rather than return to their homes; they chiefly lived in some caves or recesses in the rocks, occasionally moving about the country and visiting their friends. As he had many acquaintances among the Bheels along the banks of the Pera and Godavery rivers, he sent two of his Koly friends to some of the Bheel Naiks, inviting them to join him, and to proceed on a plundering expedition into the Konkan. Early in the month of January 1830, about thirty Bheels joined Keerva, who had assembled an equal number of Kolies who were at the time in the hills south of Kotool. As the Kolies, &c. around Joonee and in the Ghorenahir quarter had been plundering both above and below the ghauts, detachments of regular troops were moving about to apprehend them. A few men of one of these detachments (of the 11th regiment), under a Naik, were encountered by Keerva's gang, at the small village of Mandwah in the hills south of Kotool; the party were called upon to ground their arms and surrender themselves prisoners; this they very properly declined doing, and were consequently attacked by the Bheels and Kolies. The sepoys occupied a very small temple, and managed to keep their assailants off for several hours, until a detachment in the vicinity came to their relief. Several of the sepoys were killed and wounded. Keerva proceeded with his gang into the Konkan, and attacked and plundered the village of Kinnoully, and afterwards divided the spoil amounting to 7,590 rupees, when they reached the ghauts, the greater portion of it having been given up to the Bheels. The Kolies separated and the Bheels returning to their homes, were pursued by a detachment of the 17th regiment N. I. under that very active and most zealous

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officer, the late Captain Luyken. I have omitted to mention before that that portion of the hilly tract of country lying south of Hurrischander, forms the western boundary of the Poona district; while that part extending northward, from the same hill fort, forms the western boundary of the Ahmudnuggur district. Troops were out now in pursuit of the Bheels, Ramoossies and Kolies who had committed depredations in the latter part of 1829, and beginning of the year 1830. Many of the officers and men employed had been out the previous season, and had consequently become well acquainted with the inhabitants and the localities of the country. All were actuated by an unusual spirit of enthusiasm, and willingly underwent the fatigue and labour of this harassing duty. Although the services and exertions of all were so great, yet it would be very unjust to the memories of the late Lieutenants Lloyd and Forbes, the former of the 11th regiment and the latter of the 13th regiment, were I not to mention that they greatly contributed to the restoration of tranquillity in the hilly country. A number of prisoners were taken to Poona and Thanna; Ramah Keerva with several other notorious leaders and their followers were brought to Ahmudnuggur, where Keerva was executed. Some years previously, detachments from the Konkan had endeavoured to capture Keerva by surrounding him in his house at night, but he invariably contrived to escape; but as the havildar commanding one of these parties was the Koly Patell of a village near Kotool, Keerva set fire to his house by which he lost property worth several hundred rupees. As I have before noticed, this practice of retaliation is a common one among the Kolies, and I had soon an opportunity of making an effort to check such a system. Two nights after Ramah Keerva was seized, the house of the man who gave the information which led to his apprehension, was burnt, with the dwellings of four other persons; two of these were extremely poor, and one of them a widow. I therefore had the loss of each person valued as nearly as possible, and allotted to the two poorer persons three times the value of the house and grain that were destroyed; and to the other three double the amount of the property consumed by the fire; and instantly circulated a proclamation offering a reward of five hundred rupees for the apprehension of the incendiary, and announced to the people, at the same time, that it became the duty of the government authorities to afford protection to persons who suffered injury in their person or property for having rendered useful service to the state.

I shall close this memoir by mentioning that the inhabitants of the Kotool and Rajoor districts showed a very great desire to aid the troops in the service on which they were employed; and while acting independently, without any of our troops near, they seized a number of the Bund and brought them prisoners to camp.

AHMUDNUGGUR, 19th July 1836.

IV.—Statistical Observations on the Varragherries, or Pulney Mountains.—By ROBERT WIGHT, M. D. Surgeon.

(Communicated by the Madras Government).

The Varragherries or, as they are now more frequently denominated, Pulney mountains, are situated at, and partly close the opening of the valley of Dindigul, having a direction from east to west. Their length in that direction, according to Captain Ward, who surveyed and drew up an elaborate memoir* regarding them, is fifty-four miles, with a medium breadth of fifteen; their superficial area being calculated at 798½ square miles. The plain from which they rise, as measured at Davedanaputty within a few miles of their base, is about 1,100 feet above the level of the sea, and presents, a few feet (8 to 10) under the surface, a bed of kunkur, varying, in different places where it has been penetrated in digging wells, from ten to twenty feet in thickness, overlying a bed of mouldering gneiss which crumbles into soil as soon as exposed to the air. Permamallie their highest peak, at least so far as I had an opportunity of determining, is nearly 7,000 feet above the plain, or about 8,000 above the sea, and may be estimated from a variety of measurements which I made, to rise from 1,500 to 2,000 feet above the average level of the higher range of hill villages. This point, however, I was prevented determining accurately by circumstances which I could not control. The most elevated village, or hamlet rather, I saw, that of Sembaganoor, is above 5,500, and perhaps may be about 5,600 feet above the sea—all the others appear to be on a much lower level. These hills may, according to their degree of elevation, be divided into two zones or regions; the lower characterized by the abundance of arboreous vegetation or jungle, with which it is covered; the upper by the greater predominance of herbaceous or grassy vegetation. The jungle in the upper zone is confined to patches on the sides of the hills, and in the bottoms of the deep glens, or rather gullies, by which the ridges are separated. These ridges are generally rounded on the top, with at first gently sloping sides, which gradually become steeper as they descend, and near the bottom are in many places quite precipitous. The rocks of which they are composed, so far as my observation extends, are all stratified, even to the extreme peak of Permamallie, and there the strata are nearly if not quite vertical. The principal rock composing this immense mass is gneiss, interstratified with quartz rock and traversed by veins of felspar. In many places it is seen projecting above the surface firm and unaffected by the weather, but more generally it is decayed to a considerable depth; and

* This memoir will be published in our next number, accompanied by a map of the Hills.

in such places so completely disintegrated that it is reduced to a gritty clay, the grains of quartz only, still remaining unreduced by the action of the causes that have so completely altered the other component parts. The strata generally have a dip inclining to the south-west, but varying in degree in different parts of the hills. On the terrace of Vilputty it scarcely seems to exceed 45°, while on Permamallie it is nearly 90 degrees.

The village of Poombary stands near the edge of a terrace, commanding a view, in a north or N. N. E. direction, of a valley many miles in extent, the sides and upper limit of which are bounded by precipitous rocks, presenting the appearance of having been abruptly broken by the sudden sinking of the intermediate portion. Standing on the edge of that terrace, and looking at the rocks on either side, the strata are quite conformable on both, and with a dip towards the south, of apparently not more than 15 or 20 degrees.

This valley in its outlines and general features is I think one of the most remarkable I ever saw. Its sides are nearly straight, and are perfectly parallel, united by its upper boundary, which is equally precipitous, at nearly right angles; the hollow between, presenting the same irregularity of surface that the higher grounds on either side do. That valley, or, as it may more appropriately be denominated, strath, seems very extensively cultivated, terraced fields being visible on either side of a stream by which it is traversed as far as the eye can reach.

The grassy tops of the hills are covered with a coating of very black soil, resembling peat-earth, varying in thickness from a few inches to several feet. The sub-soil, where the black prevails, is a yellowish clay, in some places of an ochre colour, but generally of a darker shade. Some that I saw was stiff and plastic, probably well fitted for making bricks, but has not yet been sufficiently tried to determine that point. Near Poombary it is light coloured, and being used in the construction of the huts, gives them a very clean and neat appearance, when viewed from a distance, which is apt to make the beholder suppose the inhabitants much more highly civilized, and more cleanly in their habits, than a nearer approach tends to confirm. The soil, about the valleys under cultivation, seems light and loamy, of a reddish brown colour, and, where well managed, produces large crops of the very few articles which the natives seem to consider worth the trouble of careful cultivation.

The productions of the higher or grassy regions are few, and for the most part of inferior quality, not however as it seems to me from the sterility of the soil, but from bad husbandry; the grain fields being every where so over-run and choaked with weeds, that it appears quite impossible for good crops to be produced. Some fields of Tennay (*Panicum italicum*) however, which I saw were excellent, whether from the ground being previously better prepared, or from its growing so strong that it

choaked the weeds, I was unable to determine. Their fields of wheat, barley, and cumboo (a very inferior sort is in use), were all full of weeds, the crops thin, and the quality of the grain inferior in proportion. Garlic is the staple production, and is raised in great quantities. It is tended with much care, the fields are well ploughed and manured, and not a weed to be seen: the returns seem very great, and, judging from the size of the bulbs only, of excellent quality.

This fact is sufficient to prove the fitness of the soil for the production of grain of the first quality, if a little more care was bestowed on its culture. This they do not think it worth, because they say "we cannot sell it, and what is the use of taking so much trouble with what we have to eat ourselves." Owing to this neglect the wheat and barley are of the worst description, rice, from their own account of it, equally bad, but of it I saw none, and can form no opinion of my own.

Their cultivation, equally with that on the plains, is much influenced by the seasons, being successful or otherwise, according as they have rain. Captain Ward mentions, with due encomiums, the ingenuity with which artificial canals are conducted to irrigate their terraced fields; but these unfortunately can only be of use, so long as the streams from which they derive their supply of water continue to flow. It does not seem ever to have occurred to the constructors of these canals to form reservoirs in which to lay up a supply of water against a drought; though, so far as my unpractised eye in such matters enable me to judge, many might be formed at no great cost, and prove of the greatest value to the inhabitants. It is true, that, to form such substantial structures, might require more skill than they possess, and prove too expensive for the poverty-stricken natives; but, until some such contrivance is had recourse to, it must ever prove difficult to guard against scarcities, in a country where the deep slopes of the rock has so strong a tendency to drain off the moisture of the thin coating of soil with what it is covered. These droughts, indeed, to a greater or less extent, seem of frequent occurrence, because in all enquiries respecting the productiveness of the soil and supplies of food, the answer invariably commenced with the postulate—"if the rains are good, then we have good crops and plenty of food; if not we are not so well supplied."

The natural productions of the country are sufficiently varied to give us reason to put a high estimate on its probable capabilities. In the course of about 15 days I collected little short of 500 species of plants, and without any attempt on my part to preserve specimens of all the plants in flower or fruit at this season; many being rejected merely because I was not in want of specimens. It did not in short occur to me at the time, which it has since, to compare the vegetable productions of these hills with the recorded ones of the country generally. This I greatly regret, as I think, were a somewhat perfect collection formed, it would be found to con-

tain a number of species amounting to from $3\frac{1}{2}$ to 4 fifths of the whole peninsular flora, so far as we are yet acquainted with it, and to present a vast number of species peculiar to themselves. Among the European forms observed were two species of *Ranunculus*; two of *Anemone*; three of *Clematis*; two of *Berberis*; a new *Parnassia*; two of *Drosera* (sun dew); one *Stellaria*, and one *Cerastium* (chick-weed); a rose, very abundant; three or four kinds of rasps and brambles; one *Potentilla*; one *Circæa* (enchanters night shade); a tree allied to the Bilberry (*Thibaudia*); one *Anagallis*; two of *Lysimachia*, both allied to British species; the common dock, very abundant about the villages; and three kinds of rushes (*Juncus*), one very nearly allied to the common British rush. (*Juncus effusus*.) Among the truly tropical forms, a species of *Magnolia*, the first I believe that has been discovered in the peninsula, is the most interesting; the *Rhododendron nobilis* very abundant; a very large and handsome *Ilex* (holly), but without the thorny leaves of the European plant; a species of *Gordonia*, a tree resembling in its flowers the *Camelia* and tea plant; a very remarkable species of fig, with a climbing stem, bearing fruit of the size of large oranges, in clusters along the stems: besides many other interesting trees which I fear it would be tedious to mention. Four species of palms are met with on the higher regions, namely the sago palm (*Caryota urens*), a wild areca palm, the *Bentinckia condupana*, and an alpine species of date. The grasses are very numerous, but the predominant tribe (*Andropoginæ*) are not those best suited for pasturage, being generally of a coarse nature and highly aromatic quality. Ferns, mosses, and lichens, abound: among which, the most conspicuous is a branching variety of the Tree-fern, (*Alsophila*) very common in thick jungles on moist banks of streams.

My residence was so short, and at such an unfavourable season of the year, that I am unable to speak from personal observation of their climate. The mean of 60 observations of the thermometer suspended in a house gives 63° Fahrenheit, as the mean temperature during 20 days at an elevation of 5,450 feet. From a register of this kind no very satisfactory conclusions can be drawn. Had the thermometer been suspended under a shade in the open air, the results, so far as they went, would have been more satisfactory, but unfortunately the plan was not adopted. The very unsettled state of the weather, which confined me to the house nearly ten out of the twenty days I was there, would however have rendered such a register of little use, from the limited period of observation. Captain Ward, whose longer residence on them gave him a better opportunity of observing the thermometer, does not once mention it in the course of his memoir.

The population of this extensive tract of alpine country appears, from a statement attached to theutcherry copy of Captain Ward's memoir, to be 3,299. If that record is correct, there must have been a very rapid decline since that time: for, according to one furnished on my application, by the collector, and made up in 1833, it appears it is now

reduced to 1648 souls, an unaccountable falling off in so short a period, otherwise than by emigration, as there has been no remarkable sickness or scarcity to have swept away half the population.

Those who remain, appear a robust and healthy set of people, very active, and, I dare say, capable of great exertion if excited, but, like most people similarly situated, very indolent. They appear a simple race, having few wants, and these easily supplied. The principal part of their food is the produce of their own fields, while their clothing, agricultural implements, condiments and luxuries, are procured from the low country in exchange for their garlic; hence the care bestowed on its culture. Their food consists principally of rice, wheaten cakes, barley, and barley congee. Of animal food they seldom or never partake, and very rarely of curry, not from want of inclination, they say, but from want of means to get the materials. Their clothing is very sparing, considering the rigorous climate they inhabit. It consists of a cloth wrapped round their middle, and another thrown loosely over their shoulders, or used according to circumstances as a turband. The children, like those of the plains, are perfectly naked, which must be adverse to the extension of population, since the most robust only, can be expected to sustain uninjured, such rude exposure, to the rough inclemencies of the weather that occur at the change of the monsoons, and during the cold winter season, when the thermometer is said to sink within a few degrees of the freezing point, the puddles to freeze, and the grass to become covered with hoar frost.

Their huts are built of wicker work, plastered over with clay, and thatched with grass and ferns. They usually have a neat appearance outside, but are not remarkably cleanly within. The courts in front, and the streets of the villages, are frequently paved, but contaminated with accumulations of filth, too often of the most disgusting description. The spaces between the houses are usually overgrown with rank, and worse than useless, jungle, while they might be occupied either by trees that would afford health and shade, or by really useful ones, such as oranges; and, if measures are taken to ameliorate their condition, still better by some of the European fruits, such as apples and pears. Plums I believe would thrive equally well, and to these might be added coffee, as affording a produce of more intrinsic value than any of those already mentioned. I am not quite certain how far it would succeed on the higher zone, but it would unquestionably do so on the lower, and in a few years prove a valuable addition to the exports from the hills.

Their means of intercourse, not only with the plains but between the villages, are usually of the worst description; so that beasts of burden can rarely carry a load equalling that of an ordinary cooly on the plains; and the roads, bad as they are, usually deteriorate, as they approach the low country, from the ascent being steeper and more broken there than above, and the jungles thicker. To this cause much of the poverty of

the people is no doubt attributable, the cost of conveying their goods to market absorbing so large a proportion of their price that but little profit can come to the sellers.

The accompanying tables, one supposes to have been prepared about 1820, but without date, the other in 1836, show, that in these 16 years the population has diminished more than a half, I believe without any other assignable cause than emigration, induced by poverty and want naturally resulting from the obstacles to improvement inherent in the character of the country itself, when not only not counteracted by artificial means, but increased by the abstraction, in the form of taxes, of the small amount of capital which finds its way there.

Believing it to be the wish of government both to preserve, and to ameliorate the condition of, this interesting portion of the population, as well as to extend the benefits which may be expected to flow from the possession of a tract of country so large and centrally situated, enjoying a climate widely different from that by which it is surrounded, and fitted thereby for the production of so many articles not indigenous to India, but the possession of which might prove of great importance: I shall take the liberty of offering a few suggestions for its improvement, the result of my observations while there, which may, if considered worthy of adoption, be the means of restoring the moiety of the population it has lost, and tend to enhance the value of the district they inhabit to the country at large.

In attempting to ameliorate the condition of the hill population, two plans suggest themselves: the first and most obvious, and the one apparently most likely to produce a speedy effect is, to relieve the people of their taxes for a given number of years, until it is supposed they will have accumulated the means of paying them without inconvenience. This, however, is not the one which presents itself to me as the best. I object to such a plan, on the ground that what was first received as a boon might afterwards be claimed as a right, giving rise to much trouble and inconvenience in the re-establishment on the part of the sircar of his original rights, and causing heavy discontent among the inhabitants; while it is probable, the money so given would be squandered in place of being employed in the manner intended. I would further object to this plan, on the ground that no part of the money, so withdrawn from the treasury, would be devoted to the improvement of the country and roads, the object, of all others, most wanted. A third objection is, that it might prove a premium to emigration from the plains, causing a further loss to the state of the labour of the emigrants in a tax-paying district. Opposed as it is, by such weighty objections, this plan cannot be entertained for a moment. The second is, to devote the revenue of the hills to their improvement, by which much good may in a few years be accomplished at a very small cost; and that

drawn so imperceptibly from the general treasury, that it would not be felt; at the same time that it would give universal satisfaction to the payers, when they saw their contributions to the state applied for their personal benefit. Unless some such measure is adopted, there is much reason to fear the total depopulation of the hills by emigration alone. At present the aggregate amount of taxes raised from them is only about 3,300 rupees per annum: that sum, carefully applied, would, in a few years, repair the now almost impassable roads, establish completely the present imperfect, but very useful and much trodden, communication between Davadenaputty and Periacollum on the south, and Pulney on the north, by clearing the paths of innumerable impediments which now obstruct them, and opening freely, the very close and unhealthy jungles at the foot of the hills near the latter place. Sheds, for the accommodation of merchants and the preservation of their goods, might be erected at convenient distances along these roads, and public choultries at each of the large villages, in which they could bivouac during their stay, collect their garlic, &c. and make their bargains; and, lastly, when these more immediate wants were cared for, bunds might be built, in the most convenient situations for preserving supplies of water against droughts.

Improving the access would at the same time lower the cost of imports, and increase to the growers the value of exports, by diminishing the cost of bringing them respectively into market, while the formation of reservoirs of water would ensure more certain returns to the agriculturist. While on the hills, I had a quantity of Jumrah or Himalayan rice sown, for trial; if the experiment proves successful it may become a valuable article of export, being of good quality, which the kind now in use is said not to be. It seems further desirable to change the wheat and barley seed; that now in use having become deteriorated by long culture on the same ground. This the ryots might receive in a present, as a very small quantity of each would be sufficient to supply the whole cultivation. But it should be given on the express condition of more attention to good husbandry being bestowed on its culture than is now the practice: by which wheat fit for exportation might be grown, and would prove a great accommodation to the inhabitants of both the high and low countries.

The inhabitants, though in the extreme of poverty, are, notwithstanding, exceedingly indolent, from having no very pressing wants to stimulate them to exertion; it appears therefore indispensable, as the first step towards improving their condition, to afford them such a stimulus, by creating artificial wants. This I think may be easily accomplished by opening a few shops in some of the large villages, containing an assortment of agricultural implements, hatchets, knives, bill-hooks, cloth, female ornaments, condiments, &c. The same necessity that now induces them

to exert their ingenuity to do without things they want, but have few or no opportunities of procuring even at a high price, will stimulate them to exertion to procure the means of purchasing things daily before their eyes, and of the uses and value of which they are by no means ignorant. When they know that a few measures of good clean wheat or barley will purchase them a hatchet or a cloth, as certainly as so many heads of garlic, they will soon see the advantage of bestowing equal care on the culture of the one, as is now given to that of the other: and, when the facilities for carrying their produce to market are increased by means of improved roads, they will take care that the merchants, now in the habit of trading on the hills and fixing their own prices, give them proper value in exchange, as they can if refused take it themselves to the low country markets. It may, in the first instance, be necessary to give a premium for the establishment of shops, but this cannot be long required.

Should these suggestions be thought worthy of adoption, either wholly or in part, it may be necessary, to ensure the careful appropriation of the funds to proper objects, to order the collector or his immediate subordinate to inspect the works in progress at least twice a year, and to pay more transitory visits, at any time his other duties may call him to the neighbourhood. And should they happily prove useful in paving the way to future prosperity and increase of the population, by giving a stimulus to exertion, it may, after the first two or three years, be proper to carry any excess of revenue that results to the credit of the state: since these objects will be much better accomplished by a slow, than speedy process, which will allow time for the habits and dispositions of the people to undergo the changes necessary to enable them to keep pace with the improvement of their country. Another great improvement it appears to me would be, as already hinted, the introduction among them of the coffee plant, by which the present rank unwholesome and useless vegetation, with which their villages are choaked, would be superseded, and a substitute of great intrinsic value made to take its place. Such a proceeding was adopted a few years ago in the Kandy country by Sir E. Barnes, and has so completely succeeded, that already every cottage has its coffee inclosure, and coffee shops have become common along all the principal roads, at which it is as much the custom of coolies carrying loads to stop and drink coffee, when fatigued, as elsewhere it is their habit to partake of the pernicious contents of the toddy shop. On the upper region sugar could scarcely be expected to prove a lucrative crop, at least for some years, but it appears to me it might be tried with every hope of success on the lower valleys, and, should it succeed, would prove an article of great value.

CHANASHOOMAREE TABLE OF THE FURRAGHERY AND KUNNANDAVAN MOUNTAINS.

	Karakat Vellalers.	Kunnay Vellalers.	Kykaliers.	Vellam Chettys.	Kongu Chettys.	Tellunga Chettys.	Murawars.	Kamplars.	Tottars.	Wuddagars.	Osteakars.	Villayen.	Kavary.	Anders.	Artificers.	Washermen.	Barbers.	Lubbers.	Chucklers.	Pellian.	Number of castes.	Males.	Females.	Total population.
Palator.....	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	157	318
Tandyood.....	0	72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	114	224
Munnaloor.....	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	235	265	560
Punyymullay.....	0	237	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	129	153	282
Pautchoor.....	0	207	289	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	469	447	916
Perryur.....	0	284	243	141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	503	496	999
Kawinjee.....	0	1097	532	284	51	60	15	116	4	19	16	93	15	5	405	79	95	0	108	263	15	1671	1628	3299
Poomburra includ- ing Velpetty.....	0	327	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	288	359	647
Munnanoor.....	0	327	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	288	359	647
Nachyile.....	0	327	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	288	359	647

Anjeenad Travancore.

DASAJADDA TABLE OF THE FURRAGHERY AND KUNNANDAVAN MOUNTAINS.

NAMES OF THE PRINCIPAL VILLAGES.	VILLAGES.			RELIGIOUS ESTABLISH- MENT.			CATTLE.			ON WHAT DISTRICT DEPENDENT.		
	Principal.	Subordinate.	Total.	Visnoo.	Shveen.	Sundry petty temples.	Oxen.	Cows.	Buffaloes.	Sheep and goats.	Number of Houses.	
Palator.....	4	1	5	2	2	25	52	70	71	0	0	117
Tandyood.....	4	8	12	8	0	1	30	50	42	0	0	86
Munnaloor.....	2	4	6	3	3	18	137	145	112	0	0	119
Punyymullay.....	2	0	2	0	4	0	84	86	0	0	0	68
Pautchoor.....	2	4	6	0	0	0	431	400	52	0	0	235
Perryur.....	1	7	8	6	10	43	285	402	55	0	0	211
Kawinjee.....	16	24	40	11	30	138	1019	1153	332	0	0	836
Poomburra including Velpetty.	6	5	11	2	1	8	155	259	105	0	0	183
Munnanoor.....	6	5	11	2	1	8	155	259	105	0	0	183
Nachyile.....	6	5	11	2	1	8	155	259	105	0	0	183

Anjeenad Travancore.

V.—Further Observations regarding the Homöothermal method of Acclimating Extra-Tropical Plants within the Tropics. — By ROBERT WIGHT, Esq. M. D. &c. &c.

It will be recollected that the Homöothermal method of acclimating, rests on the supposition, that plants raised from seeds, sprouted under a high temperature, have their constitutions so modified as to fit them for successful culture in higher temperatures,* than if raised in the usual manner under shade. In the following remarks, I shall offer some further elucidations of the method, and propose some experiments, which will go far, I think, either to refute the argument, or to establish the plan on a firm foundation.

I have recently met with two papers bearing indirectly on the subject; to give some account of which and show their application to practice, are my reasons for now resuming its consideration. The first of these is a letter from N. B. Ward, Esq. of London, to Dr. Hooker, published in the *Companion to the Botanical Magazine*, vol. 1st, page 317, —“On an improved method of transporting living plants;”† the other a memoir, by Messrs. Milne, Edwards and Colin—“Sur la végétation des Cereales sous de hautes temperatures.” Mr. Ward informs us that the simple incident of burying the chrysalis of a sphynx in some moist mould, contained in a wide-mouthed glass bottle, lightly covered, led him to the discovery, that earth so situated was always equally moist

* Since this paper was sent to the press, I have met with the following very apposite fact in support of the principle, and strongly corroborative of the method of acclimating, advocated in my former paper.—“I remarked that in coffee-plantations the nurseries are formed not so much by collecting together those young plants which accidentally rise under the trees that have yielded a crop, as by exposing the seeds to germination during fine days in heaps between plantain leaves. These seeds are taken out of the pulp, but yet retaining part of it adhering to them. When this seed has germinated, it is sown, and produces plants that can bear the ardour of the sun better than those that spring up in the shade in the coffee-plantations.”—*Humboldt's Personal Narrative*, Eng. Edit. 4, pages 67, 68.

The heat developed by the fermentation of the adherent pulp, seems in this case to cause the rapid germination here mentioned, and to produce the constitutional change on the plants which enables them to “resist the ardour of the sun better than those that spring up in the shade.” More conclusive evidence of the truth of the principle explained could scarcely, in my opinion, be adduced.

† Republished among the “*Selections*,” at the end of this Number. The British Association for the Advancement of Science has considered this subject of importance sufficient to induce them to offer a premium for experimental researches regarding it.—*Editor*.

by the condensation on the sides of the bottle, and return of the moisture, which evaporated during the heat of the day; and that plants, growing in mould so preserved, would live for months or years without any additional supply of water. He was thence induced to extend his experiments, and in the course of them ascertained that, so protected, the most delicate plants, and from stations enjoying the purest air, continued for years to thrive in the pre-eminently impure atmosphere of London; and that they remained nearly unaffected by change of temperature, tropical and arctic plants, so isolated, growing freely in the same case.

The application of this last fact to the introduction of tropical plants into England was too evident to be long overlooked. He says, “reflecting on the causes of the failure attending such conveyance (of plants on long voyages), arising chiefly from deficiency or redundancy of water, from the spray of the sea, or from want of light in protecting them from the spray, it was of course evident that my new method offered a ready means of obviating all these difficulties, and in the beginning of June 1833, I filled two cases with ferns, grasses, &c., and sent them to Sidney.” There they all arrived in safety, though the glazed cases by which they were covered were not once, or only once, opened on the voyage. “The English plants were removed, and the cases refilled at Sidney in the month of February 1834, the thermometer ranging between 90 and 100°.”

“In their passage to England they encountered very varying temperatures; the thermometer fell to 20° in rounding Cape Horn, and the decks were covered a foot deep with snow. In crossing the line, the thermometer rose to 120°, and fell to 40°, on their arrival in the British channel in the beginning of November, eight months after they were enclosed. These plants were not once watered during their voyage, received no additional protection by day or by night, and were taken out at Loddiges’ in the most healthy condition.” Since then numerous cases of plants have been sent to various tropical countries, and others returned with equal success. It is now the practice to send annually numerous cases of plants so protected from the Calcutta botanic garden to England, the glass cases of which, are not once opened during the voyage; the only precaution required, being to place them in such a situation as to afford them the greatest quantity of light.

My object in recapitulating so much of this paper, is to show the application of it to the determination of the value of my suggestions for acclimating plants. In the hot houses of England, where the temperature is kept up to the tropical standard, the seeds of fruit and timber trees might be germinated, and the young plants sent to this country for introduction, along with others (for the sake of comparison) germinated in the usual way.

If the premises, on which my views are grounded are correct, plants so prepared should be not only endowed with the power of resisting high temperature, but should produce seeds endowed with similar properties, and become the means of greatly extending our catalogue of useful plants: nor need the use of glazed cases be confined to the introduction of extra-tropical plants; those from other tropical countries might in like manner be introduced with certainty, and without loss or accidents on the voyage, from bad weather, exposure to sea spray, changes of temperature, &c. and could be kept in safety after landing, till a favourable season arrived for transplanting them; or, should it be desirable or necessary to send them into the interior, the continued protection would be equally effective for their preservation. On this part of the subject I believe it is quite unnecessary to say more, as the application must be obvious to every one.

The cases consist of a box, the joinings of which are made water tight, to retain the moisture of the earth. To this a glazed frame is fitted, so close as just to go easily within the box. The frame ought to be about 18 inches or two feet high. The soil being then well moistened and the plants introduced, the glazed frame is fitted on, after which nothing further is required. Mr. Ward observes—"It may be as well to state once for all, that the success of my plan is in exact proportion to the admission of light to all parts of the growing plants, and to the due regulation of the humidity of the mould, wherein they grow. It is safer in all instances to give rather too little than too much water. Plants frequenting a humid soil require more water, while fleshy succulent plants are best preserved, planted in dry sand."

The French memoir has for its object the determination of a point of the highest importance to the tropical agriculturist, and one, which it is surprising has not hitherto been investigated with the care which it obviously merits, namely the highest temperature at which the more common European Cerealiæ can be cultivated with success; and, so far as it goes, is one of great value. Reasoning from insufficient data, I was led to infer, that seeds, sprouted in a high heat, would produce plants capable of successfully resisting temperature, much higher than those to which they are generally exposed in the usual course of cultivation, and that in this way extra-tropical plants might, so to speak, be tropicalized. The experiments of the French philosophers unfortunately do not bear on this point, but as it seems desirable that the result, as well as their deductions, should be known among us, I shall give a brief summary of them, and then show the points in which they appear to me defective, in the hope that the ingenious authors may be induced to repeat them, with such modifications as may tend to confirm or refute my views.

The authors, having shown, in a previous memoir, that the germination of the seeds of both monocotyledonous and dicotyledonous plants was not prevented, other circumstances being favourable, by exposure to a temperature of 112° Fahrenheit, were led to enquire whether the more common European Cerealiæ (edible corn) might not be cultivated successfully in the very warm climates. On this point they found great discrepancy of opinion between practical agriculturists equally, conversant with the history and practice of agriculture, and scientific travellers who had visited such climates: the former, maintaining their belief that they might be successfully cultivated in all hot countries; the latter, denying, from actual observation, that they would succeed generally in tropical climates. To determine this point, samples of the two principal varieties of wheat in common use in France, the *winter* and *spring* varieties, were sown side by side on the 23d April, in a piece of well prepared ground, the increasing heat of the season being then very decided. Both germinated alike, and for some time advanced equally. By and by the heat increased, and a remarkable difference became evident; for, while the spring wheat continued erect, its stems elongating and advancing in the usual manner to ear, those of the winter wheat ceased to increase in length, began to decline from the erect position, and the short stems became hid in tufts of large leaves; in a word it remained *en herbe*. In this form they continue to vegetate vigorously, producing numerous short stems, and large succulent leaves, forming together a beautiful green plot. The spring variety arrived at maturity at the usual time; when the change in the winter wheat commenced, the heat had risen to about 66° Faht.; whence the authors infer that this variety is incapable of arriving at maturity in any country, the mean temperature of which exceeds 65° Faht. The next experiment seems strongly corroborative of this deduction. A fresh portion of spring wheat was sown in July, when the mean temperature had risen to 71° Faht., and underwent the same changes that the winter wheat sown in spring had previously done; that is the stems ceased to elongate, became oblique and depressed, and were enveloped in tufts of large leaves, simulating luxuriant pasture or turf. Hence it is further inferred, that the spring variety can only be cultivated successfully in a climate the mean temperature of which is under 71° Faht. In confirmation of these deductions from experiment, the following facts are cited from the works of Boussingault and Humboldt. The former of these travellers states that, in the whole of the zone embracing the foot of the Andes, from the level of the sea to the height of 1721 metres (nearly 5600 feet), he neither found wheat nor barley; but, immediately above, he entered a broad zone presenting abundance of thriving corn. The first of these zones has for its infe-

rior limit a medium temperature of 25° cent. (77° Fahr.), and at its superior boundary a mean heat of 18.8 cent. (66 Fahr.): it therefore has a higher temperature than that at which the inhabitants can successfully cultivate these grains; a result according accurately with the deductions from experiment. Humboldt remarks that the temperate region of all climates, where the mean annual heat is between 18 and 19° cent. appears the most favourable for the culture of the Cerealiæ; that in the equinoctial part of Mexico the European Cerealiæ are not cultivated on any part of the table-land, under an elevation of 8 or 900 metres (say in round numbers 2600 and 3000 feet); and on the slopes of the Cordillieras, between Vera Cruz and Acapulco, he had rarely seen that kind of cultivation commence under an elevation of 12 or 13 hundred metres. That long experience had proved to the inhabitants of Xalapa that wheat, sown about that town, vegetates vigorously, but does not shoot upwards into ear; on which account it is cultivated as pasture and forage for cattle: but that, in the province of Guatemala, though much nearer the equator, and at a lower elevation, European corn ripens; perhaps owing to some local cause modifying the influence of the climate. He further informs us that he has seen, in the province of Caraccas near Victoria (latitude 10° 13'), the most beautiful fields of wheat, at an elevation of from 17 to 19 hundred feet; that the corn fields of the isle of Cuba (lat. 21.58) have even a less elevation than that; and in the Isle of France (lat. 20° 10') wheat is cultivated almost at the level of the sea.

These last statements seem so greatly at variance with the facts previously enumerated and the deductions from them, that it is difficult to conceive how they can be reconciled, or reduced to any general principle, otherwise than by assuming that culture can produce varieties suited to different climates. Would the Victoria, Cuba, and Mauritius varieties of wheat succeed in France, if sown during the summer season, or in circumstances similar to those in which the winter and spring varieties of that country had failed? I think they would. The cultivation of wheat in this country affords an additional proof in support of this view, and the recent presentation at the meeting of the Madras Agricultural Society of well filled ears of the Victoria variety of wheat, and also of barley and oats, all grown in a mean temperature of about 75°, confirms it; since all the European varieties of the same kinds of grain failed in France, under a mean temperature not exceeding 71 degrees.

Perhaps these differences may be more satisfactorily accounted for on the principles explained in my former paper, and even the cause of the production of varieties shown. Thus it was observed, in the course of the experiments in France, that the growth in a normal form,

of all the kinds and varieties of European corn subjected to experiment, was prevented by the high temperature of July (71° F.); but that, on the heat afterwards subsiding in August (to what degree is not mentioned), they all shot out fresh erect stems, and many of them produced ears, though, owing to the advanced season of the year, none matured its crop. It was also observed that the winter wheat died down to the root in winter, but not the root itself, and on the return of spring produced a luxuriant crop, which ripened in the usual way. In India we sow in October and November to reap in February and March, (Victoria wheat is quicker, requiring only about 100 or 110 days for maturation): the mean temperature for these months is for October 82°, November 78° 9', December 75°, January 73.5, February 77° 7'. Supposing the seed sown in October, after the setting in of the rains, under a temperature of 82° (11 degrees higher than that of Paris in July), the progressive diminution of heat, during its after stages, enables it to advance uninterruptedly until the increasing heat of February brings it to maturity; whereas, if sown in December or January, when the heat is at its minimum, the result of the Paris experiment gives us every reason to suppose that the rise of temperature in February would arrest its progress, in the same way as happened in France; and there is equal reason to infer, if the failure in Xalapa is justly attributed to the heat, that the adoption of a similar modification of the method of culture would enable them to raise grain in place of merely pasture crops, and at the same time supply themselves with a variety of grain suited for successful culture in their climate. This view, which seems fully in accordance with the experience acquired in tropical climates, is at variance with some points of that obtained in temperate ones. Thus it is recorded in the memoir that winter wheat, sown in March, when the temperature was 6 degs. 5m. centigrade (about 44° Fahr., a temperature too low for germination), which did not germinate till the heat had risen 3 degrees, yet continued, notwithstanding a rapidly increasing temperature, steadily to advance to maturity. These cases seem so diametrically opposed as to be inexplicable on any known principle, and can only be accounted for on the supposition that art can change the course of nature, in so far at least as is manifested in these vital operations of plants. According to the laws of vitality explained in my former communication, we might perhaps say that the winter variety requires a very high comparative degree of heat, to supply which it is necessary, in the first instance to increase its susceptibility for that stimulus by exposure to cold; and that the other has had its constitution so modified that the opposite condition has been established, and that it, therefore, requires to have its susceptibility diminished by previous exposure to a higher temperature.

than that in which it is to grow (the very change which it is the object of the Homöothermal method to produce), to prepare it for culture in a tropical climate, by rendering it so very susceptible of cold, that a slight reduction of temperature is sufficient to counteract the injurious tendency of excessive heat. According to this view it is desirable that the authors of the memoir should extend and vary their experiments, so as to determine this point, and prove the existence of the modifying principle I have supposed. This, with the experience derived from their former experiments, might now perhaps be more easily accomplished than it could have been previously. They have ascertained that winter wheat, sprouted under a temperature of 19° centigrade, and exposed to temperatures progressively increasing to 22°, did not succeed; let them now sprout the same variety in a heat of 23 or 25°, and after it has ceased to grow erect, expose it to the highest summer heat of France (22°), that at which all varieties of grain yet tried had failed, and see whether it will then throw out new fruitful shoots, as the others had done on the reduction of temperature; and, in the event of its perfecting its seeds, to ascertain whether they can successfully contend with such a temperature as arrested the progress of the parent stock. Until some such course as that here suggested is adopted, the experiments hitherto made can be of no value to agriculture, opposed as they are by unlimited experience in warm climates. Humboldt who had no such theory to support, and who therefore simply states the facts as either known to himself or recorded by others, writes as follows.

"The environs of La Victoria present a very remarkable aspect, with regard to agriculture. The height of the cultivated ground is from two hundred and seventy to three hundred toises above the level of the ocean, and yet we there find fields of corn mingled with plantations of sugar-canes, coffee, and plantains. Excepting the interior of the island of Cuba,* we scarcely find any where else in the equinoctial regions European corn cultivated in large quantities in so low a region. The fine fields of wheat in Mexico are between six hundred and twelve hundred toises of absolute elevation; and it is rare to see them descend to four hundred toises. We shall soon perceive, that the produce of grain augments sensibly, from high latitudes toward the equator, with the mean temperature of the climate, in comparing spots of different elevations. The success of agriculture depends on the dryness of the air; on the rains distributed among different seasons, or accumulated in one rainy season; on winds blowing constantly from the east, or bringing the cold air of the north into very low latitudes, as in the gulf of Mexico; on mists, which for whole months diminish the intensity of the solar rays; in short, on a thousand local circumstances, which have

* The district of Quatro Villas.

less influence on the mean temperature of the whole year, than on the distribution of the same quantity of heat among the different parts of the year. It is a striking spectacle, to see the grain of Europe cultivated from the equator as far as Lapland, in the latitude of 69°, in regions where the mean heat is from 22° to 2° in every place where the temperature of summer is above 9° or 10°. We know the minimum of heat requisite to ripen wheat, barley, and oats; we are less certain in respect to the maximum, which these species of grain, accommodating as they are, can support. We are even ignorant of all the circumstances, which favour the culture of corn between the tropics at very small heights. La Victoria and the neighbouring village of San Matheo yield an annual produce of four thousand quintals of wheat. It is sown in the month of December, and the harvest is reaped on the seventieth or seventy-fifth day. The grain is large, white, and abounding in gluten: its pellicle is thinner and not so hard as that of the wheat of the very cold table-lands of Mexico. An acre near Victoria generally yields from three thousand to three thousand two hundred pounds weight of wheat. The average produce is consequently here, as at Buenos Ayres, three or four times as much as that of northern countries. Nearly sixteen times the quantity of the seed is reaped; while, according to Lavoisier, the surface of France yields on a mean only five or six for one; or from one thousand to twelve hundred pounds per acre. Notwithstanding this fecundity of the soil, and this happy influence of the climate, the culture of the sugar-cane is more productive in the valleys of Aragua, than that of corn.

"Near San Matheo we find the last fields of wheat, and the last mills with horizontal hydraulic wheels. A harvest of twenty for one was expected: and, as if the produce were but moderate, I was asked, whether corn produced more in Prussia and in Poland. It is an error that generally prevails under the tropics, to consider grain as plants which degenerate in advancing toward the equator; and to believe, that the harvests are more abundant in the northern climates. Since calculations have been made on the progress of agriculture in the different zones, and the temperatures under the influence of which corn will flourish, it has been found, that, beyond the latitude of 45° the produce of wheat is no where so considerable, as on the northern coasts of Africa, and on the table-lands of New Grenada, Peru, and Mexico. Without comparing the mean temperature of the whole year, but only the mean temperature of the season which embraces the *cycle of vegetation* of corn, we find for three months of summer, in the north of Europe, from 15° to 19°; in Barbary, and in Egypt, from 27° to 29°; within the tropics, between fourteen and six hundred toises of height, from 14° to 25.5° of the centigrade thermometer.

"The fine harvests of Egypt and of the kingdom of Algiers, those of the valleys of Aragua and the interior of the island of Cuba, sufficiently prove, that the augmentation of heat is not prejudicial to the harvest of wheat and other alimentary grain,* unless it is attended with an excess of drought or moisture. To this circumstance no doubt we must attribute the apparent anomalies, that are sometimes observed between the tropics, in the inferior limit of corn. We are astonished to see to the east of the Havanah, in the famous district of Quatro Villas, this limit descend almost to the level of the ocean; while to the west of the Havanah, on the slope of the mountains of Mexico and Xalapa, at six hundred and seventy-seven toises of height, the luxury of vegetation is such, that wheat does not form ears.† At the beginning of the conquest, the corn of Europe was cultivated with success in several regions, which are now thought too hot, or too damp, for this branch of agriculture. The Spaniards recently removed to America were less accustomed to live on maize; they still adhered to their European customs; they did not calculate whether corn would be less profitable than coffee or cotton; they tried seeds of every kind; they interrogated nature with more boldness, because their reasonings were less founded on false theories. The province of Carthagena, crossed by the chain of the mountains Maria and Guamoco, produced wheat till the sixteenth century. In the province of Caraccas, this culture is very ancient among the mountainous lands of Tocuyo, Quibor, and Barquisimeto, which connect the littoral chain with the Sierra Nevada of Merida. It is still happily practised there, and the environs of the town of Tocuyo alone export annually more than eight thousand quintals of excellent flour."

It does not appear, from these extracts, that high temperature is such an insurmountable obstacle to the successful culture of the *Cerealia*, as the authors of the memoir would lead us to believe. They seem indeed to have been so captivated with the simplicity and conclusiveness of their theory, that they have disregarded many old and well known facts opposed to their conclusions. Still it is not too late; the same ingenuity that suggested their first very simple and beautiful series of experiments, might with equal facility indicate others leading to still more important results, by showing how we may be able to sub-

* This passage seems very strongly opposed to the deductions of Messrs. Edwards and Colin, but cannot be considered as invalidating their accuracy until supported by comparative statements of temperature at the time of sowing in the respective countries.

† Whether is this explanation of the non-production of ears, or that of Edwards, the true one? I myself feel inclined to adopt the latter as being the more probable of the two.

ject to our control, and at will modify according to our wants, the operations of those principles of vitality, with which nature has endowed plants for the perservation of the vegetable kingdom.

Before concluding these remarks, I will briefly advert to another subject of very great importance to Indian agriculture. Humboldt states that the inhabitants of Xalapa cultivate wheat, not for its grain, because there it does not rise into ear, but for its forage and pasture. The authors of the memoir inform us, that, sown in too high a temperature, the *Cerealia* do not produce stems, and rise to flower, but remain in the form of grass (*en herbe*), forming a beautiful rich turf, but that afterwards, on the diminution of temperature, they shoot afresh and produce grain crops. They further inform us that, in some parts of the south of France, especially in the delta of the Rhone, it is the practice to sow early barley in autumn, for their cattle in winter, and usually it gives abundance of pasture during that season, and with the requisite care afterwards, a crop of grain. Hence, they add, if it is judged advisable, we may take two crops from the same seeds, one of forage for cattle, the other of grain for man, and both of superior quality. In the Carnatic the greatest difficulty the agriculturist has to contend with, is the want of forage for his cattle during the hot season, constraining him to use cattle of very inferior quality and unequal to his work, merely because more easily fed. Might we not, by following the example of the Xalapeans and Provincians, supply ourselves as they do with abundance of the finest pasture and hay? I think we might—and by a very simple process—so simple, I believe it will be acknowledged by all, that it ought to be carefully tried. The subject is indeed well deserving the attention of all our agricultural societies, but more especially of our own, when the want of provender is annually so severely felt by the poorer ryots. The plan that I would propose for making the trial would be to sow wheat and other grains towards the end of the monsoon in December and January. If the statements and deductions of Messrs. Milne-Edwards and Colin are correct, the resulting crop ought not in the first instance to rise to stem and ear, but should form a rich pasture, the produce of which might be cut for hay or used for grazing during the whole of the hot season, the roots all the time extending and strengthening themselves for the final effort which is to close their existence, that of producing a crop of grain during the ensuing cool season.

As first experiments often fail, from the intervention of unforeseen circumstances difficult to prevent or even to detect in the first instance, I would recommend trials to be commenced as soon as possible, and repeated monthly, or at all events during the continuance of the petty monsoon and towards the close of the year. I have now sown two

small patches with wheat and barley, but feel rather uncertain about the quality of the seed; should they however germinate, I may possibly be able to estimate the probable result before the publication of this paper, in which case it will be communicated as a postscript. I am the more anxious to see this extensively tried, as success would at a moderate computation nearly double the value of land; first by the augmented return from it, and next by the means which it would afford of providing for a greatly improved breed of cattle. The improvement of our cattle is indeed daily becoming an object of greater importance, now that our internal commerce is increasing, and there is a prospect of our soon being able to bring into use the English plough, the economical employment of which, as an agricultural implement, must greatly depend on our ability to provide it with suitable draught cattle.

VI.—On two new Genera of Rasorial Birds.—By B. H. HODGSON, Esq.
British Resident in Nipal.

If a tythe of the attention which has been bestowed on the Insesorial, had been given to the game, birds, we should not now be obliged to wade through huge tomes in which the habits and manners of the latter are wholly overlooked, and their forms most vaguely discriminated, whilst all the stress of description is laid on colours!

In the absence of any competent guidance as to the affinities of the Tetraonidæ, I cannot speak satisfactorily of the relations of the two birds, I am about to describe, both of which are distinguished by remarkable peculiarities of form and habits, giving them a very decided, but osculant character.

Order—RASORES.

Family—TETRAONIDÆ.

Sub-family—PERDICIINÆ nobis.

Genus—LERWA nobis.

Bill shorter than the head, very strong, conspicuously arched throughout; the upper mandible greatly larger than the lower, and nearly concealing it. Nostrils small, opened subvertically towards the head, and closed in front and above by a very tumid, small, hard scale.

Intire head and base of the bill closely plumed. Plumage of the body very abundant, firm, and somewhat puffy and spinous on the croup. Wings and tail ample and strong. Wings ungradated: four first quills subequal: second, usually the longest of all. Tail 14,

straight, rounded. Legs and feet rather small. Tarsi plumed below the blunt small spurs. Acrotarsus reticulo-scutellate. Lateral fore toes subequal; hind perfect; the fores pectinated to the sides.

Habitat—The Himalayan region, in the immediate vicinity of the perpetual snow. Habits, gregarious in coveys; never perches; feeds on aromatic buds and leaves, on roots, insects and seeds. Trachæa simple. Intestines and cæca approaching the length in the grouse.*

Type, *Perdix Lerwa nobis*. Proceedings of the Zool. Society of London, September 1833. *Lerwa Nivicola nobis*. Affinity equal with *Perdix* and with *Tetrao*, leading from the one to the other.

Structure and size. 15 inches long by 24 in expanse of wings; bill $\frac{15}{16}$; tail 5; tarsus less 2; central toe $1\frac{6}{8}$; hind $\frac{7}{8}$; weight $1\frac{1}{2}$ to $1\frac{1}{4}$ lbs. Bill to head as 15 to 22, very stout, hard and uncompressed: maxilla not much rounded on the culmen, but spreading on the sides, and so much longer and larger than the mandibula as nearly to conceal it. Tomiæ somewhat scarp and trenchant. Nares small, opened vertically towards the head, closed in front and above by a tumid hard arched scale which is quite nude, though the thick set plumes at the base of the bill pass forward, under the scale, to the anteal point of the nostrils. Tongue somewhat fleshy, triangular, pointed and entire. Intestines 4 feet long, with cæca of ten inches each. Gizzard large, strong and dark-hued, $\frac{1}{2}$ to $\frac{3}{4}$ of an inch thick. Bottom of œsophagus dilated and glandular, but very remote from a galline crop. Head and orbits completely clad; plumage of the body very full, strong and composed; the shafts of the feathers, very strong towards their bases, and rather suddenly attenuated, particularly on the croup, whence results that peculiarity which is so noticeable in Cebbepyrine Shrikes. A small portion of the web of each feather, next the shaft, is very strong; but beyond that limit, the web passes suddenly into very soft down, and beneath each principal plume is a smaller one composed almost wholly of down. This relates to the interior of the plumage: for, externally, it is composed and of ordinary structure; only somewhat elongated and narrowed, but without lanceolation, on the flanks.

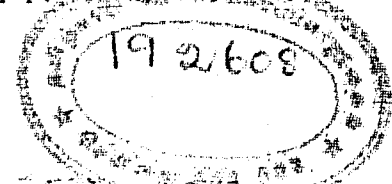
The wings extend considerably beyond the base of the tail, or, usually, to about three inches from its tip. They are very firm, unboved, and void of gradation in the prime quills, the 4 first of which are nearly of equal length, commonly exceeding the tertials by about $\frac{1}{2}$ an inch.

* Cervical vertebra 13. Dorsal, 7. Superior processes of the spinal column large, $\frac{1}{2}$ inch and more high. 3 false ribs. Scapula strong and flat. Cavity of the sternum, or chest and abdomen, very capacious, being 3 inches in depth, and 2 in width. Sternal crest or keel, moderate; and the sternum not much produced over the belly.

+ The peculiarity adverted to is not proper to our *Lerwa* alone, but is by no means so conspicuous in other allied birds.

Ms. 4. 3. 2

Ms. 7. 8. 7. 2



The latter, as well as the scapulars, are long and firm. The tail, like the wings, is distinguished by a strength and elongation, very unusual in the partridge tribe, and considerably surpassing the type of *Franco-linus*. It consists of 14, broad, round-pointed plumes, freely exerted from the coverts, and considerably graduated on the sides, so that the form is round at the end; above, it is broadly convex. The legs and feet are both small in relation to the size of the bird and to its *Perdicine* affinities, but without absolute defect of strength. The tarsi are clad on the inner side down to the insertion of the thumb or hind digit; on the outer side, somewhat less or a little below the spur. In front, they are nearly half nude, and wholly so behind.

The acrotarsial scales are divided angularly along the mesial line, as usual; but they are smaller and less regular in shape than in most of the Gallinaceous birds, and are, properly speaking, reticulo-scutellate, not scutellate nor biscutellate. The acropodia is perfectly scaled; the fore toes, membraned as usual; the lateral toes, nearly equal; the central, not long; the hind, short but perfect, and resting distinctly on its ultimate phalanx when the leg is bent. The lateral small scales of the fore toes are free, giving the pectinated appearance of the feet in the grouse, to which genus our bird has numberless affinities, external and internal; so much so that *Tetraoperdix* might very well designate the new genus I have proposed for it, if that word were not somewhat unmanageable, in comparison of our *Lerwa*, which I have therefore preferred, native though it be. The spur on the tarsus of the males is plainly developed, but small, blunt, and uncurved, except in very old males which show a slight curve and acumination in the spur.

These birds have the habits and manners of *Tetrao* rather than of *Perdix*. They are gregarious in coveys, nestle and breed under jutting rocks, feed on the aromatics, seeds and insects found in the proper Himalayan region, which they never quit, and amid the glaciers of which they take impenetrable refuge when disturbed. Trees they wholly avoid; and are usually found on the flatter and quasi-heathery ledges which form steps from the snow-bound summits of Himalaya. Our splendid pheasants occupy the same sites. The *Lerwas* moult, I think, twice a year, in spring and autumn; but certainly in autumn, their plumage being most imperfect in August. They are splendid game, with a vigorous flight, shy, and in size and strength equal to a grouse. Their flesh is white, succulent, and possessed of a very high flavour. The sexes resemble each other, and are of nearly equal size; nor do the young differ materially, except in being of duller hue, especially on the breast and flanks, which in the old birds shine with an intense chestnut brown or ochreous red colour. The young have the bill and legs dusky red.

Colour. Black, transversely lineated with white, which is irregularly smeared, especially in summer, with a rusty or chestnut* tinge. Chest and flanks, intense red brown, nearly the hue of the ripe chestnut fruit,* and largely picked out on the flanks with white, forming a broad margin to each plume. Lower tail coverts paler than the flanks, and edged with black within their pale tips. Prime quills immaculate and dusky: secondaries, largely whitened towards their ends. Bill and legs, intense coral red, smeared with dusky in young and in moulting birds. Nails dusky. Iris pale brown. A white patch under the wing, next the body.

PERDICINÆ.

Genus *ARBOROPHILA nobis*.

Type. *PERDIX OLIVACEA Latham?*

Piora of the Nipalese. Hill partridge and painted partridge of Europeans.

ARBOROPHILA OLIVACEA nobis.

Bill equal to the head, or nearly so, slender; the maxilla more than half cut out by a large membranous nareal tect, in which the advanced nares are opened longitudinally, near to the cutting edge, by an elliptic lateral downward cleft. Wings short, bowed and graduated, with the 5th quill longest. Tail 14, drooped, somewhat feeble, extremely rounded and concealed by the coverts. Legs and feet large. Tarsi elevate, unspurred, nude. Toes long; exterior lateral conspicuously larger than the inner. Nails lengthened and straightened. Cheeks invested with a red skin, which is nude in the orbital region.

Habitat—Central and lower regions of these hills, as well as most of the hilly districts of the Bengal presidency.

Habits and manners—Exclusively a forester, inhabiting the interior of deep woods, and perching as freely as a pheasant. Gregarious in coveys, breeds on the earth, feeds on the ground and on trees, eating berries, seeds and insects. Intestines and caeca longer than in *Perdix*, with a large powerful gizzard. Has a shrill twittering call. Is very timid and not at all pugnacious. Affinities, various; chiefly with *Perdix*; not determinable in the present state of Rasorial classification.†

Structure and size—Twelve ounces in weight, twelve inches long, by 18 to 19 in expanse. Bill 1. Tail 2½ to 3. Tarsus 2. Central toe 1⁹/₁₆. Hind 7⁷/₁₆. Bill equal to the head, remarkable for slenderness and straightness, as well as for the size, soft tect and advanced posi-

* Chestnut, the colour of the horse, is very different from chestnut, the colour of the fruit.

† Two pair only of false ribs. Scapula feeble and cylindrical. Sternum produced to the articulation of hip joints: its keel, high, Cervical and dorsal vertebrae 13 and 7, as before.

tion of the nares, which are nearer to the tip of the bill than to the gape. The tectis is nude and tumid, but soft and almost membranous; and it runs beneath, as well as above, the nostrils, besides limiting them before and behind. The bill and nares, in a word, bear the same relation to those of *Perdix*, as the bill and nares of *Hemipodius* do to those of *Coturnix*.

The tarsi are high and strong, quite nude, as well as half the knees, and they have the acrotarsial scales of full size, with the customary zigzag division upon the mesial line. The toes, also, are large; and the outer fore is signally longer than the inner. They are membraned as usual. The nails, with the ordinary gallinaceous attributes, are yet very noticeable for size and for straightness. One of the chief characters of this bird consists in the red cheek piece, which, however, is overlaid by close small plumes, except on the orbits. The nude skin is strong and rough, but not properly papillated, not at least as in the pheasants.

The rounded and gradated wings are very similar to those of *Perdix*. They have the 5th prime quill longest, and the tertials equally long. The wings reach within about two inches of the end of the tail. The 2d to 6th quills, inclusive, are emarginated, high up, on the outer web; entire on the inner. The tail is drooping, and nearly or quite hid by the coverts, but it is not feeble. At the point it is much rounded. The drooping of the tail, with a certain dumpiness in the figure of the bird, give it much the aspect of a quail. The intestines are 3 to 3½ feet long, with cæca of from 4 to 5 inches in length. The gizzard is large, dark, and from ½ to ⅔ of an inch in thickness. The bottom of the oesophagus is dilated and glandular; but there is no crop. The food consists of wild vetches, seeds, berries and insects.

Colour. It is very brilliant, and changes greatly in the progress towards maturity. The bird ordinarily figured and described is the female. The mature male, in perfect plumage, is as follows. Head and neck, superiorly, bright rusty red. Cheeks and chin immaculate black: sides and front of the neck black, picked out longitudinally with white. Ears immaculate rusty: a fainter stripe below them of the same hue but dashed with the black of the neck. A broad white gorget across the top of the breast. Breast immaculate slaty blue: flanks the same, picked out marginally by ochreous red, and showing a large longitudinal drop of white down the shafts. Centre of the belly and vent, white, dashed with rusty: rest of the bird, olive, immaculate, or shewing narrow transverse lunulæ, forwards; and round or heart-shaped blotches, backwards—both the marks being of a black colour. Undertail coverts, black with broad white tips to each plume. Scapulars, wing coverts and tertials, very largely margined with ochreous red, and the two latter, showing large globose drops of black near the end of each

feather. Alar and caudal plumes, internally, dusky, and for the most part immaculate, but exhibiting a freckled aspect on the external edge by confusion of the proximate hues. The female has the top of the head and neck olive, like the back; the bright rusty hue of those parts in the male being transferred to her throat and front of her neck. Her cheeks are, for the most part, hoary white, more or less dotted with black, sublinearly from the beak under the eye to the ears. Her breast is blue, like the males: but she has no white gorget across the top of it. A line of black dots encloses the red throat and frontal neck, passing from the eye like a zone down either side of the neck, and meeting on the top of the breast, in the situation of the male's gorget. In both sexes the bill is always black, and the orbital skin crimson: but the legs change from fleshy blue grey with a reddish tint into deep red. The iris is brown: the nails horn colour, passing with the legs and feet, into red. The young at first resemble the female, assuming the mature plumage very gradually in the course of three moults, with transitions too tedious for my taste. But the species, in all its changes, may be instantly known from what has been above stated.

I am tempted to add to the above generic definitions, another calculated for our Hill Chikore, the *Perdix Chukor* of Hardwicke, but which differs materially from the type both of *Perdix* and of *Francolinus*. It has a bill stronger than either, and, with the nares, extremely resembling those of our *Lerwa*; but the bill is more compressed; and the Chukore is distinguished by a strength of legs far surpassing any bird of the family. It has some other peculiarities which the following character may perhaps serve to portray, as a new generic or sub-generic type.

Bill shorter than the head, exceedingly strong, with a large vaulted compressed maxilla, and nearly concealed mandibula. Nares subvertical, small, opened obliquely towards the head. Head plumose. Edge of the eyelids nude and red. Legs and feet very strong. Tarsi nude, sufficiently elevate, with heavy salient scales and blunt spurs. Wings not bowed, scarcely gradated, 3d quill usually longest, 1st and 2d not much less: all three narrowed towards the points; the primes emarginated on both webs. Tail longish, firm and straight, but nearly concealed by the coverts.

If the above distinctions appear worthy of notice, the genus or sub-genus may be called *Chacura*; and the typic species *Chacura pugnax*.

Habits, exclusively monticolous, on elevate bare, dry, stony slopes; gregarious in large coveys. Lays many eggs of a white colour, in a careless nest, after the manner of the partridges. Has a very sonorous call, and the males are famous for courage and pugnacity, being most easily tamed and shewing none of the shyness of the generality of partridges.

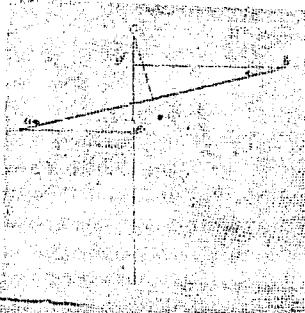
VII.—Remarks upon the Plans proposed for Constructing a "Self-Registering," and an "Indestructible" Barometer.—By T. G. TAYLOR, Esq. of the Madras Observatory.

In the January No. of the Madras Journal of Literature and Science, some attempt has been made to meet the present wants of the meteorologist, by supplying him with a barometer which promises to be "indestructible," or, in other words, one which is little liable to get out of order with ordinary rough usage; and in the same No. of the Journal, a further attempt at meteorological improvement is made, in the way of a self-registering barometer. That an indestructible barometer is much wanted, is a fact but too well known to every one who has used the ordinary instrument for any length of time on a march or even at a fixed residence; and the importance of a self-registering barometer is such, as to render any attempt at its accomplishment a matter of interest. With this view of the subject, and considering that the plans proposed for both of the above purposes are more or less true in theory, I have thought it may not be unacceptable to offer a few remarks relative to their practical utility.

In the first place it must be noticed with regard to both of these plans, that the employment of a metallic tube is highly objectionable, by reason of the little dependence which can be placed in it, to maintain a perfect vacuum for any length of time, even for a day:—not to offer an opinion gratuitously, however, I may mention the experience of Captain Sabine, of the royal artillery. Captain Sabine, requiring an air-tight apparatus, employed Mr. Newman, the justly celebrated and careful philosophical instrument maker. Mr. Newman, fully aware that cast-iron could not be trusted, employed gun metal, and that too of three-quarters of an inch in thickness. The gun metal failed; and an air-tight apparatus was only obtained at length, by covering it on both sides with three coats of paint. In addition to this, and bearing more immediately on the point in question, I may state, that a barometer, constructed upon the "indestructible" plan, has lately been subjected to trial at the Madras Observatory. The tube was made out of a well twisted London-made gun barrel; this of itself proved unequal to exclude air, but was afterwards made tight by a coating of caoutchouc varnish—a precaution, however, which was eventually of no avail, for, on the application of fire, for the purpose of boiling the quicksilver in the tube, the leakage recommenced, so that nothing further, could be done with it.

With regard to the self-registering barometer, the idea is certainly, at first sight, a very pretty one, and, but for the metallic tube, apparently unobjectionable. Since, however, a metallic tube is not absolutely necessary, we will take the liberty of introducing in its stead a

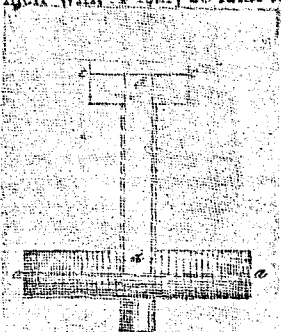
glass one. We will suppose (as is necessary) that the whole machine is constructed in Europe, where every obstacle in the shape of workmanship vanishes; and consider for a moment the principles of the instrument. In the first place, it will be observed, that the barometer-end of the balance (if we may so term it), has to support a column of mercury of two square inches area, and two inches depth; in addition to which we have to add a tube of iron, whose weight is varying at every fluctuation of the barometer; for it must be recollected that the part immersed in the quicksilver lessens the weight imposed upon this end of the balance to the amount of the weight of an equal volume of quicksilver. Let us suppose, however, that this objection is got rid of (as indeed it can be), by a proportionate allowance in the divisions of the scale, and proceed, in the next place, to notice what takes place when the barometer rises, or when an additional weight is imposed upon the barometer-end of the balance. If the centre of gravity of balance coincides with the axis of support, it is evident that, on a rise (however small) taking place, down goes the barometer, until the lower extremity touches the bottom of the basin *c*—but if, as is usual in practice, the centre of gravity of the balance is *below* the axis of suspension, what then will be the result? If *a* *b* represent a balance, supported at *c*, and *c* *d*, a plumb line;—on imposing an additional weight at *a*, that end will descend until the product of the weight on *a* into the perpendicular *a* *e*, equals the product of the weight on the end *b* into *b* *f*. Here we see two objections to the self-registering barometer No. 1: 1st, that, in order to ascertain the amount of rise or fall, it becomes necessary by trial to adjust the axis of suspension, to such height above the centre of gravity, as shall render the scale



we may have adopted correct: 2dly, that the scale, when rendered correct at the zero or any other point, will not be correct for any other point of indication; unless, indeed, we here again have recourse to computation, and from a table of corrections, or compute the value for each division and engrave our scale accordingly. On account of friction (which we have no very certain means of making allowance for in calculations of this sort) it is impossible to say where the centre of gravity should be placed, so that an alteration in the pressure would be read off from a scale of inches, as seems to be Dr. Gilchrist's intention; but, setting aside friction, and assuming the weight of the baro-

meter 15 pounds; it should be about two inches above the centre of gravity.

The above remarks were set down as memoranda on first reading over the papers to which they refer; but, on a second and more careful reading, an objection has offered, which will, I fear, be fatal to the balance barometer;—this I will now proceed to explain.—Let *aa* represent the surface of the quicksilver, which being large with regard to the tube *bb*, we may suppose to be fixed, since we can make allowance for its fluctuations; *cc* represents the surface of the quicksilver, corresponding to any given pressure, (29 inches for instance)—Now the weight imposed upon the barometer-end of the balance, is that of the tube, and of a cylinder of quicksilver which may be imagined to surround the column *dd*, which is supported by the pressure of the atmosphere. Let us suppose the atmospheric pressure to be increased to 29.5 inches; what now takes place? The surface *cc* rises to *ee*, and consequently an additional weight (proportional to *ee*) is imposed upon the barometer-end of the balance;—now the effect of this weight being to lower the whole tube bodily, it follows that a further rise of the surface *ee* will take place, and that, successively, cause and effect will ensue, until the entire tube is filled, or the end of the tube “brought up” by the bottom of the cistern.



The form No. 2 seems to claim attention principally from being constructed of a metallic tube. Leaving this consideration out of the question, it is by no means clear that the plan proposed is more free from objections than many which at present exist. How are we assured that a bubble of air does not exist in the quicksilver between *c* and *c*? For, allowing the stop-cock to be air-tight, still, in the course of carrying, the quicksilver in the short leg being in contact with air, and being agitated forward and back, will assuredly sometimes take up a bubble of air, and thereby render the reading erroneous.

With regard to the self-registering apparatus, it appears to be well adapted to the purpose intended; but the objections to the barometer, which it is proposed to be employed with, must be surmounted, when the self-registering barometer will no doubt be brought into general use.

VIII.—Contributions to Indian Botany, No. 2.—By ROBERT WIGHT, Esq. M.D., F.L.S., &c. Member of the Imp. Acad. Naturæ Curiosorum. Surgeon on the Madras Establishment.

DICTYOCARPUS.*—R. W.

MELOCHIA, Willd.—RIEDLEIA, D' Cand. Prod. Syst. Nat.—Wight and Arnott, Prod. Fl. Ind. Orient.—SIDA, Roxb. Fl. Ind. Vol. 3d.

Nat. Ord. MALVACEÆ.—Linn. Syst. MONADELPHIA DECANDRIA.

When Mr. Arnott and myself were elaborating the orders Malvaceæ and Byttneriaceæ for our work, the specimens of this plant we had to consult, were unfortunately so imperfect, as to prevent a careful analysis of the parts of fructification. We were consequently constrained to follow, without sufficient examination, the determination of the justly celebrated botanist (Willdenow) who had first described it from, we presumed, good specimens, aided by a short but precise character, from the pen of the late Dr. Klein of Tranquebar, who sent him the specimens. With these materials before him he referred the plant to the genus *Melochia*. Decandolle afterwards without seeing it, but guided by Willdenow's description referred it without doubt to the genus *Riedleia*. Roxburgh who, perhaps about the same time, or even earlier than Willdenow, examined it and had a drawing taken (which was sent with the rest of his collection of drawings to the India House), named it *Sida retusa*; afterwards, I presume from becoming acquainted with the true *Sida retusa*, he changed the specific name but retained the generic one.

Since the publication of our Prodrômus, I find that Mr. Arnott has, in an article in the *Annales des Sciences Naturelles*, vol. 2d, page 230, quoted this plant as a true species of *Riedleia*; while he expresses a doubt as to the other species we have referred to the genus being really species of it, whether as the result of after examination does not appear. A slight examination, on my return to Madras in 1834, of recent specimens, having led me to doubt the correctness of Willdenow and ourselves in referring it to a Byttneriaceous genus, this last remark of Mr. Arnott determined me to re-examine it with care, so soon as I could procure specimens. Owing to its extreme rarity in the southern provinces, I had no opportunity of doing so until my present visit to Madras (where it is a common plant); the result is that I find it to be neither a *Melochia*, nor a *Riedleia*, nor referable to the same natural order; but that it forms a genus so very nearly allied to *Sida*, that might perhaps be referred to it, were it not already so overloaded with species that it is extremely difficult to unravel them.

* ΔΙΚΤΥΟΝ rete, Καρπός fructus; in allusion to the reticulated carpels.

The essential character by which Malvaceæ are distinguished from Byttneriaceæ is their one celled anthers, usually bursting transversely across the apex. In Byttneriaceæ they are two celled and open outwardly. The first step therefore was to determine the natural Order of my plant—it is a true Malvaceæ. The next point was to ascertain whether it was really the same as the one described by Klein and Willdenow. A comparison of the accompanying figure, with the following very succinct character by Klein transmitted with the specimens to Willdenow, will, I think, leave no doubt on that head. "Calyx 5-fidus: Corolla monopetala, 5-partita, basin tubulosa: stamina 10 monadelphia: germen depressum, styli 5, longe flexuosi: capsula depressa, 5-locularis, 5 spermata: semina reticulata trigona." Roxburgh's description corresponds in every essential particular except the last 'semina (carpella) reticulata,' as he speaks of them being "pretty smooth," which does not, however, detract from his known accuracy, since it is not till near maturity that they become strongly reticulated, a state in which he might not have examined them, or he may not have observed it, as it is not till the carpels are removed from the calyx that this beautiful structure comes into view.

Having ascertained its identity with the plant of these authors it only remains to determine the genus.

On comparing the characters above quoted with those of the genus *Sida*, I find only one of any weight in which they differ. In *Sida* the stamens are indefinite, here they are constantly definite, twice the number of the petals. Is this a sufficient ground for its separation?

According to the Linnean system, which attaches perhaps an undue weight to the number of stamens, it might be supposed a sufficient reason, and I have no doubt that that alone induced Willdenow to refer it to a genus with definite stamens, though with only half the number, without adverting to the great difference of structure of the anthers. According to the natural system, which pays somewhat less respect to characters taken from the number of stamens alone, other characters being alike, the grounds for separation are not quite so satisfactory; though, for the reason above stated, it seems desirable, as much as possible, to curtail that already overgrown genus, on which account I propose keeping this plant distinct, almost solely on the ground of its definite stamens.

DICTYOCARPUS.

Gen. character.—*Calyx* 5 cleft persistent, without an involucrel. *Ovary* 5 celled, with a solitary ovule in each. *Stamens* 10; *filaments* united at the base, free above. *Styles* 5. *Stigmas* capitate. *Carpels* 5, 1 seeded mucous, reticulated at maturity.

A small rather rigid ramous shrub. *Leaves* truncated cuneate. *Stipules* petiolar subulate. *Flowers* solitary on the ends of the branches. *Fruit* flattened, somewhat depressed.

D. truncatus.—R. W.

Hab. Frequent in waste grounds about Madras.

Melochia truncata Willd : sp. 3. page 601—*Sprengel, Syst* : 3. p. 29.
Riedleia truncata De C. *Prod* : *Syst.* 1. p. 491.—*Wight and Arnott.*
Prod : *Fl. Peninsul. Ind. Orient* : vol. 1. p. 66.
Sida cuneifolia. Roxb. *Fl. Ind.* vol. 3d. p. 170. *Hort. Beng.* p. 50.
Sida retusa. Roxb. in *E. I. C. Mus.* tab. 341.

REFERENCES TO PLATE 19.

1. A branch natural size.
2. A leaf, and stipules adhering to the petiole.
3. Flower.
4. Calyx, ovary, style, and stigmas.
5. Ovary cut vertically.
6. ——— transversely.
7. Anther.
8. ——— burst, with grains of pollen.
9. Carpel separate, showing its reticulation.
10. ——— cut vertically, showing the embryo and erect radical in situ.
11. Embryo removed from the enclosing albumen, the foliaceous cotyledons drawn aside to show the radicle, which points towards the apex of the seed—all more or less magnified.
12. Carpels united into a 5-celled capsule—natural size.

NIMMOIA.—R. W.

Nat. Order SAXIFRAGEÆ.—Lin. Syst. TETRANDRIA MONOGYNIA.

Among a small collection of Bombay plants, recently communicated by Mr. Nimmo of that place, was one, the general appearance of which struck me as peculiar ; it seemed to differ from any Indian plant I had hitherto met with. This circumstance induced me to examine it with care, and I was much pleased to find it form the type of a new genus of a family nearly unknown in Southern India,* though frequent

* Vahlia is the only known peninsular genus of this order.

in temperate climates, and extending northwards to within a few degrees of perpetual snow.

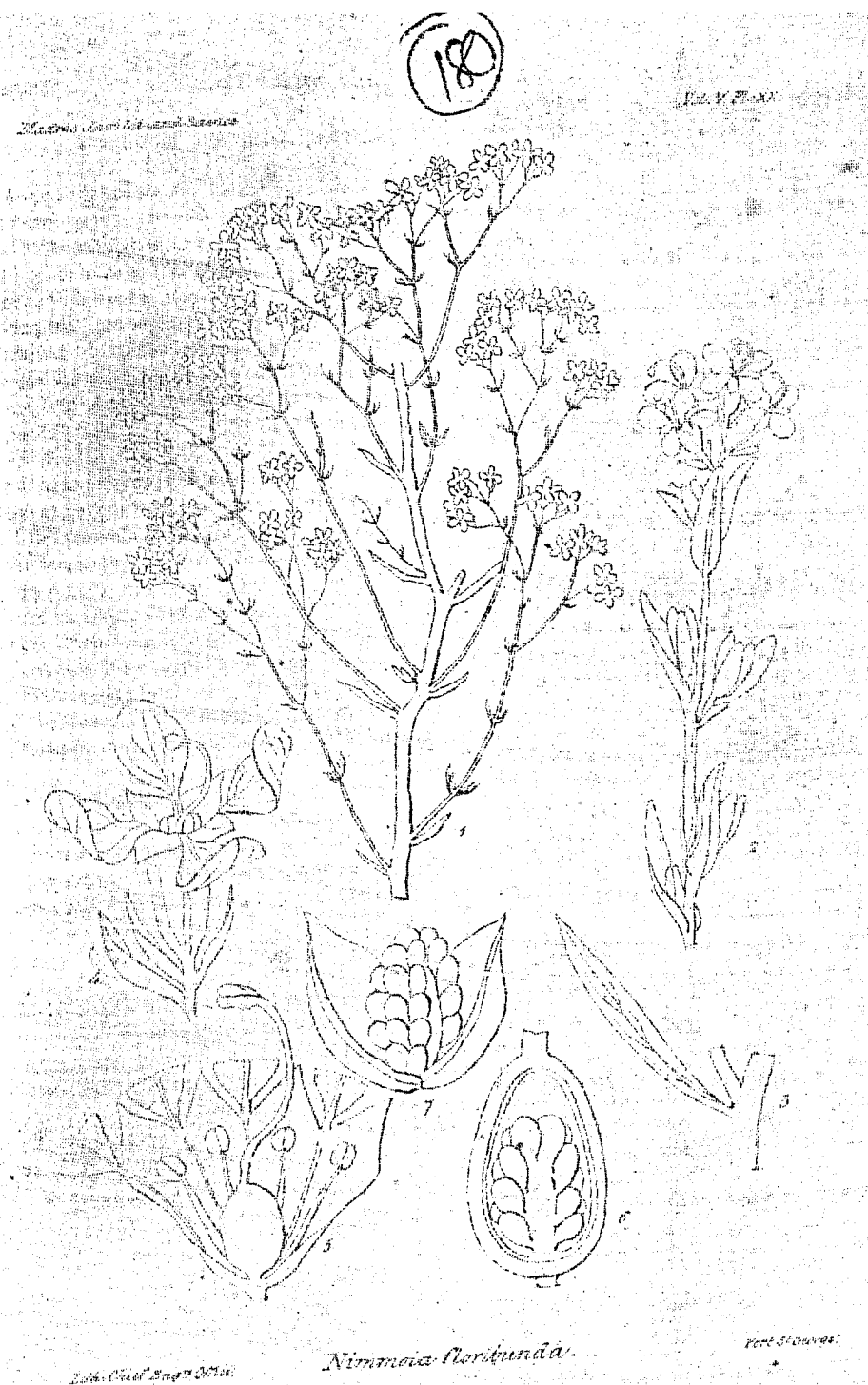
I was the more pleased with this discovery as it affords me the opportunity of commemorating in the annals of Botany the name of its finder, who has been long an assiduous investigator of the rich flora of that hitherto inadequately explored coast, and who is now the acknowledged head of the *Corps Botanique* of Bombay: a gentleman, whose diligence in collecting, is only equalled by his liberality in distributing the proceeds. With his aid, and that of Mr. Graham, already favourably known to the readers of this Journal by his catalogue of Bombay plants, I hope to have many opportunities of enriching these contributions, and enlarging the catalogue of Indian plants.

Gen. character.—*Calyx* four sepaled; *sepals* cohering, not united to the ovarium. *Petals* four, obovate entire, shortly unguiculate, attached to the top of the calyx, and alternate with its lobes. *Stamens* 4, alternate with the petals, attached to the middle of the tube of the calyx; *filaments* decurrent. *Anthers* 2 celled dehiscing longitudinally. *Ovary* free, sub-pedicellate, imperfectly 2 celled. *Ovules* numerous, attached to an erect central placenta, adhering below to the inflexed margin of the valves, free above. *Style* single, filiform. *Stigma* large, two lobed. *Capsule* free, included within the persistent calyx, 2 valved, incompletely 2 celled; dehiscing transversely across the apex, many seeded. *Seeds* small oval, testa transparent. *Embryo* central, the length of the seed, radicle pointing to the hilum.

Plant herbaceous, glabrous, very ramous. *Leaves* coriaceous, alternate, sessile, cordate at the base, lanceolate acute above, exstipulate. *Flowers* small, red, congested in numerous clusters on the ends of the branches, each bibracteate. *Calyx* and petals persistent; capsule included, dividing the base of the style into two parts during dehiscence.

N. floribunda, R. W.

This genus, though agreeing in every particular with the character of the order to which I have referred it, yet has not a single associate with which I can compare it, or with which it can be confounded; the quaternary division of its parts, with its free shortly pedicellate ovary, effectually separate it from every other genus of the order. *Vahlia*, perhaps the most nearly allied genus, has the calyx cohering with the ovary, and the placenta pendulous from the apex of the cell. Here the case is exactly reversed, the ovary is free, and the placenta erect.



Nimmoia floribunda.

Nimmoia floribunda.

R. W. 180

References to Plate 20.

1. Branch—natural size.
2. Branchel showing the sessile, cordate, exstipulate leaves and terminal cluster of flowers.
3. Stalk and leaf from the lower portion of the branch, showing the inferior leaves lanceolate.
4. Flower with attached leaf and 2 calycine bracts.
5. Calyx laid open to show the attachment of the stamens and petals, the pedicellate free ovary, style, and 2 cleft stigma. The limb of the petals cut off.
6. Ovary divided vertically, showing the erect placenta and numerous ascending ovules.
7. Capsule burst, valves drawn somewhat aside to the placenta and seeds—All more or less magnified.

IX.—*Notice of an Observation of the Lunar Spot Aristarchus.*—
By T. G. TAYLOR, Esq. of the Madras Observatory. H. E. I. C.
Astronomer.

"At seven o'clock in the evening of the 10th March 1837 I was watching the approach of the Moon's dark border to a star of the 9th magnitude, when my attention was arrested by the appearance of a nebulousity, about as bright as a star of the 6th magnitude, situated upon the Moon's disc, at about four minutes from the unenlightened edge; on referring to a chart of the Moon, the phenomenon evidently proceeded from the spot Aristarchus. I have frequently looked for this appearance during the early age of the Moon, but have never before seen any thing to compare with the brilliancy which I on this occasion witnessed."—*Extract from the Madras Observations.*

The above, it must be acknowledged, offers nothing particularly new; on the contrary, the appearance of Aristarchus as a luminous mass when the Moon is two or three days old, was noticed at least twenty years ago. This spot has always been distinguished, as being the brightest upon the Moon's surface when subjected to the influence of the sun; and, when *not* so influenced, it has at times (when the Moon was two or three days old) exhibited a more or less degree of brilliancy. To account for this phenomenon, Captain

Kater has supposed that a volcano in the act of eruption was the cause; whilst others, again, presuming on the Moon being destitute of an atmosphere, have doubted if, in the absence of oxygen, combustion could take place. It has otherwise been accounted for by supposing this part of the Moon to consist of a somewhat polished surface, and that the varieties of brilliancy were due to changes in the powers of transmission possessed by our atmosphere. However true this latter supposition may be for the variable climate of England, where the observations of this spot have chiefly been made, it cannot, with any degree of propriety, be applied to the fine months of December, January, or February in this country, where an uniformity of temperature and pressure, and consequently tranquil sky almost mechanical exists.

It is somewhat remarkable that, during the last ten years, notwithstanding that observers and well constructed telescopes have very much increased in number, still there has not a single notice appeared of this phenomenon having been observed by any one. From my own experience at Madras during the last six years I can state, that on one or two occasions only have I ever even *fancied* that I could distinguish any thing particular in the appearance of this part of the Moon, although my observations for this purpose have been unremitted.

To those who entertain the idea of a volcano in the Moon, the present notice would seem to favour their supposition exactly. The volcano has been quiet during the past ten years and has now burst forth again! A little reflection, however, upon the nature of the motion of the Moon's orbit will show us, that such a supposition may be dispensed with. In the case of a highly polished plateau of land being the cause of the phenomenon in question, its reappearance might be deferred during an interval corresponding to half the period of the regression of the nodes ($9\frac{1}{2}$ years)—but, conjointly with this cause, taking account of the other various disturbances to which the Moon and her orbit are subjected, it is easy to perceive that the occasional appearance and disappearance of Aristarchus may be fully accounted for.

X.—Hourly Meteorological Observations made at the Equinoxes and Solstices, agreeably with the suggestion of Sir JOHN HERSCHEL.

1st.—At the Madras Observatory—By T. G. TAYLOR, Esq.
H. E. I. C. Astronomer.

1837	Time.	Baro- meter.	Ther.	Wind.	REMARKS.
Mar. 20	6 P. M.	29.840	83.4	S.	Clear gentle breeze
	7 "	.850	82.1	S.	do. do. do.
	8 "	.862	81.1	S. E.	do. do. do.
	9 "	.870	80.0	—	do. and calm
	10 "	.876	78.8	E.	do. gentle breeze
	11 "	.878	77.7	E.	do. do. do.
	12 "	.850	76.5	S.	do. do. do.
	1 A. M.	.834	76.2	S. E.	do. very do. do.
	2 "	.820	75.5	S. E.	do. do. do.
	3 "	.810	76.2	W.	Flying clouds do. do.
	4 "	.808	76.4	W.	do. haze do. do.
	5 "	.812	74.8	W.	Clear do. do.
" 21	6 "	.822	74.2	—	Flying cds. calm
	7 "	.848	77.2	—	Clear do.
	8 "	.872	80.0	S.	do. strong breeze
	9 "	.890	82.9	S.	Flying clouds do. do.
	10 "	.896	85.8	S.	Clear do. do.
	11 "	.890	85.0	E.	do. do. do.
	12 "	.872	85.7	S. E.	do. do. do.
	1 P. M.	.840	86.0	E.	do. do. do.
	2 "	.816	86.3	E.	do. do. do.
	3 "	.788	86.3	S.	do. do. do.
	4 "	.790	86.5	S.	do. do. do.
	5 "	.792	84.5	S. E.	do. do. do.
" 22	6 "	.830	82.4	S. E.	Clear moderate do.
	7 "	.830	81.3	S. E.	do. gentle do.
	8 "	.842	80.6	—	do. calm
	9 "	.844	79.4	—	Haze do.
	10 "	.856	78.3	S. E.	Clear moderate breeze
	11 "	.846	77.9	S.	do. gentle do.
	12 "	.830	77.8	S.	Clear do. do.
	1 A. M.	.806	76.9	S.	do. very do. do.
	2 "	.792	76.8	W. by S.	Fl. cds. and do. do.
	3 "	.770	76.0	W. by S.	do. do. do.
	4 "	.764	75.0	W. by S.	do. haze do. do.
	5 "	.770	74.3	W. by S.	Flying clouds do. do.
" 23	6 "	.776	74.2	S. E.	Clear do. do.
	7 "	.800	76.6	S. E.	Flying clouds do. do.
	8 "	.814	79.7	S. E.	do. strong do.
	9 "	.828	83.7	S.	do. do. do.
	10 "	.836	84.9	S. E.	do. do. do.
	11 "	.820	86.2	S. E.	do. gentle do.
	12 "	.816	85.7	S. E.	Clear strong do.
	1 P. M.	.792	85.8	S.	do. & haze do. do.
	2 "	.770	85.8	S. E.	do. do. do.
	3 "	.756	87.0	S. E.	do. do. do.
	4 "	.742	86.4	S. E.	Haze do. do.
	5 "	.756	85.4	S.	do. do. do.
	6 "	.774	82.7	S.	do. do. do.

Day.	Hour.	Dry thermometer.	Wet bulb thermometer.	Barometer.	WINDS.	CLOUDS, &c.	REMARKS.
Mar. 21	6 A. M.	68	63	27.548	E. N. E. occasional airs.	Dense fog.	
	7	72	67	55	Do do do rather stronger.	Fog nearly gone.	Dew.
	8	75	69	57	Do steady do.	Zenith rather hazy, horizon much so.	
	9	80	69	59	E. airs merely perceptible.	Do do do less do.	
	10	81	69	60	Calms.	Do do do hazy	
	11	85	69	62	E. N. E. occasional puffs.	Do do do do	
	12	82	66	61	Do do do rather strong.	Do clear do	
	1 P. M.	91	65	60	Do do breeze somewhat gusty.	A few detached white cumuli scattered over sky; horizon still hazy.	Cumuli rose from the W. showing an opposite upper current of air.
	2	92	64	59	N. E. breeze somewhat gusty.	Large dense, detached cumuli W. horizon.	Whirlwinds frequent.
	3	91	63	59	S. E. by E. do do	dense white cum-strati.	
	4	90	63	58	W. N. W. do.	Cumulo-strati	
	5	91	62	57	N. E. light breeze.	Zenith cirri, horz. cumulo-strati & hazy	
	6	87	72	56	N. W. breeze.	Cumulo-strati.	
	7	81	71	55	S. W. strong breeze.	Zenith clear, horizon hazy, a few cumuli E. horizon.	Wind has changed frequently last hour between N. E. and N. W.
	8	78	71	53	Do breeze.	Hemisphere hazy.	
	9	77	71	53	Do do.	Do do.	
	10	76	71	53	Do light breeze.	Do do.	
	11	76	70	52	Do airs occasionally somewhat gusty.	Zenith cirri—horizon hazy.	
	12	76	70	51	Do do.	Overcast with cumuli.	
22	1 A. M.	73	70	50	Do do.	Hazy—a few small cumuli.	
	2	74	70	50	Do light breeze.	Do, small cumuli W. horizon.	
	3	73	69	50	Do light breeze.	Small cumulo-strati.	
	4	71	68	51	Do airs.	Do.	34. 31m. length of shadow 6.600 inches—
	5	71	68	51	Calms.	Hazy.	es, upright being 6 inches.
	6	70	67	50	Do.	Do.	4h. 16m. do do 14.534 do do.
	7	69	66	51	Do.	Do.	The longer the shadow the less distinct the termination.
	7	72	69	50	Do.	Do.	

8	75	68	52	N. W. occasional light airs.	Hazy.	Thermometer in sun 94
9	81	70	50	Calms.	Zenith cloudless, horizon hazy, a few thin cirri S. W.	
10	84	68	50	S. E. occasional light airs	Zenith a few cirri, horizon hazy	
11	87	64	50	Do do	Do cloudless, do do a few cirri S.	
12	88	66	50	S. S. E. light breeze occasionally gusty.	Do cirri do do	
1 P. M.	84	65	50	Do do	Do strati do do	
2	90	64	50	Do breeze	Do cirri, horizon hazy, dense white cum-strati have risen near to zenith all round	
3	91	65	49	Do light breeze	Do and W. quarter dense cumuli, horizon cum-strati.	
4	90	64	49	E. S. E. do	Sky hazy, cumulo-strati and strati	Wind very disagreeable, feels like hot steam.
5	87	72	49	S. W. breeze	General aspect of sky hazy, thin cirri and cumuli in various directions.	
6	82	71	47	Do steady		

The instruments used in making the above observations were placed at a window, having a northern aspect, uninfluenced by radiation or reflection. The dry thermometer was in July 1835 compared with the standard one then in use at the Madras Observatory, and found to be correct—the wet bulb thermometer coincided with the dry one, previously to applying a piece of gauze to the bulb.

The barometer was compared with the one in use at the Madras Observatory in July 1835 and found to indicate .042 too high. The heights of the mercurial column given above, are those as read off without any correction for the error of instrument just mentioned, or for reduction to 32° Fahr. of temperature of mercury.

The shadow was determined by an apparatus fitted up for the purpose—consisting of a rod of iron pointed at top, and rising perpendicularly to the height of six inches, exactly above the plane of a piece of wood 24 feet long by two inches broad. At each corner of the wood a screw is placed by way of foot, by which is effected the adjustment of the upper surface of the wood to the true horizontal as indicated by two levels attached to it at right angles to each other. In order to see distinctly the shadow, a piece of white paper was pasted on the upper surface of the wood, with every care to preserve a level surface. The termination of the shadow was picked off at the respective times of observation, and the length between the mark and the semi-diameter of the wire was measured with the detached scale of a barometer the vernier of which read off to 1-500th of an inch.

Hoonsoor is W. 12° South of Springapatam, distant 23½ miles, and is W. 5° N. of Mysore distant 26 miles.

3d.—At the Trevandrum Observatory.—By JOHN CALDECOTT, Esq.

Date.	Hour.	Barom. corrected for temp. of 32°	Therm.	Depression of wet bulb.	Direction of wind.	REMARKS.
Mar. 21	6 A. M.	29.917	78.4	4.9	Calm	
	7	.914	77.8	4.0	"	Light air.
	8	.914	78.4	6.6	"	"
	9	.947	80.1	7.6	N. by W.	Increasing.
	10	.956	82.7	9.7	N. N. W.	Fresh breeze.
	11	.946	84.8	9.3	"	"
	Noon	.911	86.6	9.9	N. W.	Strong "
	1 P. M.	.889	86.9	9.4	"	"
	2	.876	87.	9.5	"	"
	3	.863	86.5	10.0	"	"
	4	.850	86.8	9.8	"	"
	5	.852	85.9	9.4	"	Moderate "
	6	.874	84.9	8.5	"	Gentle "
	7	.877	83.5	7.0	"	"
	8	.902	83.0	6.7	"	"
	9	.920	83.0	6.7	"	"
	10	.902	82.8	7.3	"	Very light "
	11	.903	82.6	5.3	Calm.	"
	Midnight	.895	81.4	5.6	"	"
22	1 A. M.	.892	80.7	5.8	N. by E.	Gentle "
	2	.885	79.6	5.8	"	"
	3	.879	79.4	6.7	"	"
	4	.880	79.2	6.8	"	Increasing "
	5	.871	79.0	7.8	"	Fresh "
	6	.866	78.9	4.2	"	"
	7	.866	78.8	4.1	"	Light "
	8	.894	80.0	4.5	"	"
	9	.894	81.8	6.5	"	"
	10	.908	83.8	8.3	"	Increasing "
	11	.826	85.0	12.7	N. N. W.	Moderate "
	Noon	.879	88.0	10.5	N. W.	Fresh "
	1 P. M.	.840	83.5	10.0	"	"
	2	.824	83.8	10.5	"	"
	3	.818	88.5	11.5	"	Light "
	4	.802	83.1	10.4	"	"
	5	.807	87.9	10.4	"	Very light air.
	6	.836	86.3	8.1	"	"

The barometer used in these observations is a chamber one by Wrench; and from comparison with a fine syphon barometer made by Robinson, it appears to be an instrument worthy of confidence.

The correction for temperature is deduced from the formula $t - 32^{\circ} \times .003 B$ with the addition of .075 as the constant for capillarity.

The thermometer is a standard by Troughton, and the indications of the wet bulb thermometer are reduced to it.

The time is the true mean time of the Trevandrum Observatory, in Lat. $8^{\circ} 20' N.$ Long. $54^{\circ} 52' E.$

The elevation of the building in which the observations were made is not yet well ascertained, but may be assumed, without a possibility of much error, at 53 feet above the level of the sea (which is about two miles distant from the Observatory)—the heights of the mercurial column in the list are therefore those due to this elevation.

XI.—PROCEEDINGS OF SOCIETIES.

Proceedings of the Madras Literary Society and Auxiliary Royal Asiatic Society.

WEDNESDAY, 15th March 1837.

PRESENT.

The Hon. Sir ROBERT COMYN, President, in the Chair.

The Ven. Archdeacon H. HARPER,

A. D. Campbell, Esq.

Rev. H. Cotterill,

Walter Elliot, Esq.

Æ. R. MacDonell, Esq.

J. Minchin, Esq.

A. P. Onslow, Esq.

J. Ouchterlony, Esq.

Captain M. J. Rowlandson,

Reverend F. Spring,

J. Thomson, Esq.

R. Wight, Esq.

R. COLE, Esq. Sec. Asiatic Dep.

The Secretary in the Asiatic Department, for Mr. Morris, who was unavoidably absent, submitted to the Meeting Statements of the Society's Accounts for the past year.

Abstract Statement of the Funds of the Madras Literary Society and Auxiliary of the Royal Asiatic Society, from the 1st January to the 31st December 1836.

	DISBURSEMENTS.			RECEIPTS.		
Balance in favour of the Society as exhibited in the statement, submitted to the general meeting, held on the 30th January 1836.....	....	..	..	319	10	7
Total amount of subscriptions received from the 1st January to the 31st December 1836.....	....	..	..	4522	5	4
Books sold on account of the Society.....	....	..	..	27	13	8
Difference of interest in favour of the Society as stated in Messrs. Binny and Co.'s account, closed on the 31st December 1836.....	....	..	..	9	2	0
Messrs. Binny and Co.'s commission on amount of receipts.....	50	0	10			
Remitted to Messrs. Wm. H. Allen and Co. booksellers.....	2042	8	10			
Pay of the establishment.....	1426	14	0			
Paid for books purchased at Madras.....	23	0	0			
Remitted to Major Chase for books.....	510	10	2			
Postage.....	123	5	0			
Government customs on books.....	81	6	11			
Stationery.....	45	5	0			
Cooly hire.....	3	14	8			
Sundries.....	37	15	8			
Expenses incurred for binding books.....	24	14	4			
Paid for advertisements, &c.....	31	9	0			
Paid for one dozen rosewood chairs.....	56	0	0			
Paid subscription and postage for the Bombay Courier, &c.....	103	4	6			
Paid subscription and postage for the Bengal Herald, &c.....	33	12	9			
	4599	9	8	4979	0	4
Deduct disbursements.....				4599	9	8
Balance in favour of the Society.....				379	6	8

Abstract Statement of the Funds of the Asiatic Department.

	DISBURSEMENTS			RECEIPTS.		
Balance, in favour of the Society as exhibited in the statement, submitted to the general meeting held on the 30th January 1836.....	....	..	..	981	4	0
Difference of interest in favour of the Society as stated in Messrs. Binny and Co.'s account closed on the 31st December 1836.....	....	..	..	22	13	9
Total amount of subscriptions received from the 1st January to the 31st December 1836..	....	..	..	858	5	4
Amount realized by the sale of the Madras Journal of Literature and Science.....	....	..	..	*1125	0	0
Messrs. Binny and Co.'s commission on amount of receipts.....	23	14	11			
Paid to Mr. Pharoah for printing the 10th, 11th, 12th, and 13th Nos. of the Madras Journal of Literature and Science.....	1458	14	1			
Stationery.....	38	9	4			
Pay of the Establishment.....	459	0	0			
Sandries.....	106	8	9			
	2077	15	1	2987	7	1
Deduct disbursements.....				2077	15	1
Balance in favour of the Society.....				909	8	0

* Memo. since realized, Rupees 203.

The following books were presented :—

Fatawa Alemgiri, 6 Vols.....	Bengal Asiatic Society.
Mahabharat, 5 ds.	ditto.
Raj Taringini.....	ditto.
Susruta.....	ditto.
Jawarne ul ilm ul Riyazi.....	ditto.
Jervis's Indian Metrology.....	The Author.
2 Copies of a Catalogue of Stars in the Southern Hemisphere.....	Hen. Court of Directors.
Result of the Madras Observations for 1834 and 1835.....	Madras Government.
Report on the State and Navigation of the River Indus below Hyderabad.....	ditto.
De Kroon Aller Koningen, Van Bocharie Van Djehon.....	Lieutenant Newbold.
Levensschets Van Sukhan Ibrahim, translated into Dutch	ditto.
2 Siamese Manuscripts.....	ditto.
4 Numbers India Journal of Medical and Physical Science.....	Frederick Corbyn, Esq.
5 do. India Review of Works on Science.....	ditto.
Prison Discipline Reports.....	Howard Malcom, Esq.
Transactions of the Horticultural and Agricultural Society of India, Vols. 2 and 3.....	By the Society.
Chinese Repository, Vols. 3 and 4, and Nos. of Vol. 5, up to No. 6.....	By the Editor.

The Vidvan-Moda-Taranginee; or Fountain of Pleasure to the learned, translated into English, by Rajah Kalce-Krishen Bahadur. Second edition.....By the Translator.
 Bytal-Puchisi; or the Twenty-five Tales of Bytal, translated from the Brajbhakha into English, by Rajah Kalce-Krishen Bahadur.....ditto.

It was announced that the following Gentlemen have been elected Members of the Society.

<i>The Right Rev. The Lord Bishop.</i>	Dr. White,
Brigadier General Wilson, c. s.	Captain Forster,
I. Y. Fullerton, Esq.	Hon. Sir E. J. Gambier,
A. J. Maclean, Esq.	Captain J. J. Underwood,
Captain Philpot,	Lieutenant H. Watts,
Lieutenant R. S. Dobbs,	Captain A. McCally,
Captain W. Walker,	Walter Elliot, Esq.
Captain J. Alexander, re-admitted,	James Shaw, Esq.
G. T. Bayfield, Esq.	Captain F. Senior, 35th N. I.
Captain Wentworth, H. M. 63d Rt.	Rev. H. Cotterill,
Lieutenant Pratt, do.	Rev. W. Taylor.
H. Pilleau, Esq. do.	

During the past year the Society has lost twelve Members by death, retirement, or departure for Europe.

Read the following letter from Robert Clerk, Esq. Secretary to Government :—

Fort St. George, 18th October, 1835.

No. 1533.—PUBLIC DEPARTMENT.

Gentlemen,—I am directed by the Right Honourable the Governor in Council to transmit for your consideration the accompanying copy of a letter dated the 16th June last, from Cavally Venkata Lutchmiah, with its original enclosures, and also copy of a communication from the Supreme Government, dated the 21st ultimo, on the subject thereof.

2. You will be pleased to ascertain whether Mr. W. Taylor is willing to undertake the work indicated by the Asiatic Society in Calcutta, and if so, the precise assistance which he will require from the Government, in addition to that which he may be expected to receive from the Madras Literary Society.

I have the honour to be, Gentlemen,

Your most obedient servant,

To the Managing Committee
of the Madras Literary Society
and Auxiliary of the Royal Asiatic Society.

ROBERT CLERK,
Secretary to Govt.

The whole subject having been referred to the Committee of Papers, for the purpose of ascertaining from the Rev. W. Taylor, as directed by Government, whether he was willing to enter on the undertaking, the following letter, addressed to that gentleman, was read to the Meeting :

APARTMENTS OF THE LITERARY SOCIETY ;
MADRAS, 5th December, 1836.

SIR,—I am directed by the Committee of Papers of the Madras Literary Society and Auxiliary Royal Asiatic Society to furnish you with the accompanying original letter from the Secretary to Government, together with its original enclosures, and to request that you will give the whole correspondence your consideration, and acquaint the Committee, for the information of Government, whether you are disposed to undertake the examination of the Mackenzie MSS. in the manner proposed, and to arrange, translate and prepare for publication, any of those documents which may be deemed worthy of such distinction, and, in general, to superintend whatever may be undertaken regarding these MSS. with the sanction of Government, and under the auspices of the Madras Literary Society.

The Committee avail themselves gladly of this opportunity of declaring their cordial concurrence in the opinion expressed by the Committee of Papers of the Asiatic Society of Bengal, as to your fitness for the task which you are invited to undertake; and, duly estimating the zeal and learning which you have displayed in your published works on the Languages and History of the South of India, they are glad to be the medium through which you are invited to a literary employment, which they have abundant reason to believe will be consonant to your tastes, and which must be productive of results, highly interesting to the cause of Oriental Literature.

Should you have it in your power to devote your time to the work indicated, and if your inclination leads you to accept the proffered employ, I am directed to request you will favour the Committee, at your earliest convenience, with a statement of the personal remuneration which you think sufficient for the appropriation of your time and labour, and of the establishment of pundits and writers, which you consider necessary for your assistance, and any other particulars, which your acquaintance with the MSS. in question may enable you to give, as to the expenses which may have to be incurred in the course of the undertaking.

I have the honour to be,

Sir,

Your most obedient servant,

To the

REV. W. TAYLOR.

ROBERT COLE,

Secretary Asiatic Department.

To which the following reply has been received:—

To R. COLE, Esq.

Sec. to the Asiatic Dept. of the Madras L. S. and A. R. A. S.

SIR,—I beg leave to acknowledge the receipt of your letter of the 5th instant, and feel duly sensible of the honour which has been done me.

In reply I have the pleasure to state that I am willing to accept of the proposed office; and to do my best towards filling it in a manner which shall be satisfactory to the high and honourable authorities whence the proposition has, in so flattering-ly distinguishing a manner, proceeded.

For the collation and examination of the manuscripts, including the restoration by copying of those injured, decayed, or becoming illegible as may appear desirable on investigation, I am induced to believe that one year will suffice from the time of commencement, as far as regards the manuscripts now at Madras; but it may be desirable prospectively to allow an additional six months on account of those at Calcutta; of the precise extent of which I have no accurate idea. On drawing up a report of general results and recommendations, I may then hope to be ultimately favoured with further instructions as to translating, editing and publishing selected portions, if such a course appear suitable to be adopted.

It will be possibly superfluous here to enter into minute details as to purposed modes of proceeding: these must necessarily come within my own charge and responsibility, if confided to me; and in all cases of doubt or uncertainty I shall solicit and hope to receive your official guidance. To the Committee of Papers I am deeply obliged, and feel honoured by their confirmation of the opinion of the Council of the Bengal Asiatic Society, in an enlightened public measure, from which I venture to anticipate some results that will justify their decision to the literary world; and, I would sanguinely hope, distinguish them, in the annals of literature, for an important addition to our knowledge of the history, mythology, philosophy, ethics, and local customs, modes of thinking, and other habits, of the people of this very important portion of the globe.

With respect to the subject of personal remuneration, I beg to declare my very sincere desire, that the amount should be on such a moderate scale, as to afford evidence of my wish to enter on this work of public utility with no mercenary motive. I have therefore set down in the margin* a sum which I trust will be considered small for the occasion; and at the same time not so low as to be derogatory to the character of a literary undertaking of such importance, and possessing so much of a national character even, as that I have been honoured by such high authority with an invitation to enter upon.

As regards the establishment of pundits and writers that may be required, I request to be favoured with the assistance of one Sanscrit pundit, and one Canarese and Hala Canada pundit, together with one superior Tamil moonshee from the College, at such time as I shall feel it expedient to apply for such aid. But as there is much to be done of so subordinate a kind in reading, collating and other details, as not immediately to require such superior assistance, I request to be permitted to engage, at my own entire direction, and not as College servants, one good common Tamil and Telugu moonshee, one Canarese moonshee, and two native writers as copyists; the services of a moochie and peon could perhaps be made available to me without extra expense. In such case the probable expense might be—

For two common moonshees, each at 15 Rs. per mensemRs. 30
Two writers, as copyists, each at 10 Rs. „ 20

M. Rupees....50

The expense of pundits and College moonshees, need not be great; as only requiring to be put on full pay, and that probably for about half the period of time indicated. In so moderate an estimate I am actuated by a desire to keep my own motives clear of all just blame; and not to burden the Government with

* Madras Rupees, three hundred and fifty (350) per mensem.

greater expenditure than the efficient conduct of the undertaking will imperatively require.

I have the honour to be,

Sir,

Your most obedient servant,

MADRAS, December 29, 1836.

W. TAYLOR.

It was announced to the Meeting that copies of the two foregoing letters had been received from the Committee of Papers, with the following communication :—

TO JOHN CARNAC MORRIS, Esq. F. R. S.

Secretary to the Madras Literary Society, &c.

SIR,—1. I am directed by the Committee of Papers to acknowledge the receipt of your letter, dated 28th October 1836, referring for the consideration of the Committee a letter from Robert Clerk, Esq. Secretary to Government, together with its various enclosures, on the subject of the Mackenzie Manuscripts in the languages vernacular in the Peninsula of India.

2. In accordance with the instructions conveyed in the second paragraph of that letter, I have communicated with the Rev. William Taylor, and a copy of his reply accompanies. It will be seen that that gentleman is willing to undertake the examination, collation and restoration of this portion of the Mackenzie Manuscripts, and that the expense of the undertaking, including personal remuneration to Mr. Taylor, and the pay of moonshees and writers, is estimated at 400 Rupees *per mensem*; exclusive of the assistance, for a time, of certain pundits and moonshees.

3. Taking into consideration that the Manuscripts in question form a considerable portion of a collection, which was considered of sufficient importance to be made the object of a purchase by the Supreme Government at a considerable cost, and that they may contain matter of great interest on the history and literature of this country, the Committee cannot but rejoice that measures are likely to be taken to ascertain their precise nature, until a knowledge of which is attained, the purchase may be considered of uncertain value and the original intention unfulfilled. No person appears more fitted, by talents and previous studies, to undertake the laborious investigation than the Rev. W. Taylor; and the committee rely on his judgment and candour to render such a comprehensive and faithful report on them, as would be a guide when the time arrives for considering the ulterior measures of translation and publication. It will be observed that one year, or a year and a half, is laid down by Mr. Taylor as the time that would probably be required to arrive at such a knowledge of the contents of the manuscripts, here and at Calcutta, as would enable him to frame such a report. For that period, therefore, the above stated expense would be entailed; after which it would be for the consideration of the Society and the determination of Government, whether the further charges for translation and publication should be incurred. The labours of this first period would include a collation of the different manuscripts, rendered necessary by great confusion and intermixture among them (as may be gathered from Mr. Taylor's letter at p. 433 of No. 13 of the Journal of the Society); a resto-

ration, if possible, of injured portions: a fair transcript of parts becoming illegible, and an account of the contents of each in some detail. This of itself would be a very considerable advantage.

4. The Committee further desire me to say that, should the work be entered upon in the proposed manner, they will be most happy to afford every aid in their power towards the accomplishment of a design, alike so worthy of the patronage of our enlightened and liberal Government, and of the encouragement of a Literary Society with objects like our own.

The Committee recommend that no time be lost in obtaining from Calcutta the remainder of the Manuscripts in the peninsular languages.

I have the honour to be,

Sir,

Your most obedient servant,

ROBERT COLE,

Secretary Asiatic Department.

Resolved, unanimously—That copies of the foregoing correspondence be transmitted for the information of Government, with an expression of regret that the funds of the Society are quite inadequate to afford any pecuniary aid to this highly desirable public undertaking; but that all the assistance which the Society can render, as a literary body, will be cordially and gladly yielded during the progress of the work.

Read the following letter from Sir Alexander Johnston, Chairman of the Committee of Correspondence of the Royal Asiatic Society.

ROYAL ASIATIC SOCIETY:

Grafton Street, Bond Street, June, 1836.

GENTLEMEN,

The vast extent, fertility, and populousness of our Indian possessions, are known, in a general way, to all the world. A glance, indeed, at the map will shew that their extremes of latitude may, without exaggeration, be indicated by the distance from Gibraltar to the farthest point of Scotland; and that the measure of their extent, from west to east, will be nearly found in a line drawn from the Bay of Biscay to the Black Sea. Lying between the 5th and 31st degree of north latitude, with almost every conceivable variety of position and exposure, they present a range of soil and climate greatly exceeding that which is to be found within the bounds of Europe. They embrace, in truth, the utmost limits of vegetable life, from the burning heat of the desert to the point of perpetual congelation: presenting in one quarter, the loftiest mountains in the world; and, in another, vast alluvial plains, intersected by the natural channels of many noble rivers, with a corresponding variety of productions belonging both to tropical and northern regions. Not less than 80 millions of people are subject to the dominion of England: already they produce (though with imperfect skill) most of the articles which form the great staples of the import trade of this country, as materials of its manufacture, or as the objects of comfort and luxury to the great

body of its inhabitants, of which cotton, silk, indigo, sugar, coffee, and tobacco, may be mentioned as pre-eminent; and they offer an assured prospect of an almost boundless market for the produce of English manufacturing skill, if the capabilities of their country be drawn forth, and their industry be duly instructed, directed, and fostered.

But though these general truths be readily acknowledged, their practical application is very imperfectly understood. Few men in England really know what India does or can produce, with sufficient precision, at least, to justify commercial speculation. Few in India know what England requires; and none of the lights of modern science having been applied to the agriculture of the former country, its productive powers have, as yet, been very imperfectly developed.

Believing that the interests of both countries may be very importantly promoted by an interchange of knowledge, and especially by communicating to India the information and stimulus which are alone wanting to the full development of its vast resources, it has been resolved by the Royal Asiatic Society, to constitute a distinct Section, for the following, and other similar purposes; provided the necessary funds can be raised for giving adequate effect to the design.

1st. The examination of the natural and agricultural products of India, available for the purposes of commerce and art.

2dly. Inquiry into the causes of the general inferiority of the staple articles of Indian commerce.

3dly. The introduction of new articles and processes from analogous climates in other parts of the world.

The Committee of Correspondence of the Royal Asiatic Society beg leave to bring the circumstance to your notice; trusting, confidently, on your zealous support of a measure, calculated to promote objects alike interesting to the patriot and the philanthropist.

Of the means of support, the most acceptable would, of course, be such an accession of new members, European or Asiatic, as would at once provide the necessary funds, and as would afford the requisite contribution of knowledge and experience in the various branches of inquiry to which the labours of the Section are to be directed. But the Society will be most happy to receive the tender of the aid (whether in knowledge or funds) of affiliated Societies, pursuing the same beneficial objects, or any other co-operation or assistance which you may have the goodness to offer.

For the fuller explanation of the scheme in question, the Committee direct me to transmit to you the accompanying printed papers; and I shall be happy to afford you any further information in my power, in regard to it, that you may require.

I have the honour to be,

Gentlemen,

Your most obedient humble servant,

(Signed) ALEXANDER JOHNSTON,

Chairman of the Committee

of Correspondence R. A. S.

To the President,

Vice Presidents and Members

of the Madras Literary Society

and Auxiliary R. A. S.

Read a letter from Henry Chamier, Esq. Chief Secretary to Government, forwarding a copy of a letter, addressed by order of the Right Honourable the Governor in Council to the Board of Revenue, directing that the Secretary to the Society, should have access to the Reports of the Civil Engineers, with a view to a selection from the valuable matter contained therein for publication in the Journal of the Society.

The Committee in the Asiatic Department, to whom this letter was referred, will gladly avail themselves of this considerate and liberal order of the Right Honourable the Governor in Council; and their cordial thanks, and the acknowledgments of this Meeting, are respectfully tendered for the privilege granted to the Society.

Read the following extract from a letter from Lieutenant Newbold, with reference to the Siamese MSS. which were laid on the table, presented to the Society by that gentleman:

"I send for presentation to the Society two Siamese books printed at Batavia. What they relate to I know not, having lost the *catalogue raisonnée* of books I brought over from the Straits. These are intended as an *avant courier* of 10 vols. of MSS. Siamese history, which are now on the road to Madras from the Straits, and which I intend for the Society's library, as also a small volume of Siamese laws.

"It would be a great piece of good fortune could the translation of these ancient chronicles in the T'hay language go on simultaneously with that of the history of Lanca in the Cingalese, by the Hon. Mr. Turnour, and that of the Peninsula by Mr. Taylor.

"The Siamese are Buddhists of great antiquity. Their language is monosyllabic; its character you have an opportunity of judging of. Leyden states that the Siamese histories of the T'hay dynasty go back only for the space of 1,400 years; but observes that the records of the T'hay J'hay dynasty are supposed still to exist, from which "it may still be possible to glean a few grains of pure historic gold from the sands which glitter in the long valleys of the *Ménam* and *Mekon*."

"At all events from the collation of the three histories of Peninsular India, Ceylon and Siam, much light would doubtless be thrown on the origin of Buddhism, and perhaps on that of Indo Chinese nations in general.

"Although the historical romances of the Siamese are said to bear little similarity to those of the Brahmuns, still the introduction of Rama and the characters that figure in the Ramayana evince a connexion with Peninsular India. Whether this connexion is merely a literary one or not, remains to be cleared up.

"The Siamese have many romances in common with the Javans, Malays and Buggis, and probably with the Birmese and Peguers.

"According to Hamilton the Buddhism of Siam appears to be identical with that of Ceylon, differing from that professed in Tartary, Hindostan, China, Japan, and Cochin China. The leading doctrine is the transmigration of the soul, and *Ni-ri-pan* (*nirvana*), or ultimate absorption into the essence of the deity. "The priests "have neither rank, influence nor endowments, the sovereign being the real head of the church and himself an incarnation of the Buddha."

Read extract of a letter from John Bell, Esq. Secretary to the Agricultural and Horticultural Society of India, forwarding copies of the 2d and 3d volumes of the Transactions of that Society, and offering, on his

own part, copies of his works on the Commerce of Bengal. The acknowledgments of the Society are tendered to Mr. Bell, with the assurance that the donation will be most acceptable.

Read a Letter from Rajah Kalikrishna Bahadur of Calcutta, forwarding copies of his translations into English from Sanscrit and Braj-Bhāṣā for presentation to the Society. The acknowledgments of the Society are offered to the Rajah for the same.

Read a letter from M. Eugene Arnoult, editor of the Journal, entitled *L'Institut*, proposing that the Society should communicate an account of its transactions for insertion in the periodical conducted by him; also abstracts of all papers presented to the Society, and copies of works published, and requesting the Society to subscribe to his publication.

Ordered that the Journal of the Society be transmitted to M. Arnoult, with the intimation that the Society will be glad to exchange publications.

It was intimated that, in accordance with the vote of last year, the following works were ordered and had been received from the bookseller:

	Vote.
Hardwicke's Indian Zoology. By Gray	2
A Series of Maps Modern and Ancient	1
Supplement to the Encyclopædia Britannica, 5th and 6th Vols.	2
Webster's English Dictionary	2
Dictionnaire De L'Academie Française	2
Græcum Lexicon Hederico	1
Marsden's Malay Dictionary	1
Alberti Dictionnaire, Française-Italien, et Italien-Française	2
German Dictionary. By Flugel	2
Spanish Dictionary. By Newman and Baretti	2
Italian Dictionary. By Baretti	2
Portuguese Dictionary. By Vieyra	2
Gesenius's Hebrew Lexicon	1
Watson's Biblical and Theological Dictionary	1
Heyne's Tracts on India	1
Sowerby's Mineral Conchology	6
Lyell's Principles of Geology	3
De La Beche's Geological Manual	1
Lindley's Introduction to Botany	1
Lindley's Natural System of Botany	1
Prodromus Floræ Peninsula Indis Orientalis. By Wight and Arnott	1
Malte-Brun's Universal Geography	9
Turner's Elements of Chemistry	1
Royle's Illustrations of the Botany and other branches of the Natural History of the Himalayan Mountains—9 parts.	
Lardner's Cabinet Cyclopædia	82

The following donations were presented for the Museum:—

Minerals illustrative of Dr. Benza's Geological Papers which have appeared in the Journal of the Society.—By the Author.

A very extensive collection of minerals from the Malay Peninsula, the country between Madras and Bellary and various places of the Ceded Districts.—By Lieut. Newbold.

Geological specimens collected on a journey from Madras to Hoonsoor, and a very extensive suite illustrative of the Magnesite deposit at the latter place.—By Mr. Gilchrist.

A series of specimens of the Magnesite of Salem, and its associated minerals.—By Dr. Wight.

Specimens of trap and laterite from Beder in the Hyderabad territory. (See Madras Journal No. 12, p. 103).—By Lieut. Morland, Assistant Surveyor General.

Minerals from Combaconum.—By the Rev. Mr. Addis.

Geological specimens from Ava, collected by Captain Hannay on his mission to the Singphos.—By G. T. Bayfield, Esq.

The crown of a tooth of the fossil Mastodon in a very perfect state of preservation, from the same country.—By the same.

A terracotta Buddhist image, and one in brass, from Tagoung, the ancient capital of the Burmese empire, bearing Deva-nāgarī inscriptions, discovered by Captain Hannay. (See *Journal of the Asiatic Society of Bengal* for March 1836).—By the same.

The best thanks of the Society are tendered to the respective donors.

The limited dimensions of the Society's Apartments is remarked on, and it is brought to the notice of the Meeting by the Secretary that no space exists for the accommodation of the increasing Library of the Society, and for the minerals, antiquities, and other donations, continually presented for the Museum, a great number of which cannot be arranged for want of room.

It is resolved,—That the College Board be addressed to solicit permission for the Society to occupy the central room of the upper floor in the front range of the College, as a Museum, which would enable the Society to allot the whole of the lower apartments to its library.

Resolved,—That, with reference to the order given by Sir FREDERICK ADAM for the transfer of certain sculptures at Masulipatam to the Museum of the Society, the Collector of the district be addressed to request that he will favour the Society by giving the necessary instructions to that effect.—*Vide Journal*, No. 14, p. 45.

The Honourable the PRESIDENT is requested to obtain an interview with the Right Honourable LORD ELMHURST, and to solicit His Lordship to accept the office of Patron of the Society.

XII.—NOTICES OF BOOKS.

Transactions of the Agricultural and Horticultural Society of India.
Vol. 3d.—Printed at the Serampore Press, 1837.—pp. 320, 8vo.

We hail with no ordinary feelings of satisfaction, the appearance of the third volume of the *Transactions of the Agricultural and Horticultural Society of India*; presenting us with a detailed account of its proceedings, during the past year. The unequivocal evidence which it affords, of the recent rapid rise in public estimation of the sister sciences of agriculture and horticulture, must prove highly gratifying to every philanthropic mind, on the reflection how intimately their advancement is connected with the welfare and prosperity of the people, in a country so essentially agricultural as this is.

In this view we cannot deny ourselves the pleasure, which the present opportunity affords, of congratulating the country at large, on the possession within its metropolis of such an enterprising association; enjoying as it does the full confidence and liberal patronage of the Indian government; collecting, from all quarters, the accumulated experience of numerous labourers in the same field, to diffuse it, through these volumes, to every part of the civilized world; while, at the same time, it is generously aiding, with its unrivalled means, the formation of numerous other associations, under the same denomination and having similar objects in view, in all parts of the country, all of which are endeavouring, but at a humble distance, to diffuse, within the more contracted limits of their respective localities, the benefits which it is conferring on all India. That the metropolitan societies of the sister presidencies, are, as yet, far from being competent to enter the lists with the parent institution, in the honourable and friendly rivalry of doing good, is a subject rather of regret than of wonder, when it is borne in mind, that they are both comparatively in their infancy, with few members, limited means, and one, at least, (the Madras Society), as yet unaided by any share of government patronage, which has been so liberally extended to the others.* We would not, however, have our agricultural friends in this quarter to despair of having their application for assistance ultimately attended to, since it has not been refused, and we venture to think is only withheld until by its acts the Society has established its claim to the indulgence. Let it prove itself worthy, and we think we may safely predict that it will not be kept long in suspense as to the result of its application, and we think we may with equal safety adduce the two last reports of its proceedings as favourable examples of how much

The Calcutta Society has received, nearly from its commencement, 1000 rupees annually, which has latterly been increased, by a monthly donation to about 2,800, exclusive of 26,000 formerly contributed. The Bombay Society we understand received a donation of 10,000 in aid of its funds. This is as it ought to be, these societies are formed for the good of the country, much more than for any benefit which can accrue to the members and have a claim on the country's support in aid of their exertions for its benefit.

good may be expected to result from its persevering exertions in the course it is now pursuing. While we thus call on the managers of the Society's affairs, at the presidency, diligently to perform the responsible duties they have voluntarily undertaken, we would remind its members, now widely scattered over the interior, that the largest streams are but the aggregate of numerous rills, and that, without their constant contributions, the most mighty rivers would soon be reduced to barren sandy beds; that it is therefore incumbent on them, if they wish well to the country and institution, to afford assistance by contributing all the information in their power.

But should the application of the Society fail in procuring for it the solicited aid, let it be borne in mind, that it is not the pampered nursling, brought up in the lap of luxury, but he who has from his infancy been trained in the school of adversity, that generally proves the most efficient man. In case of disappointment, therefore, there must not be despair, but a redoubling of the Society's exertions. Let it be remembered, that even the Calcutta Society, with all its advantages, was at one time reduced to the brink of ruin, from which it was only saved by the energy of a few of its members.

If such was the case there, in the midst of a dense population, with numerous supporters, and in the receipt of an annual donation from government, it need not be wondered at, if on this side of India, deprived of such advantages, the Madras Society has to encounter similar shocks: but let warning be taken to avoid the rock on which the Calcutta Society so nearly foundered, namely, a too exclusive attention to horticultural operations, leading to the ruin of the funds, and the neglect of the other and more important objects of the institution.

While we thus warn our friends against falling into so grave an error, we disclaim all connection with those persons who urge exclusive attention to agriculture, to the neglect of horticulture, on the part of the Society as a body. They seem to forget, that a large portion of the natives live almost exclusively on vegetable food; that the introduction of our better sorts of culinary vegetables is an object of paramount importance, and that this must be accomplished by the conviction, on their parts, that ours are better than their own; a conviction, which can only be established by actual demonstration, and not by assertion.

At the outset of its career the Bengal Society acted on this principle, and, aided by premiums, with such success, in teaching the natives our mode of culture and the superiority of our vegetables, that it can now dispense with so costly an appendage as a garden. That a similar effect is in progress here, is evident from the marked improvement in quality of the last show of vegetables, as compared with the preceding. But the advantage of forming horticultural schools, though a great one, is not the only or even principal benefit derived from such establishments.

In them experiments, requiring years for their completion, can be undertaken, and conducted through their whole course on the most philosophical principles, not subject to the numerous accidents and contingencies to which individual enterprise is exposed, and at a cost, too, which might for ever prove a bar to their being undertaken for personal gratification, or even in the uncertain hope of their proving a lucrative speculation. An example in point occurs to our memory—hitherto it has been supposed, but without any proof, that the climate of Madras is altogether unfavourable to the production of coffee, and that it never can be grown to advantage here. The determination of this question, appearing to the Society, in a commercial point of view, a matter of the first importance, it has undertaken to set it at rest, by devoting a portion of the garden to the formation of a coffee plantation. Other experiments of the same kind, and having similar objects in view, are now either in progress, or in contemplation with the return of the season.

In addition to these measures actually in progress, arrangements are making to carry into effect, on a scale commensurate with the Society's means, the suggestions of Dr. Wight, published in the pages both of this Journal and in the volume of transactions before us, for the acclimating of foreign fruit and timber trees, edible vegetables, &c.; while it is wished to devote a portion of the garden to the formation of a nursery, for the introduction to the plains of the more valuable sorts of indigenous timber trees, hitherto scarcely known as living plants beyond the precincts of their native jungles. These, in a public point of view, are all important objects, for the attainment of which in Bengal the Botanic Garden is maintained at the public expense; but which in Madras (where no establishment of the kind exists), unless the Society take them in hand, must ever remain undone, for no private individual, however zealous, or whatever may be his pecuniary resources, while subject to all the uncertainties of removal, can be expected to engage in such endless and unrequited labours. Nor must we, in contemplating the general advantages to be derived from such establishments, overlook the local circumstances which render a garden, at whatever cost, almost indispensable to the success of the Madras Society. Here we have not, as in Calcutta, a large government garden, on which to fall back in a case of necessity. There the talented and enthusiastic superintendent of the noblest Botanic Garden in the world, has, hitherto, always been able, when necessary, to appropriate a portion of its extensive grounds to the furtherance of the useful objects of the Society. In Madras, on the contrary, the government apply to the Society to aid its efforts for the amelioration of the country.

We have been induced to enter thus largely on the consideration of the general subject of Horticultural Societies, and of the Madras one in particular, not, we trust, from having formed an exaggerated estimate

of their usefulness, which is certainly great, but in the hope that even our feeble voice may be heard in a distant quarter, and prove not altogether unimportant in inducing the government of India to place our Society on a par, at least, with that of Bombay, the more so, as it has difficulties and disadvantages of climate to encounter, scarcely to be met with in any other part of India, and has, besides, so wide an extent of country to influence by its example. But, while we thus humbly solicit the supreme government to assist the Society in carrying into effect the very meritorious works on which it is engaged, we address the inhabitants, both European and Native, of the Madras presidency, with more confidence, in the full assurance, that, whatever may be the decision of the supreme government, they will prove themselves worthy of possessing an institution, fitted to diffuse among them much substantial good, and to afford those who take a more immediate interest in its proceedings an inexhaustible fund of agreeable recreation. Let it therefore be the object, as it undoubtedly is the interest, of one and all, to support it heart and hand, in such a manner, that those who willingly and gratuitously put their hands to the work of managing its affairs, may not have them paralysed for want of means to continue their laudable exertions.

To the managers, and presidency members, we would say, recollect the eyes of the whole country are upon you—your proceedings are narrowly watched—and, unless you prove yourselves good stewards and deserving the confidence reposed in you, it will soon be estranged: furnish therefore your friends in the provinces with the means of coming to a correct judgment on your stewardship, by holding regular meetings, at fixed intervals (which are not to be departed from), for the formal transaction of business, reports of which are to be duly published for the information of distant members. Conduct the business of the Society thus regularly and methodically, and you will have little reason to complain of the want either of confidence or support on the part of the provinces.

But we must now return to the point from which we set out, and from which, in our anxiety to forward the cause of agricultural reform and improvement, we have been insensibly led so long to digress—the consideration of the *Transactions of the Agricultural and Horticultural Society of India*. The volume before us is the third of the series. The Society was constituted in 1820, and, early in 1829, published the first volume. Seven years after, in 1836, the second volume issued from the press, and in 1837 the third, equalling in its dimensions either of the preceding two, and showing, in a very advantageous point of view, the growing attention which is given to these pursuits, and the very decided

advantages resulting from early publicity, more effectually to secure which, the transactions are published in parts every three or four months.

The present volume contains 60 original papers occupying the first 198 pages; an appendix; and the remaining portion of the volume (103 pages), under the head of 'Proceedings', gives an abstract of the whole business transacted at the various meetings of the Society. The papers are, as a matter of course, miscellaneous arranged, in the order they were read at the successive meetings. In this notice, instead of considering them seriatim, we will arrange our remarks under separate heads of horticulture and agriculture; the latter divided into two branches, 1st as applied to the production of food; 2d to commercial produce—the second occupying by far the larger portion of the volume.

Of the sixty papers, six only can be considered exclusively horticultural, the first is from the pen of Mr. Masters, the intelligent head gardener of the Botanic Garden, "*On the Propagation of Exogenous Plants.*"

The term exogenous applies to all dicotyledonous plants; but, in the present instance, it may be considered as restricted to trees and shrubs, furnished with a distinct bark, and increasing outwards by annual layers of wood deposited between the bark and that of the preceding year; in contradistinction to the whole tribe of palms, which never increase in thickness from the first, and harden by age from the surface towards the centre. These last, not producing buds and branches, cannot be propagated by any of the methods adapted to increase exogenous plants; namely, grafting, layering, cutting or *gootties*. The main object of the paper is to make better known, and show the advantage of, this last method over all the others. The operation is a very simple one, and much more practised among native than European gardeners. "In young branches of exogenous plants the bark is easily separated from the wood, and if from a young branch of the Letchee tree (or indeed any other tree) we take off a ring of bark nearly an inch in breadth, at a small distance below a healthy leaf-bud, taking care to cut off all communication between the bark above and below; and at the same time if we cover the wound with soft well tempered earth, binding it on securely with any soft bandage, and keeping the whole constantly moistened with water; at the end of about 4 months we shall obtain a strong well rooted plant. As the fibres are emitted from the buds that are above the wound, they will descend into the ball of earth and form roots; as soon as they are seen protruding themselves through the bandage, the branch may be cut off and planted where it is to remain. This method is called propagating by *gootties*, and appears to be the most expeditious method of obtaining strong well rooted plants."

"Of 65 gootties, made in June last, of the *Jonesia Asoca*, the whole were well rooted in October; of 45 layers, made at the same time, none are well rooted now (December), and some just beginning to form." "Of 450 gootties of the Letchee, made in March last, the greater part were taken off well rooted in June, while of 18 layers of *Cordia Sibastina*, made on the 13th November 1832, only one has made sufficient roots to be planted out with safety."

By cuttings is another expeditious and sure method of continuing an individual species or variety. "Of 5,000 cuttings, put into the ground in July last, embracing 56 species, about 3-4ths of them are good rooted plants. Out of 7000 put into the ground in October, embracing 50 species, about 1-3d are dead." From which it appears that early in the rains is the most desirable time to plant cuttings.

The next paper we have to notice is Mr. Speed's "*Remarks on the best mode of cultivating Celery.*" This is a most valuable contribution to agricultural science, as developing a new principle in tropical agriculture, for an account of which we refer to Dr. Wight's paper, page 40 in the last number of this Journal. His improvement consisted in sprouting the seed in a hot bed under glass; it was afterwards found to resist the heat of the climate, better than when raised in the ordinary manner in the shade. It is to be hoped he will follow up the subject by ascertaining whether plants, raised from the seeds of these plants, resist the climate like those of indigenous vegetables, or, in other words, are acclimated; in which case the experiment will prove one of vast importance.

The last paper on horticulture, and of the volume, is "*Directions for cultivating some of the most approved European and Native vegetables in Bengal, by Mr. Masters.*" From this we make a few extracts. "*Artichoke*, perennial, native of the South of Europe, propagated by seeds, and by suckers. Sow in October, or at any time between September and May. Sow in rich light soil, and when the plants are two or three inches high, prick them out in a fresh bed, six inches distant from each other; when they have become well-rooted, transplant them into deep, rich soil, setting them two feet apart. To propagate by suckers, take off the suckers towards the end of the rainy season, and prick them out six inches apart, treating them in the same manner as directed for seedlings; or if large, they may be planted at once where they are intended to remain. Artichokes in this country are apt to run too much to leaves, producing small heads; to prevent this and to increase the size of the heads, when the plants are from ten to fifteen inches high, cut them off close to the ground, and cover them over with light, dry, old manure; when they have advanced a few inches

above the soil, repeat the operation. If the young plants are tied up for a few days before being cut off, they will become blanched, and may be eaten as salad."

Cabbage.—"Sow from August to November; if before the rains cease, sow in *gumlahs*, and prick out the young plants in sheltered beds of light rich earth; when they have become strong and well rooted, plant them out in strongly manured ground, two feet distant from each other. Plant the late crops in trenches, keeping the plants well earthed up as they grow, and give them plenty of water."

Cauliflower.—"Sow from September to November, and prick out the plants when about two inches high in light soil; when sufficiently strong, plant them in trenches two feet apart, and fill in with old manure. In dry situations, where the plants can be preserved during the rains, sow in February or March. Cauliflowers may also be propagated by cuttings." The following short paper C. K. Robison, Esq. from vol. 2 page 29, appears deserving of attention as it seems to afford a satisfactory explanation of the unusual success which has attended all attempts to raise these vegetables this season at Madras—the seed sown, being the produce of Bengal hence acclimated.

"From an experience of nine years, the duration of this Society, I have found, that in order to have good and early crops of cauliflowers, cabbage, peas, turnips, &c. it is absolutely necessary to sow only acclimated seeds; that is, seed which was the produce of plants raised from imported European or foreign seed, sown during the previous year; and that, for the later crops, Cape of Good Hope and Van Dieman's Land seed answer best. European seeds should never, in my opinion, be sown before the 1st November, and the produce should be chiefly reserved as acclimated seed, for the following season. Hitherto, the distribution of English seeds to the members of the Society has been the cause of uniform disappointment."

Cucumber.—"Sow in rich, light soil, giving the plants plenty of room to run. When they have made four leaves, stop them, by pinching off the leading bud; they will then produce two lateral shoots, which stop in a similar manner; and so continue to treat every new formed shoot, stopping it at the second or third joint. When the plants begin to show fruit, stop the fruiting branches two joints before the fruit, cover the ground with leaves or straw to keep the roots cool, and to prevent the fruit from becoming spotted."

It is a subject of regret in this quarter that Mr. M. has only given us the Bengal names of the native vegetables introduced into his list, as many of them are totally unknown on the coast. Botanical names

would have done much, with the assistance of Ainsley's *Materia Medica Indica*, to relieve us from this difficulty.

Agriculture.—In this division the first papers are two short ones on the introduction of American maize. These are in continuation of other two printed in the preceding volume, from which it appears that this variety is not only much better in quality, but is reckoned to produce 20 per cent in return better than the variety in use in this country, and with less culture. "The introduction of maize on a large scale might I think be successfully followed up without more labour than the planting between the stubble when the paddy is cut. The proper season for planting in Bengal appears to me about the middle of April. The corn should be steeped in water 12 hours, then buried in a cloth under ground until the germs appear. Three seeds in each hole, about four feet apart, will be found the proper distance."—Bell.

On the Coromandel coast where our rice crops are so subject to failure from irregularity of the monsoons, it appears very desirable to introduce largely the culture of so hardy and prolific a grain, and deserving the attention of the Agricultural Society. Small parcels of seed, of the best foreign varieties, might be sent all over the country for trial, and no doubt it would spread if the natives found it a profitable crop.

Guinea grass.—There are three short papers on the culture of this very valuable grass by Messrs. Bell and Hurry, explanatory of the mode of propagating it by both seeds and cuttings. The mode I adopted (for propagating by seed) is this, I prepare a small plot of ground, shaded from the morning sun, being well pulverized, the seed is then freely scattered over it, when the mallee (gardener) kneads the surface with his fingers so as loosely to bury the seed. If the weather is very hot, I cover the plot with mats for a few days *without watering*, and I have never once failed to have abundant returns. When the young grass is about 3 inches high I have each plant carefully pricked out, so as not to disturb the root, and transplanted into regular beds two feet apart, watering them for a few evenings, until they have taken firm hold of the soil. I have sown guinea grass in every month of the year, and the results have always been successful." Bell.—"Having successfully cultivated this grass for seven years I cannot too strongly recommend it to all planters who require substantial food for cattle."* The conditions necessary to success in this cultivation are that the lands should not be inundated, nor water stagnate on it, that the crop be kept clean and the land well manured, and after two years the crop changed. The quantity produced from good land, with a little care, is quite prodigious, and four or

five cuttings may be obtained in the season. With watering, an early cutting can be got, if required. I have some which will yield a fair cutting in about fourteen days. In the cold weather it scarcely grows at all, but from March to October it will yield a constant succession of crops, and is a most valuable addition to our green food. In planting, I have found that joints four or five inches long, and about as far apart, set out like canes, generally took root in a week, and, even in the driest weather, a single watering was sufficient to save them all. Close planting answers best, as one weeding is then generally enough; if distant, the coarse grasses generally choke it, unless great attention is paid. I have had as much as forty tons of green food from a single beegah, ascertained by weighing the cuttings of a square yard at a time. It is evident that such a crop must exhaust the land, and for that reason I think it fails if continued beyond the second year."

Joomla rice—Victoria wheat—American sumach.—This paper or rather series of papers is made up, 1st, of extracts of correspondence between Dr. Wallich and Mr. Robert Stuart, Resident of Nepal, on the cultivation of mountain rice, and the probability of its successful introduction into Europe; with a report of experiments, made in the Chelsea Botanic Garden, to determine the practicability of its culture in England, by Mr. Anderson the curator, which failed perhaps from bad management. 2d, an extract from the Plymouth Journal for August 1833, on the Victoria wheat, recommending its introduction into England, on the two-fold grounds of its being exceedingly prolific, and very rapid in its progress to maturity. Whether it would retain these properties in England seems very doubtful. Some that was introduced into Mysore required upwards of 100 days to mature its crop; in its native country from 70 to 75 days is the time specified. This great difference may depend on the climate of Mysore, being colder than that of Victoria. Would it retain its original properties if sown in the warmer climate of the Carnatic? The subject seems to merit a careful trial, and from sowings in several successive months, commencing with the rains in July. We recommend it to the attention of the Agricultural Society. 3d, another extract from the same Journal on American sumach (*Casalpinea corearia*). This substance promises to prove such a valuable contribution to the arts, and, probably, at no distant period, to the commerce of this country, that we are tempted to transfer the paper entire to our pages;* the more so as the plant is of tropical origin, and has already been successfully introduced into the Calcutta Botanic garden, as appears from the following notice in the proceedings of the Society. "The Doctor informs the Society that he

* See Selections p. 318.—Ed.

has secured a number of plants of the *Casalpinea corearia*, or American sumach, raised from seed presented by Mr. Hamilton."

Sugar and Sugar-cane culture.—There are six papers connected with these subjects in the volume. The first, Mr. Piddington's account of the best soils for the cultivation of the sugar cane, has been reprinted in this Journal*; of the remaining five, three are occupied with accounts of the rapid progress now making in the introduction of the Otaheitan or Mauritius sugar-cane, and its great superiority over indigenous and Chinese sorts now generally in use; a superiority so self-evident that, wherever they have been tried, the ryots have immediately adopted it. The following extracts from a letter (page 73) of Captain Sleeman, general Superintendent in the Sagour and Nerbudda territory, will show the estimation in which it is held in these districts. "A portion of the cane at Jabulpoor is every season sold in the bazar to cover the expenses of the plantation, and those of experiments in the manufacture of sugar; and the funds have hitherto been found fully sufficient for the purpose." (Proceedings page 39 and 40). "Proved by successful experiments that sugar of excellent quality can be made in the valley of the Nerbudda, a thing never believed by the inhabitants before this plantation was established. The sugar, made by the aid of men from the sugar districts in Oude, bore the same price in the bazars, as that brought from Mirzapore. 2d, that the sugar made from the Otaheite cane is rather better in quality than that made from the small straw coloured cane of the country, and far superior to that made from the large purple cane. 3d, That the cane, after eight years planting, was last season as fine in its beautiful straw-colour, in its size and in the quality of its juice, as when gathered for me in the manufacture by the present secretary of that colony (Mauritius), Captain Hick, in 1827. The plants I brought with me were deposited in the Botanic Garden in Calcutta March 1827, and, in the following season, I was supplied at Jabulpoor with cuttings from these plants. These canes now sent into the bazar as they are cut and sold, fetch about four times as much as the largest cane of the country, being much longer and the juice much finer."

Our notice of this work has already extended to so great a length, that we feel ourselves constrained to defer, till our next number, the consideration of the remaining portion (comprising the whole of the commercial branch of our arrangement); on which occasion we hope to present our readers with a comprehensive account of the numerous papers, forming the bulk of the volume, on the cultivation of cotton and tobacco.

R. W.

* Vide No. 13, p. 433.

XIII.—SELECTIONS.

1.—Letter from Mr. N. B. WARD to Sir W. J. HOOKER, on the Growth of Plants without open Exposure to Air.

Wellclose Square, London, March, 1836.

MY DEAR SIR,

I have lately heard that you wish for some information respecting my new method of growing plants without open exposure to air. As I do not intend to publish at present a detailed account, and as much misrepresentation exists upon the subject, I feel great pleasure in furnishing you with the principal facts, of which you may make any use you please.

The depressing influence of the air of large towns upon vegetation, had, for many years, engaged my attention.

The science of Botany, in consequence of the perusal of the works of the immortal Linnæus, had occupied me from my youth up, and the earliest object of my ambition was to possess an old wall, covered with ferns and mosses. Compelled by circumstances to live surrounded by, and enveloped in, the smoke of numerous manufactories, all my endeavours to keep my favourites alive, proved sooner or later unavailing. I was led, however, to reflect a little more deeply upon the subject, in consequence of a simple incident, which occurred about seven or eight years ago. I had buried the chrysalis of a *Sphinx* in some moist mould, which was contained in a wide-mouthed glass bottle, covered with a lid. In watching the bottle from day to day, I observed that the moisture which during the heat of the day arose from the mould, condensed on the internal surface of the glass, and returned from whence it came, thus keeping the mould always equally moist. About a week prior to the final change of the insect, a seedling Fern and Grass made their appearance upon the surface of the mould.

After I had secured my insect, I was anxious to watch the development of these plants in such a confined situation, and accordingly placed the bottle outside my study window. The plants continued to grow, and turned out to be the *Poa annua* and *Nephrodium Filix mas*. I now commenced a series of experiments upon other plants, principally Ferns, selecting those that were most difficult of culture, such as *Hymenophyllum*, &c. My method of proceeding was as follows:—Keeping nature always in view, I endeavoured to imitate the natural condition of the plants as much as possible, as regarded the exposure to light, solar heat, moisture, &c. Thus, if Ferns were the subject of experiment, they were planted in the mould most congenial to them, well watered, but all the superfluous water allowed to drain off, and then placed in a situation having a northern aspect. If, on the

contrary, I wished to grow Cacti, they were planted in a mixture of loam and sand, suspended from the roof of the case, and fully exposed to solar heat. Upon this part of the subject I need not, however, dilate any further, and will therefore confine myself to the results obtained.

1st, That the depressing influence of the air of large towns upon vegetation depends almost entirely upon the fuliginous matter with which such an atmosphere is impregnated, and which produces the same effect upon the leaves of plants as upon the lungs of animals.

2ndly, That, owing to the quiet state of the atmosphere surrounding the plants in my inclosed cases, the plants, like human beings, will bear extremes of heat and of cold, which under ordinary circumstances would be fatal to them. It is well known, from the experiments of Sir C. Blagden, and others, that man will bear great degrees of heat with impunity, provided the atmosphere be undisturbed, and it is equally a matter of fact, that the extremest cold of the Arctic Regions produces no bad effect, when the air is quite still. Mr. King, who has recently returned from Captain Back's Expedition, informed me that the greatest degree of cold he experienced was nearly 70 deg. below zero; that no inconvenience was felt at that low temperature, owing to the perfectly calm state of the air; but that if the wind arose, although the thermometer would likewise rapidly rise with the wind, the cold then became insupportable.

These facts I have proved in the one case, by the exposure to sun of *Hymenophyllum* and *Trichomanes*; and in the other by growing without heat *Aspidium molle*, *Phoenix dactylifera*, *Rhapis flabelliformis*, *Dendrobium pulchellum*, *Mammillaria tenuis*, &c. &c.

3rdly, That owing to the prevention of the escape of the moisture contained within the cases, plants will grow for many months, and even for years, without requiring fresh supplies of water. Thus, in the first experiment, the *Poa* and *Nephrodium* grew for four years, without one drop of water having been given to them during that period, and would, I believe, have grown as many more, had they not accidentally perished in consequence of the rusting of the tin lid covering the bottle, and the admission of rain-water.

4thly, That the degree of development to which the plants attain, depend mainly, *ceteris paribus*, upon the volume of air contained within the case, and upon the quantity of light and solar heat received by the plants. Thus to revert to the first experiment. The *Poa* and *Nephrodium*, being contained within a small bottle—the one flowered but once during its confinement, while the other did not produce any capsules. Both Ferns and Grasses, in my larger cases, flower and fruit well. *Phænogamous* plants, such for instance, as *Ipomœa Quamoclit* and *coccinea*, will not flower in a case exposed to the north, while in

the same case, fully exposed to the south, these very plants come up from seed, and flower very well.

To sum up all, in every place where there is light, even in the centre of the most crowded and smoky cities, plants of almost every family may be grown, and particularly those which have heretofore been found the most difficult to cultivate. I have now, in a wide-mouthed bottle, simply and loosely covered with a tin lid, the following plants:—*Hymenophyllum Tunbridgense* and *Wilsoni*, *Trichomanes brevisetum*, *Hookeria lucens*, and other Mosses, *Jungermannia juniperina* and *reptans*, &c. &c. These plants have been inclosed for twelve months, and are growing most vigorously, although they have not once been watered during that period. In my other cases, the *Ferns*, *Palms*, *Orchideæ*, *Grasses*, many *Monocotyledonous* plants belonging to the families of *Scitamineæ*, *Brameliaceæ*, &c. &c. grow very well; while, on the contrary, the continued humid state of the atmosphere is unfavourable to the development of the flowers of most of the *Exogenous plants*, excepting those which naturally grow in moist and shady situations, the *Linnaea borealis*, for instance, which I have had for more than two years, and which flowered twice last year in a situation where, without my protecting cases, the *London Pride* (*Saxifraga umbrosa*) ceases to exist after twelve or eighteen months.

This method will, I believe, assist the physiological Botanist in solving some points of great importance, connected with vegetation in general, such as the agency of various soils, the quantum of air necessary for the development of various tribes of plants, &c. &c.; and I shall be delighted in seeing the subject taken up by those, who, with far greater knowledge than I possess, have likewise better opportunities of prosecuting these interesting inquiries. Occupied, as I have unceasingly been for the last twenty years, with the harassing details of general medical practice, and living constantly in town, I find it impossible to do all that I wish, nor could I have gone on thus far, but for the unbounded liberality of Messrs. Loddiges, who from their ample stores, have most kindly furnished me with every plant I desired for the purposes of experiment.

I come now to the most important application of the above facts: that of the conveyance of plants upon long voyages. Reflecting upon the causes of the failure attending such conveyance, arising chiefly from deficiency or redundancy of water, from the spray of the sea, or from the want of light in protecting them from the spray, it was, of course, evident that my new method offered a ready means of obviating all these difficulties, and in the beginning of June, 1833, I filled two cases with *Ferns*, *Grasses*, &c., and sent them to Sydney under the care of my zealous friend, Captain Mallard, copies of whose letters I have enclosed.

The cases were refilled at Sydney, in the month of February, 1834, the thermometer then being between 90° and 100°. In their passage to England, they encountered very varying temperatures. The thermometer fell to 20° in rounding Cape Horn, and the decks were covered a foot deep with snow. In crossing the line the thermometer rose to 120°, and fell to 40° on their arrival in the British channel, in the beginning of November, eight months after they were enclosed. These plants were not once watered during their voyage, received no protection by day or by night, but were yet taken out at Loddiges' in the most healthy and vigorous condition. The plants chiefly consisted of *Ferns*, among them *Gleichenia microphylla* never before introduced alive, and the *Hymenophyllum Tunbridgense*. Several plants of *Callicoma serrata* had come up from seed during the voyage, and were in a very healthy state. As this experiment was made chiefly with *Ferns*, I will briefly give you an account of one other experiment, in which plants of a higher order of development were the subject of trial. Ibrahim Pacha being desirous to obtain useful and ornamental plants for his garden near Cairo, and at Damascus, commissioned his agents in this country to send them. I was requested by his agents to select them, and they were sent out in August, 1834, in the Nile Steamer, to Alexandria. They were about two months on their passage, and I have enclosed a copy of the letter from Mr. Traill, his gardener, giving an account of their condition when he received them; and have likewise sent you a list of the plants, which were contained in the Egyptian cases. I have, as yet, received no account of the Syrian plants. Various other trials have been made to other parts of the world, as Calcutta, Para, &c. &c., and with the same success.

I feel well assured that this method of importing plants would likewise be extremely useful in the introduction of many of the lower but most interesting tribes of animals, which have never yet been seen alive in this country.

In reply to an inquiry that was addressed to Mr. Ward, as to the advisability of a collector's taking glazed boxes to Brazil, Mr. Ward thus writes. "I should imagine that these may be easily procured at Rio, and various other places; but if glass cannot be obtained, or is very dear, then a number of small panes might be carried, for use, as occasion requires.

"It may be as well to state, once for all, that the success of my plan is in exact proportion to the admission of light to all parts of the growing plants, and to the due regulation of the humidity of the mould wherein they grow. It is safer, in all instances, to give rather too little than too much water. If *Ferns*, for example, are the subject of experiment, they should be planted in the soil most congenial to them, well watered, but all the superfluous fluid allowed to drain off, before the case

is finally closed; while on the other hand, succulent plants should be set in dry sand. I need not, however, dilate upon this, any further than by observing that the natural condition of the species should be imitated, as far as possible, except in the free exposure to air. The smaller species of *Cacti* will travel well, suspended in my cases, without any mould. The larger species, according to Loddiges, should be packed in very fine and dry sand. All vegetable matters, used as package, are very injurious.

"You ask how the tropical *Orchideæ* may be best conveyed:—most certainly in the glazed cases: I believe, that, thus secured, ninety-five out of every hundred may be imported in a vigorous state from any part of the world, provided the voyage does not exceed eight or ten months in duration.

"In all instances, the plants require no attention during the voyage; the sole care requisite being to keep them in the light.

"You next enquire, what plan I would suggest, where glazed boxes are not procurable, and here I must give you higher authority than my own, that of Messrs. Loddiges, who find the means adopted by your American correspondent, the most eligible, viz., that of packing them in moderately moist *Sphagna*:—always excepting the succulent plants.

"Would it not be advisable to direct the attention of your collector, particularly, to the introduction of such plants as have never yet been seen alive in this country, owing to the impossibility of importing them in the old method? Every species of *Trichomanes* and *Hymenophyllum* might thus become inmates of our stoves, as well as a number of other interesting plants, which possess oily nuts or seeds, that quickly lose their germinating property, after they are ripe. These seeds might be sown in the mould among the other plants, and would come up during the voyage. All the *Palms* and *Bertholletia*, &c. would succeed admirably in this way.

"I may remark, that there is one point, upon which misconception exists very generally, even among well informed men. Because my cases are made quite tight, it is imagined, that the plants contained in them receive no change of air. Now, it must be obvious to every one who reflects for an instant on the subject, that owing to the expansibility of the air by heat, there must, with every change of temperature, be a corresponding change in the volume of air contained within the cases. Without such a variation, the plants would, in all probability, soon perish."

N. B. WARD.

Hobart Town, Nov. 23, 1833.

Sir,—You will, I am sure, be much pleased to hear, that your experiment for the preservation of plants alive, without the necessity of water, or open exposure to the air, has fully succeeded.

The two boxes entrusted to my care, containing ferns, mosses, grasses, &c., are now on the poop of the ship (where they have been all the voyage), and the plants (with the exception of two or three ferns, which appear to have faded) are all *alive* and *vigorous*.

During the very hot weather near the equator, I gave them once a light sprinkling of water; and that is all they have received during the passage.

All the plants have grown a great deal, particularly the grasses, which have been attempting to push the top of the box off.

I shall carry them forward to Sydney, according to your instructions, and have no doubt of delivering them into the hands of Mr. Cunningham in the same flourishing state as they are at present.

Allow me, in conclusion, to offer you my warm congratulations upon the success of this simple but beautiful discovery for the preservation of plants in the living state upon the longest voyages; and I feel not a little pride in having been the instrument by which the truth of your new principle has been fully proved by experiment.

I am, Sir, &c. &c.

CHARLES MALLARD.

Barque Persian, at Sydney, Jan. 18th, 1834.

Sir,—I have the happiness to inform you, that the plants (ferns, mosses, &c.) contained in the two glazed cases entrusted to my care, were landed here at the Botanical Garden, about three weeks ago, nearly the whole of them alive and flourishing. They have since been transplanted by Mr. McLean, who has charge of the garden in the absence of Mr. Cunningham (gone to New Zealand botanizing), and are all doing well.

The complete success of your interesting experiment has been decidedly proved; and whilst offering you my congratulations upon this agreeable result, I cannot but feel some little degree of pride and pleasure in having been the instrument selected to put to the proof so important a discovery to the botanical world.

I am, Sir, &c. &c.

CHARLES MALLARD.

P. S. I ought to have mentioned that, during the voyage, the plants were watered but once, and that but a light sprinkling near the equator, and were on deck (on the poop) the whole passage.

Cairo, April 30, 1835.

Sir,—I beg to acknowledge the receipt of your letter of 2d ultimo, wherein you request information as to the state of the plants sent out by you in the Nile steamer. The collection consisted, I believe, of 173

species, contained in six glazed cases, two of which only were forwarded to me from Alexandria: The one which you mention as having been fitted up with tale, together with three others, were sent on to Syria immediately on their arrival in Alexandria, so that I had no opportunity of seeing them.

I have, however, the pleasure to inform you, that the Egyptian portion of the collection was received here in the very best condition: the plants, when removed from the cases, did not appear to have suffered in the slightest degree; they were in a perfectly fresh and vigorous state, and, in fact, hardly a leaf had been lost during their passage. Your plan, I think decidedly a good one, and ought to be made generally known.

I am, Sir, &c. &c.

J. TRAILL.

List of plants contained in the two cases sent to Egypt.

Achras Sapota.	Diospyros embryopteris.	Maranta bicolor.
Aleurites triloba.	Doryanthes excelsa.	Melastoma Fothergillii.
Alpinia nutans.	Dracena edulis.	Menispermum Cocculus.
Anona Cherimoyer.	Dracena terminalis.	Melaleuca cajuputi.
Bignonia venusta.	Erythrina crista-galli.	Mimusops Elengi.
Bombax Gossypium.	Ficus elastica.	Morus tinctoria.
Brexia spinosa.	Flacourtia cataphracta.	Myrtus Pimenta.
Caryota urens.	Franciscea uniflora.	Oreodoxia regia.
Cedrela odorata.	Gomutus saccharifer.	Pandanus odoratissimus.
Combretum comosum.	Jatropha panduræfolia.	Passiflora racemosa.
Croton variegatum.	Jonesia pinnata.	Piper Betel.
Curcuma longa.	Ixora coccinea.	Piper nigrum.
Cycas revoluta.	Latania borbonica.	Psidium chinense.
Dalbergia scandens.	Laurus Cassia.	Terminalia angustifolia.
Dimocarpus Litchi.	Laurus Cinnamomum.	Uvaria odoratissima.
Diospyros cordifolia.	Maranta arundinacea.	Vanilla planifolia.
Diospyros edulis.	Maranta zebrina.	Zingiber officinale.

2.—*Notes on the Drugs called Mishme Teeta and Pucha Pat.*
By N. WALLICH, M. D.

About a year ago I received from Captain Jenkins, Agent to the Governor General on the N. E. Frontiers of Bengal, a small supply of a medicinal root, which he informed me was in great repute in Assam, and among the tribes inhabiting the adjoining countries. I have since been able, through the kindness of Lieut. Charlton, of Saddeya in Upper Assam, to determine with certainty the nature of the plant which yields this root; and I have now the pleasure to submit some notes on the subject to the Medical and Physical Society, together with the result of the experiments made by my valued friend Mr. Twining, to ascertain the properties and medicinal use of the drug.

Mishme Teeta is the name by which this drug is designated among the Mishmees and Lamas in the mountainous regions bordering upon Upper Assam. The Chinese call it *Honglane*. Among these three nations, it is in great estimation, and in universal use as a powerful tonic and stomachic. Quantities are sent down to Assam in neat little baskets, with open meshes, made of narrow slips of ratan, or some such material, and measuring 3 to 4 inches in length by 2½ in breadth and 1½ in width. Each basket contains about an ounce of small pieces of the root, from 1 to 3 inches long; they are nearly cylindric, uneven, scabrous, more or less curved, of a greyish brown colour, and varying in thickness from the size of a crow-quill, to double that diameter. The root is perfectly dry and brittle; occasionally a few fibrillæ are issuing from one end; the inside is hard, somewhat cellular, the outside of a dingy yellow colour. The taste is intensely and purely bitter, very lasting and with only a very slight aroma; on mastication, the root tinges the saliva yellow; its interior is bright-yellow or gold-colored. It possesses no smell whatever.

In March last, I received from Lieut. Charlton some fresh roots with leaves attached, which he had obligingly procured for me from the hills. They are still alive, and in a healthy condition, notwithstanding the great disparity of climate which they have to endure in Bengal, chiefly in regard to temperature. The leaves have withered away; but fresh roots are at the present time making their appearance. I am therefore not without some hopes of preserving this valuable plant in the Honorable Company's Botanic Garden; or at any rate of introducing it hereafter into localities where it may have a better chance of thriving. I have subsequently had the pleasure of obtaining from the same liberal source two incomplete specimens of the inflorescence together with unripe fruit, produced by the plants at Saddeya. These are the materials from which the following brief notes have been taken.

Coptis Teeta, foliis trisectis, segmentis petiolatis, lobato-pinnatifidis, lobis incisive acutissime setaceo-serratis; scapo paucifloro, bracteis foliaceis lineari tripartitis.

Radix subcarnosa, multiceps, fibrillosa, intus luteo-aurea. Sarculus? Folia erecta, glabra, longe petiolata, textura flem et rigidiuscula, habitus frondem filicis ejusdem dorsiferae referentia; circumscriptione ovato-cordata, attenuato-acuminata, quadripollicaria; segmenta petiolo partiali 1/2 pollicari suffulta, lateralia semi-cordato-ovata, extus fere bipartita, pollices duos longa; intermedium duplo majus, paullo longius petiolatum, attenuatum in acumen, basi cuneata subdecurrente; omnia inciso-pinnatifida, lobis obtusis, serraturis latiusculis seta terminatis, reticulata, nervis supra puberulis, venis extimis curvato-furcatis. Petiolus gracilis, longitudine circiter folii, basi dilatatus. Scapus teres, erectus, tenuis, striatulus, folia longitudine aequans, apice gerens flores paucos (vix ultra tres) parvos, alternos, pedunculatos. Sepala oblongo-lanceolata, attenuata, acuta, albida, parallela venulosa, glabra, unguem longa, fugacissima. Petala lineari-ligulata, obtusa sepalis triplo breviora, planiuscula (?) Stamina pistillaque plura; antherae planorotundatae, albidae. Carpella immatura membranacea, 3-5-ovulata, brevis stipitata, stylo terminata carnoso subcylindrico, sequente, adscendente-recurvato, intus (stigmatibus) scabrido. Bractea sub singulo pedunculo foliacea, angusto-linearis, serraturis setaceis marginata, infima tripartita. Pedunculi fructiferi elongati.

Coptis belongs to the subdivision of Ranunculaceae, called *Helleboreae*. It consists of three species: namely, *C. Teeta*, and the two following.

C. trifolia, Salisb. in Linn. Trans. vol. viii. p. 305; Bigelow, Amer. Med. Botany, vol. i. p. 60, t. 5; Decand. Syst. Veg. vol. i. p. 322 et Prodr. vol. i. p. 47; Lodd. Bot. Cab. 2. n. 173. *Helleborus trifolius*, Linn. Amoen. Acad. vol. ii. p. 335. tab. 4, fig. 18. *Anemone Groenlandica*, Müll. Flor. Dan. vol. vi. p. 5. tab. 166.

This is a native of the most northern parts of Europe and of North America, and is quite distinct from our plant by its rounded obovate leaflets.

C. asplenifolia, Salisb. loc. cit. p. 306; Pursh. Flor. Boreal. Amer. vol. ii. p. 39; Decand. locis cit.; Smith in Cyclop. Rees, vol. xix. ad calcem vocis *Isopyri*, quo teste *Thalictrum japonicum*, Thunb. in Act. Soc. Linn. vol. ii. p. 337, et *Didynamista Salviae similis*, Ejusd. Flor. Japon. p. 364, num. 43 (inter plantas obscuras) huc pertinent.

A native of the west coast of North America, where it was found by my venerable friend Mr. Archibald Menzies, who is, I believe the only survivor of the party that accompanied Captain Vancouver in his voyage round the world. It has also been found in Japan, according

to Thunberg. The plant comes near to *Coptis Teeta*, agreeing with it in the fern-like appearance of the leaves, from whence it derives its name, and which indeed at first deceived me into a supposition of ours being a member of that tribe.

The nearest allied genus is *Isopyrum*, of which Mr. Royle's very valuable and important work, Illustrations of the Botany of the Himalaya, contains descriptions and figures of two species; namely *Isopyrum grandiflorum* Fischer, Royle Illustr. p. 55, t. 11. fig. 3, from Kunawur; and *I. microphyllum* Royle, loc. cit. fig. 4, (tab. 1 being quoted by mistake in both instances for tab. 11), from Buddrinath, where it was found by the plant-collectors employed under me.

As it is very probable that the medicinal properties of *Mishme Teeta* will be found to agree with those of the *Gold-thread* of North America (*Coptis trifolia*), so called from the colour of the root, I extract in this place the following interesting account from Professor Bigelow's work quoted above, p. 62.

"The root of this plant is a pure intense bitter, scarcely modified by any other taste. In distillation it communicates no decided sensible quality to water. The constituent with which it most abounds is a bitter extractive matter, soluble both in water and alcohol. It seems destitute of resinous or gummy portions, since the residuum from an evaporated solution in alcohol is readily dissolved in water, and vice versa. It is devoid of astringency when chewed in the mouth, and it gives no indication of the presence of tannin or gallic acid when tested with animal gelatin, or with sulphate of iron. The abundance of the bitter principle is evinced by the acetate of lead and nitrate of silver, both of which throw down a copious precipitate. The sulphuric, nitric, and muriatic acids occasion no change, and the muriate of tin gives only a slight precipitate, after some time standing.

"Of this article larger quantities are sold in the druggists' shops in Boston, than of almost any indigenous production. The demand for it arises from its supposed efficacy as a local application in aphthous, and other ulcerations of the mouth. Its reputation, however, in these cases is wholly unmerited, since it possesses no astringent or stimulating quality, by which it can act on the ulcerated spots; and where benefit has attended its use, it is doubtless to be ascribed to other articles possessing the above properties, with which it is usually combined.

"As a pure tonic bitter, capable of strengthening the viscera, and promoting digestion, it is entitled to rank with most articles of that kind now in use. Its character resembles that of Gentian, Quassia, and Columbo, being a simple bitter without aroma or astringency. The tincture, made by digesting half an ounce of the bruised root in eight ounces of diluted alcohol, forms a preparation of a fine yellow colour, possessing the whole bitterness of the plant. I have given it in various in-

stances to dyspeptics and convalescents, who have generally expressed satisfaction from its effects, at least, as frequently as from other medicines of its class. A tea-spoonful may be taken three times a day. In substance it rests well on the stomach in doses of ten or twenty grains. It is, however, difficult to reduce to powder, on account of the tenacity of its fibres."

I shall now advert to another vegetable substance which, although most extensively used by the natives of this country, has hitherto continued one of the problems in our Indian Materia Medica. The drug, to which I allude, is called in Bengalee as well as in Hindee, *Puchá Pát*, and is found in every bazar almost throughout Hindustan. My esteemed friend Baboo Radhakant Deb informs me, that "there exists no Sanscrita name for this leaf, which is largely imported by Mogul merchants; that it is used as an ingredient in tobacco for smoking, and for scenting the hair of women, and that the essential oil is in common use for imparting the peculiar fragrance of the leaf to clothes among the superior classes of natives." I believe that the people of the peninsula are peculiarly fond of this perfume, as are also the Roman Catholic inhabitants of this country generally.

Having ascertained, on my return from Europe two years ago, that a large quantity of what appeared to be the same drug as that commonly sold in the bazars under the name of *Puchá Pát* had been imported from Penang, I requested Mr. George Porter, late of that island, and formerly in charge of the botanical establishment there, to favour me with an account of the article, and also, if possible, with some growing plants of it. In February last year (1834), I had the pleasure to receive from him several plants, which I have succeeded in multiplying by cuttings, and which appear to thrive remarkably well in this garden. Mr. Porter has furnished me with the following memorandum: "The *Puchá Pát* grows perfectly wild at Penang, and on the opposite shore of the Malay Peninsula, in Wellesley province. The Arabs use and export it more than any other nation. Their annual pilgrim ship takes up an immense quantity of the leaf. They use it principally for stuffing mattresses and pillows, and assert, that it is very efficacious in preventing contagion and prolonging life. It requires no sort of preparation, being simply gathered and dried in the sun; too much drying, however, is hurtful, in as much as it renders the leaf liable to crumble to dust in packing and stowing on board. In Penang it sells at the rate of a dollar and a quarter, to a dollar and a half, per pekul. In Bengal, some which was sent from thence several years ago, sold at 11 rupees 8 annas per maund. At times the price is much higher. The last investment sold so low as six rupees only per maund. It has not been seen in flower." So far Mr. Porter's memorandum.

The *Puchá Pát* plant is evidently of the family of Labiatae. It forms a shrub (in the Botanical Garden) of two to three feet in height. The obtusely four-cornered branches and the leaves are juicy, and somewhat fleshy, and covered, especially the inferior surface of the latter, with a great deal of soft, pallid pubescence, which gives the plant a greyish appearance. All the young parts are densely villous. The leaves are opposite, petioled, ovate, obtuse, grossly and obtusely lobato-crenate, measuring from two to four inches; the lowermost on the branches are subcordate, all the others are cuneate, and entire at the base; the upper surface slightly rugose; under surface pallid, with very thick rib and nerves, and largely reticulated veins.

None of the individuals in this garden have hitherto shown any disposition to blossom; owing perhaps to the plant being so easily multiplied by division. All the green parts, on being rubbed, emit the peculiar smell of the drug sold under the name of *Pucha Pát*, which is also very like our shrub in the form, margins, and surface of the leaves.

I should have mentioned above, that the Baron Hügel informs me, that he has found a plant growing wild at Canton, which closely resembles that from Penang cultivated in this garden.

Whether *Marrubium odoratissimum Betonica folio*, J. Burm. Thesaur. Zeylan. p. 153, tab. 71, fig. 1; (*Marrubium Indicum*, N. L. Burman, Flor. Ind. p. 127), be our plant or not, it is difficult to say; but it strikes me that there is at least a considerable affinity between them.

H. C. Botanic Garden, 6th June, 1835.

Notes on the Medicinal Properties of the root of the Mishme Testa.—
By W. TWining, Esq.

The powder of this root is of an intensely bitter taste, which is accompanied with a slight degree of a peculiar aroma. The sensation produced in the mouth subsides but slowly, and is more pleasant than any simple bitter. Judging from the taste, it does not possess much astringency; and this opinion is confirmed, by finding that neither the tincture nor the infusion is much affected by the solution of sulphate of iron. Four hundred and eighty grains of the root, when coarsely powdered, and macerated in proof spirit for five days, were found to have lost 180 grains. The residue of the above tincture, when dried, amounting to 300 grains, was macerated for 30 hours in distilled water, and only 26 grains were found soluble in water; as the residuum, when dried, weighed 174 grains. The maceration in water was not continued longer than 30 hours, because fermentation had commenced, the weather being very hot at the latter end of May.

If we may be allowed to pronounce an opinion after trying the effects of the powder, and of the tincture, in 17 persons, this medicine is highly deserving of attention. The persons on whom the trials were made were chiefly patients who were suffering from different degrees of debility, after the subsidence of acute diseases; and one was a patient who was of a scrofulous habit, and reduced to the lowest stage of debility, by external suppuration of great extent. The effects of this medicine as a bitter, and its influence in restoring appetite and increasing the digestive powers, are very remarkable, and it may be said to possess all the properties of our best bitter tonics. It has seldom appeared to have the effect of constipating the bowels; but in this and many other respects, I consider further trials necessary to ascertain fully the medicinal properties of this drug.—*Transactions of the Medical and Physical Society of Calcutta*, Vol. VIII, Part I.

Calcutta, 5th June, 1835.

Notes on Cassia Lanceolata, or the Plant which yields the true Senna Leaves of the Calcutta Bazaars—By N. WALLICH, Esq., M. D.

CASSIA LANCEOLATA, Forskål, Flor. Ægypt. Arab. p. 85.—Lamarck, Encycl. Bot. vol. 1, p. 646, t. 332, f. 3.—Colladon, Hist. Nat. et Méd. des Cassies, p. 33, t. 15, f. C.—De Candolle, Prodr. Syst. Nat. Regn. Veg. vol. 2, p. 492.—Linnæi Syst. Veg. cur. Sprengel, vol. 2, p. 329.—Nees von Esenbeck and Ebermaier, Handb. der Med. Pharmac. Bot. vol. 3, p. 205.—Wallich, Cat. Herb. Ind. Or. n. 5318*. c. (in folio 204).

Cassia species angustifolia et ligustrina proz. Herb. Madras. Wall. loc. cit. a.—*Cassia ligustrinoides*, Herb. Wightian. Ibid. b.

Cassia acutifolia, De Lile in Deser. de L'Égypte, Hist. Nat. tom. 2.* Botanique, p. 219, t. 27, f. 1.

Senna officinalis, Gärtner de fruct. et semin. vol. 2, p. 312, t. 146.

Cassia Senna, Roxburgh, Hort. Beng. p. 31.—Ainslie, Mat. Méd. of Hindoost. p. 43, (2d edition, vol. 1, p. 390; vol. ii. p. 249).

Senna Leaves, Fleming, Cat. of Ind. Med. Plants and Drugs, in Asiatic Researches, vol. ii. p. 109.

The above synonymy might easily have been enlarged to a much greater extent, if my object had been to attempt a detailed history of *Senna*, and of the two species of *Cassia* which are now known to produce that leaf. But I wish to limit these notes solely to an account of the plant which yields the drug commonly sold in the bazaars throughout Hindustan, and more particularly those in Calcutta; and with this view I have confined myself to a quotation of such only, among the nu-

* By mistake I wrote Forst. instead of Forsk. in this lithographic catalogue.

merous authorities which presented themselves, as treat of the plant and drug in a more or less botanical respect, or with particular reference to this country; and even of these I have only noticed such as appeared to me of use to my brethren in the profession in India, and which I was able to consult personally. I have likewise thought it unnecessary to swell this little memoir by extracting from the works of Fleming, Ainslie, and others, what relates to the Indian names of the drug, its uses among the natives and the like; because I could have offered nothing more than a stale repetition of the information given by those authors.

It appears from Dr. Roxburgh's Hortus Bengalensis, that the plant was first introduced into the Botanic Garden of Calcutta in the year 1800, by the Rev. Dr. Carey. I am unable to say what result attended its culture at the time, but it may be concluded, from the circumstances of the plant not existing in the garden in 1803, and disappearing afterwards altogether for many years, that considerable difficulties were experienced in preserving it. In Roxburgh's valuable MS. Synopsis Floræ Indiæ the plant is introduced under the same name which it bears in the Hortus Bengalensis,—namely, *Cassia Senna*; and a specific character is added, which establishes beyond a doubt its identity with our *Cassia lanceolata*. He says, however, that the plant is "a native of the interior of India as well as Arabia, &c." of the correctness of which assertion I must express a serious doubt. In quoting Willdenow's edition of the Species Plantarum of Linnæus for his plant, a question naturally arises: which of the two, if not more, species of *Cassia* which are confounded there under the name of *C. Senna*, was actually meant by Dr. Roxburgh? Taking the species as he found it in Willdenow, the extensive geographical distribution to which I have alluded is, strictly speaking, true; but, as I before observed, the species which Roxburgh had before him was undoubtedly *C. lanceolata*, the true and genuine *Senna* plant of Asia Minor, which plant most unquestionably does not grow wild in the interior of India, nor in any part of the East Indies.

There is another species of *Cassia* which produces *Senna* leaves, and is called by Colladon *C. obovata*. It is distinct from ours, although for a long time it was confounded with it by Linnæus and others. This, too, is a native of Asia Minor; but does it not also grow in India? Both Colladon and other botanists cite Burman's *C. Senna*, which is decidedly an Indian production, as a synonyme; but I suspect they are wrong in so doing; in other words, I am inclined to consider Colladon's and Burman's plants as two different species, belonging to different countries. Roxburgh has a plant which he calls *Senna obtusa*, Flor. Ind. vol. 2, p. 344, and for which he quotes Burman's *C. Senna*; and this plant, judging from Roxburgh's excellent description as well as from

its place of growth, (Seringapatam), and lastly from native specimens which I have myself had an opportunity of examining, I believe to be a distinct species from the Egyptian *C. obovata*, and which I suggest may be called *C. Burmanni*. I must observe here, that *Cassia Senna* has not been introduced into Roxburgh's printed Flora Indica, although it is inserted both in his Hortus Bengalensis and the MS. Synopsis quoted above; but his *Senna obtusa* is mentioned in all three works, (under the genus *Cassia* in the two last).

Therefore, then, two species of *Cassia* which undoubtedly produce the Senna of commerce, both being exclusively natives of Egypt and Arabia; and a third distinct species, which belongs to the continent of India, is said by Roxburgh to yield a substitute for that article. The following is a synoptical view of them all.

1. *Cassia lanceolata*, Forskål, produces the best sort of leaves, and is the subject of my present observations.

2. *Cassia obovata*, Collad. loc. cit. p. 92, t. 15, f. 1, (with exclusion of the citation from Burman, which belongs to the following species).

3. *Cassia Burmanni*, Wall.—*C. Senna*, Burm. Fl. Ind. p. 96, t. 33, f. 2.—*Cassia vel Senna obtusa*, Roxb, locis cit.—*C. obovata*, Wight, Herb. (non Collad.) in Wall. Cat. Herb. Or. 5319 a.—*C. Senna*, Herbb. Madr. et. Heyn. Ibid. b. et. c.—*C. Senna* Hb. Russ. Ibid. d. The plant which I gathered on the banks of the Irawaddy at Paghamew (Ibid. e.) is probably this species, though I cannot speak with positive certainty, as neither my Burmese Herbarium nor my manuscript notes respecting it are with me in this country. This species has not been found in Hindustan proper. It would be very desirable to try still further the efficacy of its leaves; and I beg to recommend the subject to the consideration of those who may have the means of making the experiment.

About eight years ago I succeeded in raising a number of plants from seeds found in pods among a batch of Senna which had recently arrived from Arabia. They proved to be Forskål's *C. lanceolata*. Some difficulties were experienced at the commencement in preserving the plants and making them produce good seeds; but they were gradually surmounted, and, we have at this time (August, 1834), several plots of land in cultivation with the species; the greatest proportion of the plants being in a healthy and vigorous condition, full of flowers, and showing successive crops of ripe pods. The unusual degree of heat during the late dry season sensibly affected some of the individuals, by causing a disease in the root which killed them during the rains; still our crop is far better than I had any ground for anticipating; a good quantity of seeds has already been obtained, and a further supply remains still to be reaped, which will enable us to raise a much larger proportion of plants next year. The mode of cultivation which has

been found to answer best is to transplant the seedlings after they have acquired a height of about 6 inches, at a distance from each other of 3 feet, in slightly raised beds or patches of open ground, previously well cleansed from weeds and enriched by the addition of some vegetable mould. We sow the seeds in the month of November; germination commences in about twelve days, and the transplanting takes place in February; after which the plants grow luxuriantly, provided they are watered during the hottest days of April and May. Upon the whole, it has been found, that shading of any kind does more harm than good; and although a number of the young plants perish in their tender age from the excessive heat, yet by constantly supplying their place with fresh seedlings no sensible loss has occurred in the end from that source. The plants begin to blossom in April, and they continue producing successive crops of flowers and fruit until the cold weather begins to make its first appearance early in October, soon after which the plants die away; very few individuals surviving a second year.

Mr. Twining having with his accustomed liberality undertaken to ascertain the quality of the Senna leaf produced this year at the Botanic Garden, I am enabled to annex his very satisfactory report to this paper. It is proper, however, to observe, that the leaves furnished to that gentleman were gathered during the rainy season, in the months of July and August,—probably the most unfavourable of all for securing their active principle pure and undiluted, not only because the sap of the plant is then at its fullest rise, and necessarily modified by the continued production of flowers and fruits, but also because the drying of the leaf without the aid of artificial heat (as has been the case in the present instance), is a matter of doubtful effect. I am, therefore, warranted in saying, that had the leaves been collected in the dry weather, as I will take care they shall be next year, they would probably have proved superior to the Senna procurable in the Calcutta bazar.

Some explanation may perhaps be necessary for my offering a detailed description and coloured figure of a plant, which is already known to the world, in both respects, chiefly by the labours of De Lile in the superb French work on Egypt. But independent of the account there given being necessarily short and succinct, although illustrated by a most beautiful engraving, the work itself is so very expensive and scarce in this country (I believe it does not exist any where except in the Library of the Asiatic Society of Calcutta, at least on this side of India) that few only can have access to it. I have had the advantage of examining the plant leisurely in its various stages; and as my object is to furnish the Medical profession in India with the means of identifying a plant yielding one of the most extensively useful articles of Materia Medica, I trust I shall be excused even if I had nothing to offer but what had been furnished already from other sources.

The plant is 3 to 4, rarely 5 feet high; erect, branchy, of an elegant rounded form and aspect, and of a uniform pallid glaucous colour, corresponding well with the elegant clusters of large pale-yellow blossoms, which are produced in abundance during several months in succession; the whole forming an object of great beauty, not surpassed by any of the smaller species of the extensive and difficult genus to which it belongs. Root long, woody, tapering, perpendicular, sending forth few branches only; annual, rarely biennial. Stem cylindric, as far as an inch thick at the base, together with the thicker branches covered with a rust-coloured slightly scabrous epidermis, which on close inspection is found marked with minute parallel fissures. Branches round, pale-green, unequally and obtusely angular, very slightly flexuose towards their end, which, as well as the leaves, are glaucous and perfectly opaque; while young there are a few short sub-adpressed hairs on both sides of the leaflets as well as on the branches, which disappear by age. Tender shoots covered with much grey pubescence. Leaves petioled, pinnate, spreading, 1 or 2 inches distant from each other, scattered, from 6 to 10 inches long. Common petiol cylindric, slender, about 2 inches long, with a narrow furrow on the upper side; its base swelled and gibbous below. About the middle on the upper side, across the furrow, is seen a slightly elevated line covered with short, minute, brown evanescent hairs; this is also the case between the opposite leaflets on the slender, straight rachis, which ends under the terminal pair of pinnae with a short, small and deciduous cuspis. Pinnae exactly opposite, in 6 to 10 pairs, spreading, $1\frac{1}{2}$ to 2 inches long, slightly increasing in length from the base of the compound leaf to its apex, narrow or linear-lanceolate, tapering-acute, the midrib ending in a very minute point, margins gently decurved, base a little unequal, the upper half being acute, the lower a little broader and blunt; of a thickish, almost fleshy brittle texture, flat, very pallid and glaucous; both sides, especially the lower, have a number of minute adpressed short hairs, which disappear by age; the upper side is marked with some oblique capillary nerves, the lower by a very slender whitish rib. Partial petiols very short, measuring scarcely a line in length, cylindric. Stipules small, fleshy, opposite, spreading and recurved, withering, lanceolate, acute channelled, smooth, with an oblique semicordate base, the outer side of which is thicker than the rest, rounded, concave below; within the base are a number of black, short, subulate loosely attached and deciduous hairs or ciliae. Racemes solitary in all the upper axils, peduncled, erect, somewhat incurved, as long as the leaves, bearing about 20 large bright yellow or gold-coloured, inodorous, short pedicelled flowers. Common peduncle one-third longer, and considerably thicker than the petiol, cylindric; rachis somewhat flattened and waved; pedicels one-flowered, very short, with a joint at the middle, and thence

thickening and clavate. Bracte exceedingly thin, membranous, pellucid, obovate, obtuse, concave, embracing the oblong and obtuse flower bud with its pedicel, adnate at the broadish base, falling off before expansion takes place. Calycine segments oblong, obtuse, concave, about $\frac{1}{2}$ of an inch long, very thin and delicate, recurved, caducous. Corolla of a uniform pale-yellow gold colour, spreading, twice as long as the calyx; petals unequal, caducous; the uppermost oblong-ovate, sessile; the others obovate, and supported on very short claws; $\frac{1}{2}$ of an inch long, many times broader than the petals; they are all obtuse, somewhat triplinerved, finely reticulated on the outer surface, with slightly elevated nerves and veins. Anthers very unequal, of two kinds; three sterile ones very short and small, placed under the narrow upper petal, subsagittate, retuse; seven are fertile, linear, with sagittate bases and oblique biporous apex; of these, five are straight, much longer than the former; the one under the pistil has a longer filament than the others; two are curved and very long, reaching above the middle of the lateral petals. Pistil curved, longer than the stamens; ovary linear, covered with grey adpressed pubescence, margins swelled, the sides marked by eight little protuberances caused by the ovules; base supported by a short, fleshy, pubescent pedicel; style bent downwards, cylindric, except at the base, which is slightly compressed; stigma minute, acute. Pod oblong, flat, almost foliaceous, pendulous, before maturity glaucous, and with a number of short adpressed hairs, afterwards almost smooth, of a dark brown colour, shining on the bloom being rubbed off; $1\frac{1}{2}$ inch long by $\frac{1}{2}$ in breadth; oblong, slightly curved or scymetar-shaped; one of the finely elevated margins being longitudinally convex, the other concave; very obtuse and obliquely cuspidate at the end; base rounded, and supported by a short pedicel; sides a little elevated along the middle, and marked across by slight swellings and depressions caused by the seeds; a number of parallel approximate capillary veins, originating from the marginal nerve, run obliquely across the sides towards the middle, forming reticulated anastomoses there as well as along their course by means of lateral veins. Valves flat, pale-ferruginous and a little pitted within. Dissepiments extremely thin and narrow, vanishing towards the margins. Seeds mostly eight, of a greenish-grey colour, shining, solitary in each cell between the dissepiments, flattened, triangular, obovate, about four lines long; their base contracted into a short thick obtuse beak, from which a ridge ascends on each side towards the middle; the sides as well as the thick margins are scabrous from numerous unequal small protuberances. Funicle long, transversal, a little adscending, capillary, originating from the concave margin of the pod, and inserted into one side of the beak of the seed, disappearing on the latter coming to maturity. The interior structure, indeed the whole pod, corresponds

entirely with the accurate description and figure given in Gärtner's work, quoted at the beginning of this paper.—*Transactions of the Medical and Physical Society of Calcutta*, Vol. VIII. Part I.

NOTE.

I beg to refer the reader to Mr. Royle's valuable *Illustrations of the Eucalyptus of the Himalayan Mountains*, p. 188 to 189, and again p. 201, Tabl. 37, for very important and interesting information respecting the plant and drug which form the subject of the above paper. It arrived in India long after I had presented my notes to the Medical Society, otherwise I should have given these substantial value by copious extracts from my highly esteemed friend's masterly work. His very accurate figure of the plant supersedes entirely the necessity of any being added to this paper.

H. C. Bot. Garden, 7th Nov. 1836.

N. W.

Addenda to the foregoing by DR. WIGHT; being practical remarks on the Culture and Preparation of Senna in the Madras territories.

MADRAS, March, 1837.

MY DEAR SIR,—As you requested, I have looked carefully over Dr. Wallich's notes on the *Cassia lanceolata*. With the exception of a few brief instructions for cultivation, I find it a purely botanical account, examining first the synonymy, and concluding with a minute and accurate description of the plant itself. A paper of that kind, coming as it does from the Magnus Apollo of Indian Botanists, leaves, so far as it goes, no room for remark. Since, however, it is your intention to reprint it in the *Madras Journal*, the following additions may prove useful to those, who either are, already, engaged in its cultivation, or who may contemplate speculating in that way: and here I may remark that, considering the ease and certainty with which this drug can be raised and prepared for the market, and its vast consumption both in India and Europe, it seems to promise a very large return to the speculator. The consumption in Europe alone is stated by Mr. Royle, (*Illustrations of Botany*, &c.), to amount to four millions of pounds, that of India it may be difficult to determine, but it is well known that the natives are in the habit of using largely the indigenous, broad pointed leaved kind, though said to be much inferior, which would, as a matter of course, give place to the better sort, if as easily procurable. This I think would soon be the case, if the cultivation was extended, as it has already become so completely naturalized in the Tinnevely district, as to be met with, in many places, as a common weed. It possesses besides the power of resisting heat and drought to an astonishing extent. I have seen it, during the hottest season, in full bloom and luxuriance, on old stone walls, and on soils so dry that no other herbaceous plant could survive, and where vegetation, in the arboreous plants, seemed nearly, if not altogether, arrested by the heat and long prevalence of strong land-winds. This fact (as shall be afterwards shown) is well worthy of attention.

In Tinnevely, the only district, I believe, in Southern India, where it is cultivated to any extent, the soil employed is of a grey alluvial kind, or such as, at some former period, has been under wet cultivation, consisting of a mixture of sand and clay. I also saw a field of it in the bed of an old tank, the soil of which was such as above described.

The ground is first well ploughed, to loosen it thoroughly, and clear it from weeds. The sowing usually commences in December, towards the end of the rains, to give the seed the advantage of the last showers of the season to make it vegetate. It is sown in rows about 18 inches or two feet apart, by dropping two or three seeds into holes about an inch deep, and a foot and half distant from each other. If rain falls, nothing further is required; if not, they are watered two or three times to promote germination.

When the plants have attained the height of two or three inches, the ground is loosened about the roots and well weeded. Should the season prove very dry, and vegetation seem to flag, they are again watered: the rule being, that the larger the leaves the better the quality; hence they are classed into first, second, and third sorts, according to that criterion. In about six months the leaves are considered fit for gathering, which is known by the spike of flowers being produced, but the flowers not yet opened. Three gatherings are taken, the two last at intervals of ten or twelve days; when the crop is finished, and the plants no longer considered capable of producing a marketable article; they are then allowed to ripen their seeds for next season. Some skill is required in gathering, to effect that operation economically, and at the same time without injuring the plants. The Senna bears a pinnate leaf, that is, one having a centre stalk with a number of leaflets (6 to 10) on each side. The object is to remove these, leaving the stalk attached to the bush. To accomplish this the lower end of the stalk is gently laid hold of, from below, between the finger and thumb, and the leaflets stripped off into the hand, by drawing the fingers along the stalk. In this way the bushes are rapidly cleared of their foliage, and no unintentional admixture of pods or other impurities can possibly occur. In about twelve days the second crop of leaves is fit for gathering, and in twelve or fourteen days more, the third and last is plucked.

The most important part of the process yet remains—that of drying—for, unless properly dried, both its commercial value and medicinal properties are deteriorated. Two methods have been tried, namely, exposure to the heat of the sun and to a current of air in a dark room. The former is said to be the method pursued in Egypt, the latter is the plan adopted in Tinnevely; at least so I was told, but, at the same time, with such evident reluctance, as to leave a doubt on my mind of its being really a true statement. I have now, however, no doubt on the

subject, for, on examining two specimens, one from Bombay, the other from Tinnevely, the difference was such as to prove, not only the truth of the statement, but the infinite superiority of sun dried leaves. The colour of the Bombay or Egyptian sample was a very pale green, nearly white; the leaves narrow, thick and leathery, or coriaceous, somewhat brittle, and having the smell of well prepared hay. The Tinnevely one, was of a light pea green colour, very thin, membranous (from excessive luxuriance?), flexible, and having a sour, vinegar-like smell, as if it had undergone the acetic fermentation while drying. Another indication of the same thing may be found in the great loss of weight the latter sustains in keeping. Again—samples of two sorts of Senna raised in this country from Tinnevely seed, the one dried in the shade, the other in the sun, were infused in equal quantities of boiling water; the former produced a pale, the latter a deep purplish brown, infusion, corresponding in these respects with infusions of Tinnevely and Egyptian samples. The former is less active, soon decomposes and acquires a sour smell and a muddy opaque colour, while the other retains for many days, under similar circumstances, its transparency, and without undergoing decomposition. These facts, I think, are quite conclusive, and show, in a striking point of view, the advantages of sun drying, considered in relation to medicinal properties only. But that is not all, it is well known that Egyptian Senna is largely adulterated, but is notwithstanding a more efficient medicine than the pure Tinnevely drug, a difference, which the preceding experiments prove to be, partly at least, attributable to the mode of drying, though other circumstances may contribute to produce this effect. Is the difference altogether attributable to the mode of preparation? or partly to the Egyptian Senna being adulterated with more active ingredients? or to the operation of some other cause yet undiscovered?

These are questions of importance, and merit the fullest investigation, both in a medical and commercial point of view. If the comparative inactivity of the Tinnevely Senna is owing to the first cause, the cure is simple, and the advantages, commercially, very great, since the cost of preparation, both in time and outlay, must be materially lessened by the rapid and unexpensive process of sun drying, as compared with the slow and more costly one of fitting up dark apartments. If it is in any degree owing to the admixture of other kinds of Senna leaves, we have an indigenous species to supply them; and, lastly, if owing to the quality of the soil or culture, the subject still remains for investigation.

I shall now make some remarks on what I consider the defective points of the Tinnevely mode of cultivation, and suggest some alterations tending to diminish the cost of production, and probably to improve the quality of the produce.

The lands appropriated in that district to the culture of Senna, are of a very expensive description, while it does not by any means appear certain that they are the best, since, by giving a tendency to excessive luxuriance, it is probable the due elaboration of the active principles of the plant is prevented, and mucilage formed; to which its diminished activity and greater tendency to fermentation may be mainly owing. Bearing in mind its power of resisting heat and drought, it will perhaps on this account be found, that the much cheaper, light sandy soils of the sea coast, and along the banks of rivers (now extensively appropriated to the cultivation of Indigo) are better adapted for its culture. The similarity, indeed, in many respects, of the Indigo plant is such, as to give us reason to believe, that any soil found suitable for it, will answer for Senna. Commercially speaking, it is of importance to determine, whether the drug produced on cheap and easily wrought soils, has its active properties increased or diminished. I would, therefore, recommend attention to this subject, since, if the former is found to be the case, it will probably materially diminish the cost, and fit it for the consumption of the Indian markets. The Tinnevely Senna being nearly 500 per cent. dearer than the Egyptian or bazar Senna.

I have mentioned above that only one crop, of three gatherings, lasting through a period of about one month, is procured from each plant, after which it is no longer considered fit to produce a marketable article. Mr. Royle informs us that he raised at Seharunpore some plants from seed picked from a parcel of bazar Senna. A figure of the plant, proves its identity with the one cultivated in Tinnevely, while its medicinal properties were ascertained by experiment, to be equal to the best any where grown. He, in collecting the crop, in place of gathering the leaves as practised here, cut down the whole bush. Some sown early (in March) "were cut down three different times, and always threw out a profusion of new branches, so that several crops were procured from the same plant in one season." The vegetation of some that was sown later, seemed only stopped by the accession of the cold weather. A combination of these plans might prove eminently productive, for, by sowing earlier, say in August and September, the first crop might be gathered in February or March, the plants might then be cut down, the soil slightly ploughed and manured between the rows, and watered; when a second crop might be expected about the usual time of gathering the first, according to the present practice; and, perhaps, as many as four crops might thus be obtained from the same roots, as they would be extending and strengthening after every cutting! This is the method adopted with Indigo, and I can see no reason to apprehend failure in the case of Senna, while it might be the means of effecting so great a reduction in the cost of production, as would enable it not only to compete with on equal terms, but even to undersell, the Egyptian article in this

country, and, from its greater purity, give it a decided advantage in the highest market where it now brings a very high price.

In conclusion, I beg to add, that, though these notes are somewhat hurriedly written, they are not the suggestions of the moment. It is now a year since I had an opportunity of inspecting the Tinnevely plantations, and I have since then repeatedly thought of drawing up a much more elaborate account of this cultivation than the present. Brief, however, as these hints are, I believe them amply sufficient, the simplicity of the culture of the plant, and of the preparation of the leaves, rendering more detailed instructions unnecessary: while the mere circumstance of having called attention to the subject, pointing out the advantages likely to accrue, will I hope prove an adequate stimulus to those who have the opportunity of extending the cultivation of this article of almost general consumption. India now imports perhaps not less than between three and four hundred thousand pounds weight of Senna annually, of which in 1831 she re-exported to England upwards of 200,000 lbs., the whole of which she might, with ease, produce within her own territories, and mostly from lands now lying waste, and with the additional advantage, that the collection and preparation would afford employment to all classes of cultivators, at those seasons when most other field labours are at a stand.

With respect to the indigenous Senna (*Cassia Burmanni* Wall.) I fear it is not so well known as it ought to be among Europeans, since it possesses very considerable medicinal properties, and is much used by the natives; who, to increase its activity, add a small portion of castor oil to the infusion, much in the same way as we add Epsom salts. It is a common and widely distributed plant in arid pastures and wastes, but by no means a conspicuous one, from the circumstance of its lying flat on the ground. In the hope of making it somewhat better known, I shall endeavour to procure recent specimens, and prepare a figure for your next number, which is the more desirable, as it may generally be procured in almost any part of the country, and might prove a useful substitute for the more approved lance-leaved species; or may perhaps be advantageously combined, as in Egypt, on the well known principle, that two medicines, possessing similar properties, act better in combination than either separately. Leaving this point, however, to be settled by those who have opportunities of subjecting both kinds to the test of experiment,

I remain, &c.

ROBERT WIGHT.

To R. COLE, Esq. Sec., &c.

ON THE AMERICAN SUMACH.*

The American Sumach, of which an experimental cargo is now on its passage to Liverpool, is the product of a tree which grows abundantly in many parts of South America, and possesses properties which render it decidedly more valuable, both to the Dyer and Tanner, than either Oak Bark, Catechu, Kino, Sumach, or the best Aleppo Galls. It contains, according to the able and scientific analysis of Mr. Samuel Rootsey, of Bristol, on a mean of two experiments, 76.25 per cent. of soluble or extractive matter, while Galls yield only 59.166645, Sumach (common) 40, Kino 40.4167, Catechu 67.08335, and British Oak Bark 30 per cent. Its most important constituent, however, in a commercial point of view, is *tannin*, or that principle which, by its union with animal matter, constitutes leather, of which the same experiments shew it to contain a mean of 51.1680 per cent. while the best Aleppo Galls yielded only 35.45835 per cent., Sumach 0.95834, or less than 1 per cent. and the best British Bark 13.4167 per cent. A tabular view of the results of Mr. Rootsey's experiments may be seen in Jameson's Edinburgh Philosophical Journal, and an abstract of these results in the Gardener's Magazine for August, 1834, under the name of *Dividivi*.

The substance has been largely and profitably employed in the tannery of Mr. John Nethersole, near Kingston, Jamaica, for some years past; and, from trials which have been made in England by skilful professional Tanners, it has been ascertained that one part of the American Sumach is equal to four pounds of the best British Oak Bark, and tans the leather in two-thirds less time; whence there results a gain of not only two-thirds of materials, but also of two-thirds of time. To the Dyer it will prove still more valuable—while Chemists will find their advantage in substituting it for Galls in the manufacture of Ink, in forming ointments for the cure of hæmorrhoidal complaints, &c. &c. Taking the per centage of tannin as a standard of comparison, the intrinsic value of the American Sumach is equal to 1.443, or about $1\frac{1}{2}$ of the best Aleppo Galls—hence the market value must always be estimated from the current price of that article.

Persons wishing to make trial of this new article, are requested to apply (post or carriage free), to Messrs. Vianna and Jones, Liverpool, to whom the cargo is consigned; to Mr. Samuel Rootsey, Chemist, &c. Bristol; to Messrs. Balkwill and Sons, Chemists, Old Town-Street, Plymouth; or to Dr. Hamilton, late Secretary to the Royal Devon and Cornwall Botanical and Horticultural Society, by whom every informa-

tion required will be furnished, and with whom samples may be seen. As the quantity expected is but small, and the arrival of the cargo may be daily looked for, those who wish to become purchasers are requested to be early in their applications.

Plymouth, October 3d, 1834.

The *Cesalpinia coriaria* varies in size according to the richness of the soil from a shrub to a large timber tree; the timber of which is valuable for many purposes of domestic economy and for building. It grows in the hottest, most sandy and arid soils, in which it appears to thrive better than in colder situations. In hot situations plants raised from the seed will flower in the third year of their growth, and will perfect their pods in the following year. In Carthage, December and January are the flowering months, but the plants raised from seed which I sent to Jamaica in 1829, and which was sown sometime about the month of October, flowered for the first time in August, 1822,* and in the same month in the following year after flowering, the branches, which are slender, were bent down with the weight of pods. In Carthage the pods are left on the trees till the high winds in March bring them down, when they must be gathered and housed before the April rains commence. From the experiments made on Oak bark however by Sir Humphry Davy, I should be inclined to think they would be found richer in the tanning principle if gathered by hand about the full moon of the month in which they attain their full growth, but before the sap has begun to descend, and the green colour to give place to the Mahogany hue of maturity. Oak bark is found to contain one quarter more tannin in spring than in autumn. The tannin resides wholly in the brittle exterior coat of the pod, all the rest being comparatively worthless; hence after dyeing, the pods should be ground in a mill and the refuse (amounting to one-fourth of the whole) separated by sifting. This refuse, though not worth the expense of freight, may be applicable to many useful purposes for dyeing, &c. on the place of production. In times of scarcity the pods are eagerly devoured by cattle. While young and soft, the pods are punctured by a small active little winged insect of a greenish colour, which deposits its eggs within, where they are hatched, and the young insects bury themselves in the seeds, the farinaceous portion of which they live upon as in the accompanying specimens of hollow seeds. This insect is, as Mr. Loudon, to whom I sent some for examination, informs me, a species of *Bruchus* similar to that which preys on the seeds of the family of *Brassicæ*, but has not hitherto been described by any Entomologist. I have named it for the present *Bruchus Cesalpinia*, or the Dividiyi *Bruchus*. I

* Query, 1831.—Ed. Trans.

have frequently received it alive from Carthage along with the seeds. A few specimens of dead *Bruchus* accompany this. How far the depredations of this insect are injurious to the pod itself must be determined by experiment.

In forming plantations of the *Cesalpinia coriaria* the trees should not be closer than 18 feet; whence an English acre will contain 135; and taking the average weight of produce from each when in full bearing, at 100 lbs. the harvest will amount to 135,000 lbs. the nett produce of which when ground and freed by sifting from the refuse, should be at least 101,250 lbs. or 45 tons 4 cwt. and 2 lbs. a return fully equal to that of the cane, and obtainable from land unfit for producing sugar.—*Transactions of the Agricultural and Horticultural Society of India*.—Vol. III. page 92—94.

W. HAMILTON.

On the identity of the bark of the *Strychnos Nux Vomica* with the false Angustura of writers on *Materia Medica*.—By W. B. O'SHAUGHNESSY, M. D., Professor of Chemistry, Medical College, Calcutta.

Few medicinal barks have ever attracted more attention than that generally termed the false Angustura. Introduced into Europe originally as the bark of the *Galipea febrifuga*, its poisonous properties soon denoted a different source. The *Brucea ferruginea* and *anti-dysenterica* were next suspected, and this erroneous idea continued to be entertained so long, that on an alkaloid being discovered in the bark in 1822, it was named *Brucine*, in conformity with the supposed origin of the bark: In 1823, however, it was ascertained that the bark in question arrived in Europe exclusively from South America, and not from the shores of the Red Sea, where the *Brucea ferruginea* or *vooginaos*, is indigenous.

The question has continued at issue, from 1825 to the present period. In 1828 was published M. Fée's admirable work on the Natural History of Remedies; and this author, whose elaborate research is quite unsurpassed, describes the false angustura as "*Arbor ignota, habitat in America meridionali*." Dr. Duncan in the last edition *Edinburgh Dispensatory*, 1830, says, the tree from which the false angustura is obtained "is not yet known, but it is a native of South America, and therefore it is not, as formerly asserted, the bark of the *Brucea anti-dysenterica* which grows in Abyssinia."—p. 340.

In Dr. Thomson's last edition, 1833, p. 226, we find no further information than a brief allusion in a foot note to the existence of the spurious bark, and to Plamba's obsolete observations regarding its history and name.*

* Nor in the later edition of 1836 is anything new added.—*Editor Madras Journal*:

The first hint we meet of the true nature of this bark occurs in the valuable *Manual of Materia Medica*, by Vavasseur and Edwards, in which, p. 269, the authors observe,—“This substance, obtained from South America, is probably yielded by a *strychnos* yet undescribed, and not by the *Brucea anti-dysenterica*,” &c.

Lastly, in Dr. Christison's unrivalled work on poisons, last edition, October 1835, p. 806, we find the author observing,—“It was long supposed to be the bark of the *Brucea anti-dysenterica*, but the latest inquiries seem rather to point at its being the produce of a species of *strychnos*, and perhaps of the familiar species, *S. Nux Vomica*.”

Such is a fair outline of the history of this bark up to the latest period. Since the last meeting of the Society I have been enabled to clear up all doubts on the subject, and to identify the false *angustura* as the bark of the *nux vomica* tree.

The subject was brought to my notice by my having been intrusted with the analysis of a crystalline substance supposed to have been prepared from the bark of the Rohun tree (*Swietenia febrifuga*). My experiments shewing that the crystals were brucine with traces of strychnine, the presumption immediately arose that the bark from which the crystals were obtained was the bark of the *strychnos nux vomica*, the only poisonous *strychnos* abundant in the Bengal jungles with which the natives are familiar.

Specimens of the bark from which the crystals were prepared, of the *kuchila* (native name of *nux vomica* bark) from the bazars, and from a *strychnos nux vomica* tree in the Botanical Garden, kindly supplied by Dr. Wallich, were readily procured and compared with each other—all were found identical in their physical and chemical composition, all yielded brucine and traces of strychnine, and all produced the same toxicological effects.

On a reference to the characters assigned by the authorities I have quoted as distinctive of the false *angustura*, we find the following chemical tests—1st, nitric acid, which changes the interior of the bark to a blood-red colour, and causes the red external exuberance to become green; 2dly, the prussiate of potash which causes in an infusion of the bark a faint green colour; and 3dly, sulphate of iron, which changes the infusion to a deep green. To all these re-agents the *nux vomica* bark presents the described indications.

The most remarkable and curious of the external characters of the *nux vomica* bark, and one in itself an indisputable proof of its being the false *angustura*, is the singular red exuberance which occurs on the outer surface of the specimens now presented to the Society.

This red exuberance was the first property of the spurious *angustura* bark which attracted attention in Europe. M. Fée states that it frequently happens that “the false *angustura* has a spongy exuberance of a very beautiful rust colour, and that M. Pelletier who had analysed it had by mistake described it as a lichen of the genus *Cladonia*.”

M. Fée denies that it is a lichen, and considers it as the result of a leprous disease of the bark, the stages in which he clearly and correctly describes. It commences, he states, by little regular prominences, surrounded by decayed epidermis. These tubercles increase in size, become irregular in outline and confluent, and pass through the several shades, between a clear yellow and iron-rust colour.

When the disease is of long standing, the part affected acquires considerable thickness, and is much deformed. No trace of organization can be detected in it by the naked eye. Examined by the microscope, it is found to be composed not of cellular tissue like Cryptogamic plants, but of true vascular tissue as in the Phanerogamic class,—a fact sufficient to shew that the exuberance is not a lichenoid production.

It is altogether unnecessary to add a minute description of the *nux vomica* bark, since Fée's account of it under the name of the false *angustura*, is as accurate as possible.

I trust the identification of the long doubtful false *angustura* may be of practical therapeutical utility, as well as pharmaceutical interest. It is extremely rich in brucea, an alkali of exactly the same properties as strychnine but fortunately but of one-twelfth the energy of that poison. According to the recent experiments of Andral, Magendie and Chevalier, brucea is extremely effectual in the cure of paralysis, atrophy, chronic rheumatism, sciatica, and several analogous affections. I have much hope, too, that it will be found useful in the treatment of intermittent and remittent fevers. The bark will now become an article of some consequence as an export, since the preparation of brucea as a medicine was limited or almost prevented by the rare and casual supply of the bark, from which it was obtained. In fact, brucea was only to be found in the museums as a curiosity. In the shops its price was as high as 40 shillings the ounce—hence the virtues of the remedy were only ascertained, its benefits not diffusible. We can now prepare it in Bengal for three or four rupees the ounce, and I have no doubt its consumption will become very extensive.—*Quarterly Journal of the Medical and Physical Society of Calcutta*,—No. 1, January 1837. October 22, 1836.

Catalogue of Plants collected at Bombay.—By JOHN GRAHAM, Esq.
(Concluded from page 183, No. 14).

172. *Datura fastuosa*. Common.—173. *Dracopis ferrea*. In flower pots only.—174. *Dimocarpus titchi*. In gardens, though not common. It bears fruit here but not equal to that obtained from China.—175.

* The *Litchi* forms the favourite fruit in Chinese deserts. It resembles somewhat the fruit of the Maple (*Acer Campestre*) in external appearance. The tree grows in a wild state in French and Jones' Islands, Whampoa.—EDIT. RECORDS.

Dalbergia arborea, native name Carunj. A very pretty tree; leaves deciduous in the cold weather.—176. *Dalbergia Sissoo*. Black wood used extensively in making furniture.—177. *Dalbergia scandens*.—178. *Dolichos tuberosus*.—179. *Dolichos cultratus*. A species of *Dolichos* is much cultivated and eaten like French beans, the *tetragonolobus*.—180. *Dolichos pruriens*.—181. *Dioscœrea sativa*. Common yam.—182. *Dioscœrea bulbifera*.—183. *Diospyros Ebenum*.—184. *Daemia reticulata*.—185. *Dillenia speciosa*.—186. *Diospyros montana*.—187. *Diospyros hirsuta*.—188. *Daphne Bholia*.—189. *Dendrobium*? On the Ghauts.—190. *Dombeya palmata*. In gardens only.—191. *Exacum bicolor*.—192. *Evolvulus hirsutus*.—193. *Euphorbia Tirucalli*. Common milk bush.—194. *Euphorbia antiquorum*.—195. *Euphorbia thymuloides*. Used for edgings, instead of box.—196. *Euphorbia nerifolia*.—197. *Euphorbia hirta*. A common weed.—198. *Eugenia jambas*. Jambler, rose apple.—199. *Eugenia Malaccensis*.—200. *Erythrina Indica*. A deciduous tree. It flowers in March and makes a very showy appearance.—201. *Eupatorium Zelonia*.—202. *Eclipta prostrata*.—203. *Elephantopus scaber*.—204. *Feronia elephantum*. Wood apple, a large handsome tree.—205. *Ficus Curica*. In gardens only.—206. *Ficus religiosa*. Peepul tree.—207. *Ficus Indica*. Banyan tree.—208. *Ficus elastica*.—209. *Ficus racemosa*.—210. *Ficus pubescens*.—211. *Flacourtia supida*. In gardens only.—212. *Flacourtia sepiaria*. Elephantia.—213. *Flacourtia inermis*.—214. *Guazuma ulraifolia*.—215. *Gardenia radicans*. In gardens only, cultivated for its beautiful, white, sweet smelling flowers.—216. *Gardenia lucida*. Elephantia.—217. *Gardenia dumetorum*.—218. *Gardenia exultans*.—219. *Gestonia floribunda*.—220. *Grewia orientalis*.—221. *Gomphrena globosa*. In gardens only, cultivated for its flowers.†—222. *Gloriosa superba*. Common during the rains.—223. *Guilandina bonducella*.—224. *Gürtnera racemosa*.—225. *Garcinia Cowa*. Common in the Concan.—226. *Grewia Asiatica*.—227. *Gerardia delphinifolia*.—228. *Gmelina arborea*.—229. *Gmelina Asiatica*.—230. *Gossypium herbaceum*.—231. *Glycine Sinensis*.—232. *Galega purpurea*.—233. *Garuga pinnata*.—234. *Grislea tomentosa*.—235. *Hoya carnosa*. Cultivated as an ornamental plant.—236. *Hoya viridiflora*.—237. *Hyperanthera Moringa*. Very common.—238. *Helicteres taora*.—239. *Hibiscus populicus*. Bhendy tree.—240. *Hibiscus rosa Chinensis*. Cultivated as an ornamental plant.—241. *Hibiscus mutabilis*. Cultivated as an ornamental plant.—242. *Hibiscus Sabdariffa*. Iropille, used in making jellies, tarts, &c.—243. *Hibiscus esculentus*. Commonly cultivated.—244. *Hibiscus surratensis*.—245. *Hibiscus cannabinus*.—246. *Hibiscus tricuspis*.—247. *Hedysarum gyrans*.—248. *Hedysarum strobiliferum*.—249. *Hedysarum tuberosum*.—250. *Hedysarum vespertilionis*.—251. *Hemidesmus Indicus*.—252. *Ixora coccinea*.

* Is this not a variety of *E. albaoides*, a common plant in China?—Edit. Records.

† Indigenous to China.—Edit. Records.

—253. *Ixora parviflora*.—254. *Ipomœa Quamloquit*. Cupid's flower.*—255. *Ipomœa fragrantissima*.—256. *Ipomœa tuberosa*.—257. *Impatiens Balsamina*.†—258. *Inula Indica*.—259. *Jasminum Sambac*. Mogrel, native name. Extensively cultivated for its flowers.—260. *Jasminum odoratissimum*.—261. *Jasminum latifolium*.—262. *Jasminum undulatum*.—263. *Jasminum auriculatum*.—264. *Justicia pieta*. Common in flower pots.—265. *Justicia nervosa*.—266. *Justicia bicolor*.—267. *Justicia montana*.—268. *Jonesia pinnata*. On Salsette.—269. *Jatropha curcas*. Used for forming hedges.—270. *Jatropha manihot*. In gardens only, very rare.—271. *Jatropha multifida*. In gardens, as an ornamental plant.—272. *Kydia fraterna*.—273. *Kyllingia umbellata*. Grass.—274. *Loranthus*. Several species.—275. *Lawsonia inermis*. Used for forming hedges.—276. *Laurus cinnamomum*. In gardens only.—277. *Laurus Persea*. In gardens only.—278. *Limonia monophyllum*.—279. *Limonia trifoliata*.—280. *Lagerstroemia regina*. In the Concan.—281. *Lagerstroemia Indica*.—282. *Lagerstroemia parviflora*.—283. *Lantana purpurea*.—284. *Lepidagathus cristata*.—285. *Menyanthes cristata*.—286. *Menyanthes Indica*.—287. *Mussaenda frondosa*. On the Ghauts.‡—288. *Morinda Indica*.—289. *Morinda citrifolia*.§—290. *Mirabilis Jalapa*. In gardens.—291. *Mangifera Indica*.—292. *Mimusops elengi*, and 293. *Mimusops hexandra*. Both pretty trees commonly planted by Mussulmen around towns, such as Aurungabad, &c.—294. *Murraya exotica*. In gardens only.—295. *Melia azadirachta*. Neem tree.—296. *Myrtus communis*. In gardens.—297. *Mau mea America*. In gardens, rare.—298. *Michilea champaca*.—299. *Momordica charambee*. Commonly cultivated as an article of food.—300. *Menispermum cordifolium*.—301. *Musa paradisiaca*. Plantain.—302. *Musa*? On Ghauts.—303. *Mimosa pudica*.—304. *Mimosa cinerea*.—305. *Mimosa Arabica*. Babool tree; common; in extensive use as firewood.—306. *Mimosa scandens*. On the Ghauts.—307. *Mimosa Sirissa*.—308. *Mimosa glauca*.—309. *Mimosa dulcis*.—309. *Moræ chinensis*.—310. *Mentha perilloides*.—311. *Marsilea 4-folia*.—312. *Morus Indica*.—313. *Milthavia tomentosa*. In gardens only.—314. *Mesembryanthemum*? In gardens only.—315. *Nyctanthes Arbor tristis*.—316. *Nicotiana Tabacum*.—317. *Nerium Oleander*.—318. *Nerium coronarium*.—319. " *coccineum*. Rare. } All cultivated as ornamental plants.
320. " *antidysentericum*. }
321. " *tinctorium*. }
322. *Nymphaea lotus*.—323. *Nelumbium speciosum*.—324. *Nauclea orientalis*.—325. *Oryza sativa*. Common rice.—326. *Ocimum sanctum*. Planted at temples.—327. *Ochna lucida*.—328. *Piper nigrum*. In

* This plant is indigenous to Danes' Island, China.—Edit. Records.

† This species occurs in China.—Edit. Records.

‡ Abundant on French Island, Whampoa, China.—Edit. Records.

§ A native of China.—Edit. Records.

gardens.—329. *Platan virgata*.—330. *Plumbago rosea*.—331. *Plumbago Zeylonica*.—332. *Physalis angulata*.—333. *Plumeria acuminata*.—334. *Periploca esculenta*. A very pretty twining plant; flowers during the rains.—335. *Perilla ocymoides*.—336. *Polyanthus tuberosa*. Cultivated in gardens; worn by native women in their hair.—337. *Parkinsonia aculeata*. In gardens.—338. *Poinciana pulcherrima*. Common in gardens. It grows in abundance close to the caves of Ellora, near Aurangabad, but I suppose it has all been planted.—339. *Portulaca oleracea*.—340. *Psidium pyrifera*. Grown in gardens.—341. *Punica Granatum*. Grown in gardens.—342. *Premna integrifolia*.—343. *Phlomis Indica*.—344. *Pedaliium Murex*.
 345. *Passiflora foetida*. In Gardens.
 346. „ *laurifolia*. Do.
 347. „ *minima*. Do.
 348. „ *alata-cœrulea*. Do.
 349. *Pistia Stratiotes*.—350. *Pentapetes phœnicea*. In gardens.—351. *Pterospermum acerifolium*.—352. *Phascolus Munga*.—353. *Polygonum glabrum*.—354. *Phyllanthus bacciflorus*.—355. *Pandanus odoratissimus*.—356. *Prenanthes sarmentosa*.—357. *Quisqualis Indica*. In gardens.—358. *Rhizophora Mangle*.—359. *Rosa*? Several species in gardens.—360. *Ricinus communis*.—361. *Ruellia Zeylonica*.—362. *Rottleria tinctoria*.—363. *Saccharum officinarum*. Cultivated.—364. *Smilax aspera*.—365. *Santalum album*.—366. *Solanum tuberosum*.—367. *Solanum lycopersicum*.—368. *Solanum melongina*.—369. *Solanum nigrum*.—370. *Solanum jacquini*.—371. *Sterculia colorata*.—372. *Sterculia urens*.—373. *Sterculia foetida*. Poon tree. Grows to a great height in Malabar; masts are made of it.—374. *Sphæranthus Indicus*.—375. *Sansevera Zeylonica*.—376. *Sapindus emarginatus*.—*Sapindus tetraphyllus*.—377. *Spondias Amra*.—378. *Sesamum Indicum*.—379. *Sida populifolia*.—380. *Smithia sensitiva*.—381. *Spilanthes alba*.—382. *Salvadora persica*.—383. *Stemodia ruderalis*.—384. *Tectona grandis*. Teak tree.—385. *Tamarix Indica*.—386. *Turnera ulmifolia*. In gardens.—387. *Tradescantia discolor*. In gardens.—388. *Tradescantia cristata*.—389. *Triumfetta annua*.—390. *Thunbergia grandiflora*. In gardens.—391. *Tamarindus Indica*.—392. *Tagetes patula*. In gardens; worn by native women in their hair.—393. *Trichosanthes Anguina*.—394. *Trophis aspera*.—395. *Terminalia Catappa*.—396. *Terminalia alata*.—397. *Terminalia Bellirica*.—398. *Tabernaemontana dichotoma*.—399. *Utricularia stellaris*.—400. *Ulmus integrifolia*. Salsette.—401. *Unona longifolia*.—402. *Vitis vinifera*. In gardens.—403. *Vitex trifolia*.—404. *Vernonia arborea*.—405. *Vernonia anthelmintica*.—406. *Verbena sativa*.—407. *Verbena dichotoma*.—408. *Viscum compressum*.—409. *Vangueria spinosa*.—410. *Vangueria edulis*.—411. *Vitmannia elliptica*.—412. *Yucca gloriosa*.—413. *Zingiber officinale*.—414. *Ziziphus Jujuba*.—415. *Zinnia elegans*. In gardens only. 416. *Zea Mays*. Indian corn; extensively cultivated.—417. *Zapania nodiflora*.—Records of General Science, Nos. 21 and 22, for September and October 1836.

Account of the Province of Rámnád, Southern Peninsula of India. Compiled from the "Mackenzie Collection," and edited by the Secretary to the Royal Asiatic Society.

INTRODUCTION.

This province, the government of which is now administered by the British, formed in ancient times the greater part of the principality, or fiefship, of the *Sétu-pattis*, the chiefs or guardians of the passage leading from the continent of India to the island of Rámésvara, and thence to the opposite coast of Ceylon, called Ráma's Bridge, or Adam's Bridge. These chieftains, dating their authority from the period of the establishment of a place of pilgrimage on the island of Rámésvara, by the Great Ráma, claim an antiquity even higher than that of the Pándyans, or kings of Madura, but to whom, it would appear, that they were, in general, tributary, though now and then asserting and maintaining their independence. Of their history, however, we are not now to speak, but of the province as it was in the year 1814, when the data were taken from which chiefly the following account is compiled. It lies between the ninth and tenth degrees of north latitude; and the seventy-eighth and seventy-ninth of east longitude; is bounded on the north by the provinces of Tanjore and Pudukotta, on the south and east by the sea, and on the west by the districts of Tinnevely, Madura, and Sivaganga; and comprehends an area of nearly two thousand five hundred square miles. Its general aspect is that of high and low lands, the latter having numerous artificial lakes, constructed for the purpose of promoting cultivation; the former exhibiting a variety of dry grain-fields, while the northern districts abound with extensive groves of Palmyra trees, with scarcely a vestige of jungle. The whole is divided into seventeen districts, comprising one thousand six hundred and sixty-eight towns and principal and subordinate villages, with a population, at the period to which we allude, of about one hundred and fifty-seven thousand.

FORTS, TOWNS, AND VILLAGES.

Rámnád,* the capital of the province, has both a fort and a town. The former is a fortification, the sides of which, from north to south, and from east to west, are each about half-a-mile in length, consisting of a single wall, strengthened with thirty-two bastions, built at equal distances from one another, and with one gate-way which is to the east. The wall is twenty-seven feet high and five feet thick, without a rampart, but with loop-holes, and surrounded by a ditch. This fort was built

* Properly, Rámanátha-páram, from Ráma, the god, or king of that name; nátha, a lord, and páram, a town or city.

upwards of two hundred years ago, by MOGHAVA RAGUNATHA SETUPATTI, who, at the same time, constructed the large reservoir, or artificial lake, that lies on the N. W. side. About two hundred yards from the gate stands the chieftain's palace, which is a spacious Gothic structure, surrounded by a high wall, within whose cincture is seen a great number of apartments, some of two and others of three stories high, whose fronts and portals exhibit some taste, according to the Carnatic style of architecture. In the grand hall, called Rámalinga Velasam, the chieftain, his wives, and his ancestors, are represented in a highly embellished manner; and, among a variety of other paintings and gildings, finely varnished, is a painting of the battle between the rájás of Tanjore and Rámnád, which happened in the year 1770. In the outer court, at the grand entrance, is the chieftain's kachahri;* on the south side, in the outer court, are large stables for elephants; and, on the north side, stables for horses. On the north-east bank of the reservoir is a small and beautiful Protestant church, with a burial-ground adjoining it, as also a vestry-house. A few yards from the western bank of the reservoir is the burning-place of the chieftain and his ancestors, where several grand tombs are erected to the memory of the latter. On the north side, between the walls of the fort and the reservoir, is a high cavalier, raised with earth, which commands an extensive and delightful prospect of the surrounding plains. A Roman Catholic chapel, which was built by Colonel MARTINEZ, in the year 1799, stands near the south-east angle of the fort, and nearly in the centre stands a small Hindú temple. The principal streets, which are few, are wide and airy; the others, which are numerous, are irregular and narrow. The houses are mostly thatched roofs.

The town of Rámnád is situated east of the fortress, from the gate of which a wide street leads, with two grand rows of bazars, regularly built. Here a market is held every Wednesday, when the people, from a distance of fifteen or twenty miles, bring in cotton, grain, and other provisions for sale. The town, and its suburbs, including Letchmapúram (a village situated to the north), are about three miles in circumference. At the east end of the bazars, where a road intersects, crossing north and south, are several detached houses, with gardens surrounding them, and a small mosque. These separate one part of the town from the other. There are, also, two or three other mosques, which, though not conspicuous, are by no means elegant. Upon the whole, the streets are narrow and ill-contrived; the houses are moderately well built, and are upwards of two thousand three hundred in number; and the population exceeds eight thousand seven hundred souls, consisting of Musalmáns, Bráhmáns,

* A hall of justice, an office.

and Sudras, and a few native Christians; many of the two former carry on a considerable trade in grain and other articles of import from Travancore, Ceylon, &c. There are no artisans here, excepting gold and silversmiths, braziers, and ironsmiths; the latter, about two hundred families, who are Musalmáns, reside in the town. The east part of the town is inhabited by manufacturers of chintzes and printed cloths.

Letchmapúram is seated east of the large reservoir of that name. It has a handsome Hindú temple, built about thirty-six years ago; and on the north-east of the reservoir stands a spacious and elegant chattram,* or caravansery.

Kámúri, a fort lying thirty-one miles west of Rámnád, and thirty miles south by west of Sivaganga, is seated on an elevated rocky ground on the north bank of the Kúndár river, and commands a most delightful and extensive prospect. It is small, but of some strength, built of stone, of a circular form, with a double enclosure of walls, having an interval between them of about sixty feet; the outer wall is twenty feet high, and about four feet thick, without a rampart or parapet, but has nine bastions: the inner wall is stronger, twenty-five feet high, with a rampart, and seven bastions. On an eminence, to the south-west, is a redoubt. In the inner fort, a granary and magazine still remain; between the two walls, on the western side, is a well of very clear water cut through rocky strata, having steps on the one side descending to the bottom. This work appears to have been performed with great skill, though, no doubt, not without much difficulty, owing to the solidity of the rock.

About one thousand yards from the fort, on the southern bank of the river, the town of Kámúri is seated. A small Hindú temple stands on the north side, and a pretty wide street surrounds it. There are many more streets, but most of them narrow and crooked, with low thatched houses built of earth; a few, however, are covered with tiles. Almost in the centre stands a grand terraced house, belonging to a native, the elegance and situation of which afford an agreeable prospect. In the dry season the dust and heat are almost intolerable; and in the rainy season, owing to the black soil, the mire is so deep as to render the streets almost impassable. Some of the inhabitants here are very

* These chattrams much resemble the ancient hosteleries of Europe. They are charitable foundations for the lodging and entertainment of a certain number of guests for a specified time; one day, three days, and sometimes longer. Some are founded merely for the relief of Bráhmáns; others, for all classes of the natives; and some, for the accommodation and entertainment of Europeans. The late Rájá of Tanjore had one at which, for the space of three days, any European gentleman passing that way was most sumptuously entertained. Similar ones were also to be met with in other parts of the Carnatic but a very few years ago.—*Ed. Jour. N. A. S.*

opulent men, and many of them trade to a considerable extent in cotton, as it is in greater plenty here, and in the neighbourhood, than in any other part of the province. A great market is held on every Tuesday, when astonishing crowds of people come from the neighbouring districts for the purchase of articles to retail in the different villages. Cattle are also brought to this market for sale.

Armukamkotta is a fort that lies twenty-one miles north by east of Rámnád, on the road towards Trichinopoly, and three miles east of the lake of Rasinganiangalam. It stands upon an eminence, having a gentle declivity to a river which runs by it to the north and to the east. This river has an impetuous torrent, and in the rainy season flows up to the walls of the fortress, and, inundating a large tract of land in its course down towards the sea, often proves injurious to the villages situated on it. The fort is denominated after its form of a hexagon, having six bastions at equal distances. It was built about one hundred and ten years ago, and appears, from the accounts respecting it, to have been a place of some importance. It is in good order, has a gate on the west, and a few wells of excellent water, which are now appropriated for the use of the garden that is made in it by the neighbouring villages: it is otherwise desolate and uninhabited.

At Mangalagúdi is a small ruined fort. This village is situated on the high road from Armukamkotta, and is chiefly inhabited by Musalmáns, who carry on a little trade. A market is held here every Thursday.

There are several other forts, but all in a ruined state, and almost levelled to the ground.

Tirupallani, a populous village six miles south of the capital, situated on a commanding plain, is highly distinguished as one of the sacred places of Hindú worship; the temple stands on the east side of the village, and a rectangular reservoir is situated opposite to it. Two pavilions are raised on stone pillars; the one adjoining the gate of the temple, the other to the east of the reservoir. The temple is surrounded by a high stone wall. The main street of the village is about two furlongs in length, and forty feet wide; the south and east streets are inhabited by Bráhmans, and the north and west streets by the people attached to the temple, and other Hindús. This temple is dedicated to the god Jaganátha, and the festivals are celebrated annually in the months of April and July. In the north-west and south-west angles of the village, are two substantial stone pavilions; and, on the north-east side, a reservoir of excellent water. A broad but shallow salt-water lake runs west of the village, which receives the surplus waters that flow from the interior parts of the country, especially from the kalin-gula, or sluice of the Chakkrakotta lake, the whole falling eventually into the Kottagudi river.

The pilgrims who resort to the temple at Ráméswara to pay their adorations, must, after performing their ablutions in the sea, first come here to worship.

Adisé-tirtha is not a village, but a famed place on the coast, lying nine miles south of the capital; it is esteemed holy by the Hindús on account of its *bath*, which was found by RÁMA, who bathed here, on his expedition to the Isle of Lanka. The men generally bring their wives and families with them; but, in the event of the wife not being present, the priest gives the husband a piece of straw to roll round the little finger of his right hand, as an emblem of the wife. The act of washing here in the sea is a form of penance that they perform, from a general notion that, by doing so, they wash away all their sins. Devotees, and especially those of the Bráhma caste, who go on pilgrimage to the Isle of Ráméswara, must return hither to perform the enjoined rites of devotion, and the priests who attend here make a small collection from them, giving in return holy ashes to rub on their foreheads. The neighbouring villagers assemble here to bathe on certain days of the year; also on the days of the new moon, and particularly at the time of an eclipse either of the sun or moon.

Kilakaraí, a populous sea-port and commercial town, situated nine miles south by west of the capital. It is inhabited by Muhammadans, many of whom are opulent, and carry on a considerable trade both by sea and land. The houses and granaries are finely built on the margin of the sea, from which it has a beautiful appearance. The circumference of the town is about two and a half miles; the streets are numerous, but narrow and ill-formed; the houses are low and have thatched roofs. A small Roman Catholic church is situated near the eastern skirts of the town, contiguous to which are the ruins of a Dutch factory. There are about eleven mosques, or rather tombs of some respectable Musalmáns who have died here, a few of which are very elegant in structure, especially one which stands about the centre of them, the cupola of which is covered with gold. The place abounds with very thick groves of Palmyra trees. It carries on a good sale in Padanir,* which the Musalmáns much esteem, and drink to excess. The inhabitants of this town follow almost every trade, and carry on an extensive manufacture of long cloths, both fine and coarse: upwards of a hundred boats belong to this port. The coast abounds with low rugged rocks, which are only seen above water at low tide; it is, therefore, dangerous for the passage of vessels, unless conducted by a pilot who is well experienced in these roads. Vessels pay for their anchorage here as well as in other parts. A sea custom-house is established here.

* A sweet beverage extracted from the Palmyra tree, similar to toddy, but with which is mixed a little chunam: when boiled, it becomes jaggery, a coarse kind of sugar.

Muttupetta, a fishing village on the coast, situated nine and a half miles south-east of Rámnád, is chiefly inhabited by Roman Catholics. There is a large Roman Catholic church in the centre of the village, dedicated to the Virgin Mary, and a priest resides here, who is a native of Goa. A few merchants belonging to this place reside at Periapattam, a village situate about one mile to the west. Eleven fishing boats belong to this port, which carry on a pretty good trade both in fresh and salted fish: the Muhammadan inhabitants here are chank fishers. The place is the occasional resort of European gentlemen, who come for the benefit of their health, and to enjoy the sea-breeze.

Vaidálai, a pretty populous village on the coast, situated thirteen miles east of Muttupetta, inhabited chiefly by Musalmáns and Shá-nárs,* the former carrying on a good trade. The houses are poorly built and very irregular. This is a noted place for a superior quality of the Choya-vér, which is the root of a certain plant from which is extracted a red dye. It grows spontaneously in these parts, and on an island opposite to this place. Considerable revenue is derived from it.

Autankarai, a sea-port, situated eleven miles east of the capital, at the mouth of the Vigay river, on the north bank, inhabited by fishermen; it has a spacious and well-built chattiram, surrounded by a strong wall. There are sixteen boats daily employed in fishing, and from this place, and the neighbouring villages on the coast, the town of Rámnád is well supplied with fish. Several vessels frequent this harbour at the proper seasons of the year to receive paddy and chanks for exportation, as well as the Choya-vér, which here also grows spontaneously to a great extent. Oysters are to be had in abundance, and are of good flavour. About two miles on the north-west lies Ullagenkolam. This place is distinguished for the excellent tobacco it produces, which thrives here extremely well, and is reckoned superior to any in the provinces south of Madras.

Dévipattam—a sea-port and populous commercial town, well known by the name of the Nine Stones—is celebrated for a bath in the sea, that has been held sacred from the most remote antiquity, and is visited every year by a great number of pilgrims. In ancient days, from this place to Darpasenam, commonly called Tirupallani, was one continued forest, called Puráranayam. RÁMÁ resorted here when on his expedition to Lanka, with a design to kill RAVANAN, who had seduced away his wife. The priest of RÁMÁ told him that, in order to be successful in his undertaking, he must worship some image resembling the nine planets,

* A caste of Hindús whose particular avocation is the cultivation of the palm and the collecting of the toddy it produces. Many of them, however, apply themselves to other occupations, and some are very opulent.—*Ed. Jour. E. A. S.*

including the sun and moon, in representation of which he planted the nine stones on the sea-shore, and, having dedicated them to the nine planets, worshipped them accordingly with much fervency; since which period the Hindús have a tradition, that by bathing here they will be cleansed from their sins, and that, by visiting so miraculous a place, they will, in like manner, be successful in all their enterprises: it is, moreover, observed, that these stones are an emblem of prosperity to the country, and, in the event of any of them breaking off at the top, it is considered a prognostic of some disaster.

A considerable trade is carried on here; there are about fifty trading boats belonging to the port, which, as well as that of Kilakarai, is plentifully stored with provisions, and is, therefore, considered a place of much importance. In times of scarcity the granaries are thrown open, and a free sale is carried on, conducing greatly to the general benefit of the inhabitants, and to the opulence of the merchants who reside here. About the centre of the town stands a Hindú temple, encompassed by a wall and a wide street, through which the wooden chariot of the idol is drawn at the festival, which is held in the month of March. A large pavilion is built on the west of the temple, on the high road, for the convenience of travellers, where, also, alms are bestowed daily on a small number of Brahman passengers, who, however, are not allowed to stop longer than one day. This place being a quay for paddy-boats, and other small craft, a sea custom-house is here established.

Rásingamangalam is a large village situated eighteen miles north of Rámnád, and about one mile east of the large lake of that name, which irrigates an extensive sheet of paddy lands. It is populous, has a few wide streets, and the houses are built moderately well. In the north-east part of the village stands a small Hindú temple, where an annual festival is celebrated in the month of June. To the south-west is a remarkably thick grove of mangoe-trees, affording a pleasant and delightful shade. A small village called Auveranyaindel, lies three miles to the north-east, where a weekly market is held on Thursdays.

Tirupalágudi, lying five miles north of Dévipattam, is seated below the bank of a lake, and west of the road towards Tanjore. It has a lofty temple almost in the centre of the village, but it is inhabited principally by Musalmáns, who are engaged in the manufacture of long cloths. There is a pavilion on the high road, fronting a reservoir of excellent water, and commanding an agreeable prospect of the sea.

Arnútmangalam is situated two and a half miles to the north of Ar-mukamkotta, on the road towards Trichinopoly; it is inhabited by a peculiar tribe of Velálars* called Arambukutan Velálars; according to tradition, they are a modern people, who, emigrating from the southward,

* A caste of Hindús, whose principal occupation is husbandry.

settled here as farmers about four hundred years ago: their manners and customs, distinguishing them from the other classes of Velálars, are very singular. The men marry among their own tribe, and never seek a bride elsewhere. They will on no account engage to hold a situation under any authority whatever, but employ themselves solely as cultivators of the land: they will not make obeisance to the rájá of the country, nor will they pay any kind of formal respect or compliment to any description of persons, but express their humility by rubbing their bellies with their right hand.

Tondé, a sea-port town situated on the road towards Tanjore, is a dependency of Sivaganga. It carries on a good trade with Columbo, and other sea-ports. A few opulent merchants reside here. The houses are low built; the streets narrow and irregular; the inhabitants are principally Musalmans, but there are also a few Karaiyars; the former are engaged in manufacturing long cloths, and the latter are fishermen. Inland commodities, consisting of grain, tamarinds, cloths, &c. &c. are exported from this place, as also chanks, which are fished in great abundance. It lies eleven miles north-east of Armukamkotta.

Tiruvadanari, a village of some note from having within it a grand Hindú temple, is situated on the high road which leads from Sivaganga to Tondé, and intersects the road that leads from Sivaganga to Trichinopoly; the temple stands near the west end of the village, encompassed by a high wall and a street: the houses are tolerably well built. An annual festival is celebrated here in the month of April; and a weekly market is held on every Monday. It lies seven miles and a half west-north-west of Tondé.

Kunnangudi, a pretty populous village, has a temple on the west, encompassed by a wall, in which is a well of excellent water. It lies five miles and a half on the north-east of Hanumantagudi. This temple is of great antiquity, and is said to have been built by KARIKALA CHOLA RAJA, while on his religious excursion to Rámeswara. A grand festival is celebrated here annually in the month of June. The productions are chiefly cotton, paddy, and dry grain.

Kottapatnam is a small sea-port town, situated in the Tanjore country, ten miles north of the Pámbanár, which forms part of the general boundary between Tanjore and this country. Several small detached pieces of land appertaining to the latter are irregularly situated in the Tanjore country. A Bráhmañ village lies east of the road, and within the town are two mosques. Fine cloths, &c. are manufactured here by the Musalmáns, who carry on a pretty good trade. Chanks are fished in abundance, and a good deal of salted fish is carried from this port to distant markets.

Dévakottá is a populous village, but the streets are narrow, crooked,

and dirty. However, it is a place of much importance for trade, and many Hindú merchants reside here.

Sálagráma is a populous village, situated about a mile east of a large lake on the Sivaganga border, and inhabited by husbandmen, chiefly Velálars. It has two wide streets, and though the houses are neither large nor beautiful, yet, being situated on a high ground, and having an opening at the south and east sides presenting a variety of fields, for the most part of the year in a high state of cultivation, it is very pleasant. A manufacture of brown sugar is carried on here, and a plentiful market is held on every Tuesday. It lies nineteen miles north-north-west of the capital.

Súranám is a small village inhabited by Roman Catholics, seated below the bank of a lake near the borders of Sivaganga. It is noted for a beautiful Roman church, and is the residence of a priest, who has the superintendence of all the Christian villages in this part. It lies five and a half miles north of Sálagráma.

Kamenkotta is a populous village situated twelve miles north-west of the capital, and south of the high road leading from Madura to Rámnád. Opposite this village is a beautiful pavilion seated on the south bank of a large and fine reservoir, which is filled from the river Vigay. This part of the province is richly cultivated in paddy, and has garden productions in great abundance.

Pagalúr is a small village seated below the bank of a large lake of that name, lying seven miles to the west of the capital. It is celebrated as being the place at which a ceremony is performed on the installation of the zemindár or chieftain of Rámnád. This ceremony is held to be most essential, as the inhabitants of this village are of the original stock from which the guardian of Adam's Bridge was first selected, and therefore they retain the prerogative of bestowing the title of Sétu-patti; the zemindárs, in consequence, observe to the present day to resort hither to receive the sceptre of authority, according to ancient usage; the ceremony continues for a few hours, and consists of a variety of pompous rites.

Gangakondán, a populous town seated on the eastern bank of the Vigay river, lies ten miles north-west of the capital. It is composed of several irregular streets, and has a very good market on every Sunday, is well stored with grain, cotton cloths, and all articles of provision. Extensive groves of Palmyra trees abound on the northern and eastern banks of the river, the toddy from which is taken to Rámnád for sale.

Ninarkovil is a large village near the confines of the Sivaganga country, seated on a pleasant plain well cultivated with dry grain. It lies about fifteen miles north-west of Rámnád, and is distinguished for the grand Hindú temple that stands in the centre of the village. Two annual festivals are celebrated here in April and July. The place is held

in high veneration by the Hindus. There is a large reservoir on the west side of the temple; south of which are several pavilions built for the zemindár's accommodation, surrounded by a wall. Here is a small manufacture of coarse cloths, which are taken to the neighbouring markets and sold.

Parmagudi, a large and populous town of commerce, is situated on the southern bank of the Vigay river. It lies twenty-one miles north-west of the capital, and through it runs the high road from Rámnád to Madura. It is chiefly inhabited by weavers, and contains upwards of one thousand one hundred houses, for the most part covered with tiles; the streets are numerous, but dirty, and very irregularly formed. Manufactures of the best cloths, silks, muslins, silk carpets of great value, vestures, turbans, women's silk, and coloured cloths, are carried on here, and these articles constitute the best part of its trade. There are several ranges of bazars, and an annual festival is celebrated by a contribution raised by the weavers and merchants. A large and spacious stone pavilion, substantially built, is seated near the west end of the town, adjoining which is a chattiram, where alms are daily distributed among twelve poor Bráhmans, or other travellers. Yams thrive here, and are in great abundance. The ironsmiths here are Musalmáns, who are seldom known to follow this trade in other places.

Paindoni is a small village situated about two miles to the south-east, commanding an extensive view of fields of paddy, cotton, and dry grain.

Abramam, a populous and flourishing town on the high road to Madura, seated below the bank of a very large lake, which is named from it, lies five miles north-east of Kámúri, and thirteen miles south-west of Parmagudi. It is inhabited by merchants and tradesmen, who are principally Musalmáns and Chetties.* The farmers are Marravars† and Velálars, who carry on an extensive cultivation of paddy, which, from the ample supply of water that the lake affords, yields two crops annually. The town is about half a mile in length, divided by two well-formed but narrow streets. On the north side is a well faced with stones, which has a clear spring of excellent water, affording an abundant supply throughout the year, although there are many other wells about it, the waters of which are brackish. The trade is considerable in grain, cotton, and cloths. It is the popular belief, that within an area of two miles in circumference of the town, the bite of a snake, or of any other venomous reptile, has not the usual poisonous

* A cast of Hindus whose principal occupation is merchandize.

† A cast of Hindus who appear to be almost confined to this part of the country. Their occupation is husbandry. In customs they differ from the Velálars, and most other castes of Hindus, and allow their widows to marry a second, third, or fourth time.—*See*

effect; and that when bitten beyond the prescribed limits, the patient is taken to a small temple that stands on the eastern extreme of the town, where some water is simply administered to him, when, as the people affirm, he perfectly recovers within a few hours.

Viracholen, a village lying about seven miles north-west of Abramam, is seated on the south bank of the Kredamánadi river. It was anciently the residence of the rájás of the country, in whose days it is said to have been very populous, and it still abounds with remains of antiquity which corroborate the assertions of the people of its having been once a place of grandeur and magnificence, and the residence of the Chola Rájá, from whom it derives its appellation. The present population is very inconsiderable, and consists of Musalmáns, Kallarís,* Marravars, and a few other descriptions of people. The manufacture is long cloths: on the north side of the village stands a small Hindú temple of great antiquity. There are the ruins of many other edifices in this vicinity.

Shekull, a populous village situated on the high road towards Tinnevely. It lies below the bank of a large lake of the same name, and is inhabited by Velálars, Marravars, and herdsmen: the road leads through the village; the houses are poorly built.

Kadaládi, a village situated on the road that leads from Kámúri to the sea-coast. It was a place of great note and commerce; and, though it at present shews marks of decay, it preserves some trade, and has a good market on every Tuesday. It lies ten miles nearly west of Shekull.

Tiruchuli, situated about three quarters of a mile south-west of the capital, and seven miles west by north of Abramam, is a large and populous town on the south bank of the Kundár river. Its inhabitants are numerous. It is composed of a few fine and regular streets, with pretty, well-built houses. The north and east suburbs of this village are diversified with small gardens of esculent and other plants.

Arpukotai, lying seven miles west-south-west of Tiruchuli, is a large village inhabited principally by weavers, who are employed in the manufacture of the company's long cloths. The western environs of this village are plentifully cultivated with tobacco—the soil, a black loam, being very favourable for the growth of this valuable production. A weekly market is held on Fridays, which is the chief one in this district.

Pandlagudi, eight miles to the south of Arpukotai, though not a village of great note, is, however, particularised as being the only place where the manufacture of saltpetre is carried on in this district; and

* A low cast of Hindus peculiar to this part of India. They are herdsmen and cultivators, and, as their name implies, thieves by profession.—*Ed. Jour. R. A. S.*

also for a layer of white stone, of a brittle nature, which extends from the south of it in a north-westerly direction, as far as Palavanattam. The stones are collected, and burned in kilns for the preparation of chunam or lime, which is esteemed the finest sort that can be had in the province. The ruins of a double-walled mud-fort stand on the west of the village.

RIVERS.

There are many streams in this province that empty themselves into the sea, but none are navigable, and few deserve the name of rivers. They are for the greatest part nothing more than broad brooks or rivulets; some are only drains flowing from the lakes, others spring from the high lands, and both are every where fordable. Running upon a flat and almost level surface, they become broad without having a bed of any depth. These rivulets, in their course, supply several lakes, and the water is reserved for the purpose of cultivation, which, in good years, yields a valuable produce.

Pámban-ár, a rivulet which rises from the high lands east of Kuna-gudi, in the Sivaganga, enters this province on the west, near the upper frontier, below the village of Perambúr, takes its course easterly about five furlongs, crosses the general boundary, and re-enters Sivaganga; where, for more than three miles, it continues its course, when, touching the boundary south-east of Tirtengúr, and winding along it for about three-fourths of a mile, it re-enters this province. About one mile in its tract it is intersected by a channel which supplies the Mutunád lake. Pursuing its course for a few furlongs in an easterly direction, it separates into two branches, which, after running nearly parallel with each other to the distance of three miles, unite near the junction of another channel, termed the Pámb-ár. Widening gradually in its course, the stream receives another branch below Elapagudi, which flows from the southern kalingula of the Mutunád lake, and proceeds south-east about three miles; touches at the boundary between the villages Payaddakotta and Mudukuvial; constitutes a small part of the northern boundary between this province and Tanjore, and continues its course for three miles, where it intersects a detached piece of land appertaining to Sivaganga; whence, meandering along the general boundary in an east-north-east direction, it separates into five branches, and disembogues into the sea by three mouths.

Virashelai-ár, a narrow and rapid stream, has its source in the high lands in the vicinity of Prámali, in the Sivaganga country; and, being fed by numerous jungle streams, passes by Naikupai, supplies the large lake at Tripatú, and, after an easterly course, crosses the high road that leads from Pudukotta to Sivaganga; thence, continuing easterly about a mile, it glides south, and crosses the road from Kunagudi to Tripatú,

where it unites with a channel that flows from the northern kalingula of the Tripatú lake, continues its course to Murthen-pullar-kovil, through an entire wood, and traversing in an east-south-east direction four miles, receives a channel from the west, termed the Tirumunimuttu-ár, about one mile south of Nedavakotta, whence it pursues an easterly course through a thick grove of Palmyra trees, widens in its way, and passes by Kullel Yalavenkotta, where it enters this province below the termination of a disputed boundary, and is joined by a channel called Koatha-ár, west of the village Othayauchi. It then takes a north-easterly course towards Thavakotta, where it separates into two branches, which, uniting about a mile to the east, run north of the fort of Hanumántagudi, and south of the village: it again separates into two branches. The northern one runs easterly three miles, and then separates into two streams, taking an east by south course for ten miles, and falls into the Pámban-ár, below the village Audavatúr; the lower branch assumes the name Paushi-ár, from the village Paushipattam, which is situated on the coast near the junction of this channel with the sea. The southern branch of the Virashelai-ár pursues a south-easterly course about seventeen miles from Hanumántagudi; passing by Kumbukotta and Audavatúr, it waters several tanks in its tract; and, crossing a high road that leads to Rámnád, along the sea-coast, discharges itself into the sea.

Munnimuttu-ár, a rivulet issuing from the southern kalingula of Kotaivial lake, in the Sivaganga country, takes a south-easterly course, and, passing by Kaurai, Pauvanakotta, and Munní, enters this province on the east by the latter village, and afterwards pursues a south-easterly course eight miles; waters the several lakes in its tract; and falls into the Teruvadanári lake, from whence the surplus water, flowing over the southern kalingula of that lake, in like manner loses itself in other lakes towards the east, the superfluous waters of which still form a pretty wide stream near Thullamurrungur, and running in an open plain, crossing the high road to Rámnád, forms a communication with the sea to the south of Tondé.

Kotaikarrai-ár, a wide and rapid stream formed at the junction of two rivulets that enter this province on the west by the village Kokaárné, waters the large Rásingamangalam lake, the superfluous waters of which are conveyed by a channel that issues from a large and well-built kalingula constructed on the northern bank. This channel runs in an east-south-easterly course five miles, crosses a high road by Armukamkotta, and glides south-east nearly two miles; thence it pursues an east-south-east course towards Kunnaryandel, runs south-east from that village about a mile, separates into two branches on the west, of the high road, and communicates with the sea by two mouths about a mile distant from each other.

Vigay, a river which rises among the mountains on the south-east of the Dindigal valley. This river runs through the north-east ridge of a chain of mountains that border on the west of the province of Madura. It finally escapes from the mountainous tract which it traverses for about thirty miles, precipitates itself at the foot of the hill of Guntapanaikánur, passes by Pilmankúmbi, Nuddavakotta, and Cholvándán, and, being augmented by the waters of other small rivulets, it passes by Thovaramán and Madura; and thence rolling in a considerable body, and traversing these districts in a course nearly south-east, reaches Trippavanam, where it becomes very broad, continues in a winding course, and, being fed by other streams, passes by Mánamadura; then turning south a few miles it proceeds east, and enters this province on the west by the village of Tholachatanúr. Here for about eight miles it forms a part of the general boundary between this province and Sivaganga, in a course nearly due east. This fine river comes with a full swelling stream between Pirmaguda and Yaveneswara, towards Warapuli (where the boundary embraces a small village that stands on the south bank appertaining to Sivaganga); and gliding on south-east three miles, turns east for four miles, when the stream, flowing directly south for three and a half miles, is considerably diminished in its width, and now makes but a poor appearance in consequence of the numerous cuts from it for the purpose of irrigation, and to supply the lakes. The Vigay, now confined in a narrow bed, continues eastward in a winding course for eight miles, and then spreads into a large lake called Periyakolam. A small channel on the north continues easterly; it was recently cut to prevent the injurious consequences of inundations, which are represented to have frequently happened previous to this undertaking. The Vigay, retaining its name, proceeds eastward for six miles, losing itself in a salt-marsh which extends nearly five miles in length, and about a mile and a half in breadth, where, from the saline nature of the soil, a considerable quantity of salt is extracted. At the east end of the marsh the river again reappears, and proceeds in a south easterly direction about five miles; thence it forms a serpentine course, and communicates with the sea below the village Autankarai. The whole of its winding course is about one hundred and forty miles. The Vigay is the largest of all the rivers in the province, and is represented as possessing the rare advantage of affording water the whole of the year. It generally overflows from about October to December, after which it begins to decrease: the fertility of the provinces of Madura, Sivaganga, and Rámnád, depends upon the overflowing of the Vigay, from which numerous canals and water courses are led off to supply the several lakes, and for the purposes of irrigation. It is very precarious when the freshes descend in the month of April; the supply is then most

carefully reserved for the purposes of cultivation. The lands upon the whole course of the Vigay yield an abundant and valuable produce.

Kredamanadi, a rivulet which has its source from the Vigay; near Madura, enters the Sivaganga country by Pilliyúr, in the Trippavanam district, winds in a south-easterly direction for about twenty-five miles, watering a great part of that country to the south-west, touches the boundary of Rámnád below the village Viragudi, and continues in a south-easterly course for three miles, passing by Viracholan; it further embraces a portion of the country to the north about a mile and a quarter, and thence forms another part of the boundary for about a mile, whence it glides on in a southerly direction, watering the country in its course for about eleven miles, and receives a small rivulet termed the Purrala-ár, near its confluence with the Ragunátha-kaveri.

The Trimangalum river, termed the Kund-ár, is a narrow and rapid stream which, rising among the hills of Annayúr, in the Madura district, enters this province on the north in the Pullimat'ham district, by the village Kurriapatti. It takes a winding course to the east about a mile, and thence turns almost south five miles, and passes by Toapúr and Parenjalli, where it receives the Sheverikotta river, which descends from the mountains in the Tinnevely country; it widens greatly at the confluence, pursues a south-easterly course, runs between Tiruchuli and Pullimat'ham, washing the western wall of the fort, and continues to proceed to Elipúr, on the north of which it is intersected by a brook from the high lands to the east of Puliarnátham: from Elipúr, it winds eastwardly for six miles, and passes by Mandelmánikam, and, gliding on south-easterly two miles and a half, turns due south down to Ká-múri, west of a high rocky ground, and runs between the fort and town. To the east of the latter, on the southern bank of the river, is a large kalingula, about one hundred and seventy feet in length, and about seventy feet in breadth; the time of its original construction appears to be unknown; but that it is of a very ancient date is sufficiently indicated by the style and state of the structure, which not only bears every mark of antiquity, but also of frequent dilapidation and repair. It is wholly composed of large weighty masses of rude stones laid upon one another without any regular system, every dependence having been placed upon the magnitude of the materials; hence the power of the great body of water, in its pitch over the work, has frequently occasioned breaches and also placed the structure in so critical a predicament, that the inhabitants of the country to the eastward, especially in the Shekull and Mutukullatur districts, sustain the loss of an extensive cultivation, estimated to be about sixty thousand pagodas annually. No anxiety appears to be entertained by the possessors of this province to adopt any measure for restoring so important a work to its primitive state. A large canal, led off from immediately above the work, termed the

Ragunát'ha-kaveri, flows upwards of twenty-four miles through the country to the eastward, being preserved in its course over a fine plane, and affords the means of cultivating the lands upon the whole of its tract, sluices having been constructed for this purpose, most of which, unfortunately, are now in ruins. This channel wastes itself ultimately in the Kullari lake, and the superabundant flow of salt-water issuing from the southern kalingula of this lake, falls into the salt-marsh below the village Vigay, and, cutting through it, assumes the name of Kot-tegudi-ár, which communicates with the sea, on the west of the spot called Adiséti-tírha. The Kund-ár, or the surplus water that descends from the kalingula on the east of the town of Kámúri, winds in a south-easterly course for twenty-two miles, runs towards Mukúr, supplying in its tract a few lakes, and disembogues into the sea. It has a wide but shallow entrance, and a heavy shoal renders the free access of boats at the mouth impracticable.

LAKES OR RESERVOIRS.

These are variously named; the larger are called Yéris and Kum-mis, the lesser ones Yendels. The country abounds with them; several of the large ones are supplied by canals from the rivers, while others of less magnitude are filled by the local rains; the latter do not retain the water for more than three or four months. Although the larger lakes have a source whence they receive a constant and ample supply, yet the advantage of retaining their waters throughout the year is lost, from neglect of the regular system of inspection and repair. The periodical rains usually set in about the months of October and November, and the country then exhibits an almost entire watery surface; the great body of water confined by the embankments of the lakes spreads out to a great extent, often overflowing and destroying the embankments, greatly to the prejudice of the after cultivation of the lands, which depends upon the strength and preservation of these banks. When a general drought prevails, the inhabitants dig small pits in the beds of the reservoirs, whence they obtain a scanty and muddy draught. At this season the people are generally assailed by a disease called Guinea-worm; but they are so much inured to this tumour in their legs, that they think little of it. Of the principal Yéris, the following seem more particularly to deserve description, viz.:

Rásingamangalam, a large lake situated between the smaller lakes Kokaurne and Koshavan; its length from the north bank to the southern opposite extremity being nine miles, varying in breadth from one to two miles. It receives on the north side the stream of a rivulet that flows from the high lands in Sivaganga, denominated the Kottakarai-ár, and, on the south-south-west, the waters of the Vigay river. This lake originally watered about five thousand seven hundred and

sixty kánis of land.* It has two large kalingulas at either extremity; the northern consisting of seventeen arches, and the southern of fifteen; and, besides these, eighteen lesser sluices, built of stone and brick, most of which, as well as the larger kalingulas, are in a dilapidated state, in consequence of which it cannot at present supply water for more than two thousand five hundred kánis. There are six breaches along the bank of this lake, occasioned by the breaking through of the waters during the monsoons, and these not being attended to, it presents much danger to the villages and lands lying below it to the eastward.

Perriakolam; this lake, with which the Vigay river forms a communication, is situated about a mile north-west of Rámnád, and extends in length about seven miles; its breadth varies from three-fourths of a mile to nearly two miles, and, from its greater depth, it has the advantage of reserving its waters for a longer period than the Rásingamangalam. It irrigates an extent of land consisting of one thousand eight hundred and sixty kánis. This Yéri has two large kalingulas; one to the north, consisting of nine arches, the water from which flows to the eastward on a low level, and falls into an extensive salt-marsh. The kalingula to the south consists of seven arches, and the stream from it falls into the Chukrakotta lake, which lies to the south. There are twelve smaller sluices to this lake, three of which are in ruins.

Chukrakotta lake, situated on the south of Rámnád, has a large and substantial kalingula consisting of eleven arches; the surplus water discharged from it forms a canal which flows into a marsh about a mile to the southward. A kalingula on the north consists of five arches only. This lake has twelve other sluices, denominated after the original possessors of the land depending thereon; five of these sluices have been in a state of decay for the last fifty years, and the inhabitants in consequence sustain a very great loss, as they cannot irrigate more than a fourth of the land that was formerly under cultivation.

Kullari lake receives the Ragunát'ha-káveri; it is situated between the villages Tirukoshamangai and Kurkátí, and irrigates about one thousand five hundred kánis of land. This lake has two kalingulas, and twelve smaller sluices, all of which are in good order: the great quantity of water that flows from these kalingulas spreads over a salt-marsh to the eastward, and from thence, forming a channel, ultimately falls into the sea.

Abramam lake, situated to the north of the village of that name, resembles in form a spur; it is supplied by a channel from the Kreda-

* About an acre.

manadi, and waters about one thousand kánis of land: the bank is very high and substantially built. It consists of very large stones placed upon one another, and seems once to have been much more regular than at present; it has puzzled antiquarians to account for the laying of these enormous stones, as their weight is so great that no means are now known by which they could have been placed there. An odd tradition prevails that this was performed by demons. The bank is so well strengthened that it has never had any breaches, nor is it likely ever to require any great repair.

Several large lakes sustain considerable loss owing to the weak and unsubstantial condition of their banks. The waters from the high lands, and the surplus from the lake of Shekull, form a pretty wide stream, which discharges itself into the sea at Válimukam Bay, which has a good harbour for sheltering the vessels trading along this coast during the period of the land-winds and monsoon. Contiguous to this bay, on the north, is a large lake of salt-water that extends about seven miles to the west, its greatest breadth being a mile and a quarter. Salt is gathered in large quantities here, besides that which is manufactured in the salt-pans; this article is a produce very advantageous to government. Wells and fountains are, for the most part, exceedingly rare in the interior of this country, and the water that issues from them is of a very brackish quality. The sea-coast towns, although situated on vast plains of deep and heavy sand, afford fine wells and springs of clear water. A narrow salt-water lake, called Tarrava, extends from the Kottaigudi river, below Tirupallani, to the east eighteen miles, and varies from one quarter to half a mile in breadth, bordering the declivity of a range of sand-hills. This lake has a verdure on its margin, which affords good pasturage for the cattle of its vicinity. On the south side are several thick groves of Palmyra and cocoa-nut trees. At some seasons of the year a dam is thrown across this lake, confining the water to a particular part, and, by letting it off as required, admits of the remaining portion of the bed being cultivated with rice. Another salt-water lake, but of smaller extent, lies to the east of the former, and has a communication with a basin of salt-water contiguous to the sea, east of Pullimat'ham.

HILLS AND MOUNTAINS.

There is not a mountain, hill, or any conspicuous eminence in the whole of this province; yet it exhibits, in several parts of its surface, gentle swells and depressions which give it a pleasing diversity, especially in the tract about Kámúri. In the Pullimat'ham district there are a few low scattered rocks, but of very inconsiderable magnitude. The sea-coast on the south, from Tonitorai westward, abounds with low,

rugged rocks, extending into the sea; and these, with a great number of shoals and hidden rocks, render it dangerous for coasting vessels.

WOODS AND JUNGLE.

This country is, for the most part, divested of wood and jungle. Such as does exist is principally composed of the Odunkád, a kind of low thorn-tree, of which there are various sorts; but none of them are of a size to yield good timber. Near the sea-coast towns are extensive groves of Palmyra and cocoa-nut trees. The northern districts abound with the former, the soil being admirably adapted for their growth. Mangoe, Illapay, and other fruit-trees, are scarce throughout the province, and cocoa-nut trees are rare in the interior of it.

TIRTHAS.

These are certain consecrated spots in the sea, considered as sacred places for bathing, to which the Hindús frequently resort on pilgrimage from all quarters of India, to perform their ablutions, especially at the nine stones at Válimukam and Adi Sétu-tírtha, which are renowned places of sanctity on this coast. The act of washing in these places is esteemed equally as efficacious for purifying, and absolving from sin, as the far-famed Ganges.

ROADS AND PASSES.

There are several principal roads that lead through this country from the neighbouring districts. The first is a high road that leads from Tanjore by Kottapatnam, proceeds along the sea-coast, and is much frequented by pilgrims who travel to and from the Ganges to Ráméswara. About two miles from Kottapatnam the road leads into the Tanjore country, crosses a rivulet, and proceeds to Sundrapándipatnam. In its progress further, about five miles, it crosses the Pámban-ár (which here forms the general boundary between Tanjore and Sivaganga); and about a mile south, leads near a fine chattiram in the Sivaganga limits; west of Sundrapándipatnam, about two miles, it crosses the Páshi river; and, at a mile further, the Verashelai, and thence passes by Tondé, where several cross roads intersect. Leaving Tondé, it crosses the Munnimutu-river, and a few other small rivulets, and, at the distance of about eight miles, is intersected by the Kollai-karai-ár, and, passing by Tirupálagudi in its progress, it touches at Dévipatnam, after which, crossing a few brooks, it separates into two roads; the one leading along the coast to Ráméswara, the other, crossing the Vigay river, enters Rámnád, making through the whole of its course a distance of nearly fifty miles. This, although a carriage-road, is very inconvenient, owing to the heavy sand along the sea-coast. The second is a high road that leads from Trichinopoly to Rámnád, *vid*

Pudukotta, enters this country on the north by Sheraganúr, passes by Kunnangudi, Mangalagudi, and Tiruvadanari, where it is intersected by several cross roads leading to the coast; thence it touches at the village Arnutmangalam, crosses the Kottakarai-ár, and leads off on the west by Armukam-kotta to Rasingamangalam, proceeds to Sholandúr, and passing below the banks of two large lakes, touches at Peruvial, near which it is intersected by several water-courses, and latterly passes by Pillengudi on the north bank of the Vigay river to Rámnád. This is one of the grand carriage-roads, but is in a bad state owing to the frequent intervention of paddy-fields, which render it altogether impassable in the rainy seasons. A third road, also leading from Trichinopoly, separates into two parts at Tripatúr; the one leads *viâ* Sivaganga, and the other by Kaulear-kovil, and these joining at Yellangudi, the road enters this district about one mile and a half west of Ninar-kovil, and, in its progress, crosses the Vigay, passes near a fine pavilion, called Chetti-Mattam, where it joins the high road leading from Madura to the capital, and proceeds along the south bank of the Vigay below Gangakondán, and, re-crossing the river again at three other places, two miles distant from each other, passes by Mothalúr to Rámnád. The state of the road is tolerably good, but much inconvenience is felt by the intersection of the Vigay river at several places. The fourth is a high road that leads from Madura *viâ* Mánamadura, enters this province immediately after crossing the Vigay river by Tholashatanúr, and proceeds along the south bank—for three miles, touching at Parmagudi, a fine, large, and populous town, where there are two or three substantially built pavilions for the accommodation of travellers. The road runs through the town along the southern bank, about ten miles to Chetti-Mattam, and passes by Wurapilli, in the interval of which it crosses many canals branching from the Vigay, which render the road unfit for carriages; it then leads eastward to Rámnád. The fifth is also a high road that leads from Madura to Rámnád *viâ* Avúr. It enters this country at a village called Utchampalli, and, in its progress, crosses the Sheverikotta river, near its junction with the Kundár, touches at Tiruchuli, crosses the latter river, and proceeds to Shadapuram, where it separates into two different routes, the one leading to Kámúri, and the other to Abramam: the one that leads to the latter place passes by Anakolam, Mandelmánikam, and Nártakurchi, next touches at Abramam, and, in its progress to Rámnád, passes by the intermediate villages Perrúnkurnai, Akenganar, Chetra, Wulayar, Yettivial, and Lánthamattam. This road is extremely good, owing to the high and level surface of the country. The sixth, a high road that leads from Madura, Tiruchuli, and Kámúri, to Rámnád, touches at Kámúri, and after crossing the Kundár river on the east of the town, it intersects the high road from Abramam at the distance of five miles.

This is also a good carriage-road from the evenness of the country. The seventh, a high road leading from Tinnevely to Rámnád, enters this province on the west of Kunirajapuram, touches at Narripur, and, in its way, passes by Sholagudi, when it crosses the Kundár, and proceeds about five miles between a range of sand-hills, touches at Kilashelvanellúr, from which place a road separates to Kilakarai by the villages Kilakedáram and Sivakolam, where it crosses a rivulet and passes by Yérvádei to Kilakarai, and from thence proceeds along the sea-coast *viâ* Mutupetta and Vaidalai, to Pámban and Ráméswara. The road that continues from Shelvanellur to Rámnád, touches at Kothenkolam, a small village (about two and a half miles distant), and thence at Shekull, three miles from the latter, and passes through Tirukoshamangai, which is seven miles short of Rámnád. The eighth is a sea-coast road leading from Dévipatnam towards Autankarai and Pullimattam, where it crosses the ferry to Pámban, and proceeds to Ráméswara, being in this part paved with stones. All along this road are spacious and durable pavilions and chattirams for the accommodation of travellers and pilgrims. Several cross-roads intersect each other in all directions throughout the country, which, though not answering for carriage-roads, are much frequented by a class of people who chiefly trade in salt.

SOIL AND PRODUCTIONS.

The soil in this province is composed of various sorts, and, though generally fruitful, is not without some predominant disadvantages, a proof of which has been experienced by the continual emigration of the inhabitants from this to the neighbouring countries, especially within the last four years, during which period a great scarcity and mortality has prevailed, arising from a failure of rain; and the number of inhabitants who have abandoned this province from indigence, and its concomitant evils, is estimated to be not less than 150,000 souls, or nearly half its population.

The soil, though not of a very rich kind, yet, aided by enlightened husbandry, may vie in fertility with the best in the neighbouring countries, and produces early and excellent crops of paddy and of dry grain. The most fruitful soil consists of a deep black loam, which is prevalent towards the westward; the culture on these lands yields an abundant crop of cotton and dry grain. Coriander and Kadalai* are well cultivated in parts of Abramam and Kámúri. The soil next in quality is a red loam; and, inferior to these, is the black and red, light and sandy soils. Vegetation thrives remarkably upon the latter,

* A kind of pease, much used in Bengal and Upper Hindústán, and in the south commonly called Bengal gram.

which is common about the sea-coast towns, contiguous to which the grounds are inclosed and divided into small gardens. The productions consist of paddy of various kinds, several sorts of dry grain, horse gram, and a variety of other pulse, rape-seed, and oil nuts; cotton in great plenty; and the choya-vér grows spontaneously about the sea-coast and the islands. Besides the latter, there is in the western districts a small production of a thistle-plant, from the flower of which a reddish colour is extracted, and the cloths that are dyed with this are held in high estimation by the natives. The garden productions consist of raggy, beetle, pumpkins, saffron, limes, tobacco, yams, potatoes, cucumbers, sugar-canes, and plantains; the two latter, however, are not only rare, but of a meagre sort. The northern districts, as well as the neighbourhood of several of the sea-port towns, are very productive of the Palmyra, from the toddy of which a considerable quantity of coarse sugar is manufactured.

MANUFACTURES, IMPORTS, AND EXPORTS.

As a commercial province, and for manufactures, Rámnád is distinguished beyond many others, and principally for the manufacture of cotton cloths; the first of which is at Parmagudi, where the chief occupation of the inhabitants is making printed cloths, chintzes, silks, elegant silk carpets, red and blue striped cotton carpets, muslins, dupettas, turbans, dimities, izaries, gingham, cambrics, &c. Kilakarai and Dévipatnam are fine ports, the trade of which is very considerable; they are consequently the resort of many respectable merchants from all parts, whereby these places have become rich and populous. Kilakarai is reckoned next to Parmagudi for the manufacture of fine cloths, muslins, &c. A few other places are noted for long cloths of good quality, viz. Kámuri, Abramam, Arpukotta, Pálayampatti, Kuddeladi, Yekugudi, Punnakolam, Chittarkotta, Numbuthullai, Tindey, and Kottapatnam; and those of a coarse quality, commonly worn by the inhabitants, are made almost in every village in the province. Salt is manufactured in great plenty in the neighbourhood of the sea-coast towns and villages, but it is entirely under the management of the servants of the government. Besides the manufacture of this article, a prodigious quantity of it is gathered from the extensive salt-marshes, in which, on the evaporation of the water, a thick incrustation of salt, very white and fine, is left on the surface. Except at Pundlegudi, saltpetre is no where manufactured in this province.

The chank fishery commences in April on the eastern coast of Rámnád, and continues till the month of September; and, on the southern coast, from October, continuing till March. It is usually rented by the zemindár at not less than six thousand pagodas annually. The chanks fished on the eastern coast are reckoned better

than those of the southern. A comparative rate has long been established at one hundred and thirty-five chanks per star-pagoda, while those of the southern-coast are sold at one hundred and sixty-two per pagoda. The number of chanks annually fished amounts to upwards of a million. The country arrack is distilled in several places throughout this province.

The imports are shawls, woollen cloths, wheat, sugar, sugar candy, pepper, nuts, nutmegs, cinnamons, cloves, cardamums, mace, brimstone, quicksilver, iron, pearls, corals, and a variety of precious stones; teak-wood, black, and Ceylon wood; red and yellow ochre; and, in the time of scarcity, grain is imported hither from the western, as well as from the Tanjore countries. The chief trade of this province consists in the exportation of manufactured cloths of various kinds. The chanks are taken to Bengal, and the choya-vér to the northern countries; and, during a plentiful season, paddy, and other grain, are also exported. Salt is the principal commodity of export to the inland countries.—*Journal of the Royal Asiatic Society of London*, No. 5. page 165—188.

Second Report of the Meteorological Committee of the South African Literary and Scientific Institution.

THE Meteorological Committee having proceeded to draw up and circulate a compendious body of instructions for making and registering Meteorological Observations*—the same which forms a part of their first Report to this Institution—and having, moreover, distributed in various quarters copies of the printed forms alluded to in p. 16 of that Report—have received in consequence communications from various parts of this colony, in most instances expressing great willingness to co-operate in the observations recommended, but in almost every case complaining of the want of meteorological instruments, and in some, requesting a supply. Your committee are not without hopes of being enabled in some instances to supply the deficiency. Meanwhile they have to acknowledge the receipt of a regular return, according to their printed form, from Captain Wolfe, Commandant of Robben Island, of

* Vide No. 14 of this Journal, page 196.—The tables of Meteorological Observations sent from Madras will, we hope, have reached the Institution, and we request the conductors to favor us with copies of their interesting Reports, by the earliest opportunities on all occasions. The present Number of this Journal contains tables of hourly observations made at three widely separated stations of the peninsula of India, and we invite Meteorologists in other quarters to follow the suggestions of Sir John Herschel.—*Editor Madras Journal*.

the state of the barometer, interior and exterior thermometer, wind, and weather, at the hours agreed upon, during the whole of January, February, March, and April, of the present year, with the promise of their future regular continuance. In this communication the observations appear to have been made with such regularity, and the instructions of the Committee generally so well attended to, as leads them to regret that the barometer employed should (as appears by the numbers set down) be one capable of being read only to the nearest tenth of an inch, and to render them very desirous to supply a better. A spare barometer belonging to the Royal Observatory has been accordingly placed at their disposal by the Astronomer Royal, and so soon as it shall be furnished with a new tube, and otherwise repaired, will be forwarded to Captain Wolfe, with a request that his series of observations may be continued with this instrument, instead of that at present used;—Robben Island being in many respects a highly advantageous station for acquiring an insight into the meteorology of this point of the coast, much more so than Cape Town itself.

From Worcester, your Committee have received a register of the thermometer only (having no barometer), from P. J. Truter, Esq. Civil Commissioner for the district, for the month of January of the present year. Having only one thermometer, which is used both for ascertaining the interior temperature and that of the outer air, the Committee would recommend that he should be supplied with at least one other, and be requested, until a barometer can be procured, to fill up the column of the in-door thermometer with observations of the hygrometric state of the air, as ascertained by the depression of temperature produced by wrapping the bulb in wet linen or cotton, and suspending it freely, in the manner recommended in p. 12 of their instructions.

The Committee have also received from the Astronomer Royal, and from Sir J. Herschel, hourly Observations at the Solstices of December 1834 and June 1835, and the Equinox of March 1835, made according to the plan proposed in their printed Instructions. The comparison of these observations has shewn, that, in this locality at least, even at stations so near together as Feldhausen and the Royal Observatory, the fluctuations of atmospheric pressure are very far from nicely corresponding, and that, so long as any wind subsists in a mountainous district, the atmospheric strata can by no means be regarded as horizontal. The calm, however, having been complete and uninterrupted for ten successive hours on the night of the 23d ult., afforded an excellent opportunity for determining the difference of level of the two stations, which appears to be 129 feet 8 inches, subject to a trifling correction for the zero points of the barometer, which remains to be more exactly ascertained.

Communications have been received by the Committee from Sir E. Ryan, Chief-Justice of Calcutta, containing a Register of the barometer and thermometer, kept by himself during his passage from Table Bay to Calcutta, in the months of December, January, and February 1834-5; from ——— McHardy, Esq. Surgeon on board the Mountstuart Elphinstone, containing a similar register made in the voyage of that ship from Table Bay to London, during parts of the months of September and October 1834: from Captain Wauchope of H. M. S. Thalia, containing extracts from a Journal of the barometer and thermometer, &c. observed on board of H. M. S. Eurydice, off Saldanha Bay, during a heavy gale in 1819, as also in Table Bay during a violent north-wester in 1817; and, lastly, from H. W. Innis, Esq. Surgeon on board the Sherburne, containing a similar register kept during the approach to and after the arrival of that ship in Table Bay in January 1835.

Of the two former of these communications (those of Sir E. Ryan and of Mr. McHardy), it must be observed, that they both, but especially the first, afford strong corroborative, and indeed quite decisive, evidence of that important meteorological fact, of a considerable depression of the barometer in approaching to the equator from extra-tropical latitudes. Sir E. Ryan's barometer, previous to his sailing, was compared, through the medium of a portable barometer in possession of Sir J. Herschel, with the Mural Circle barometer of the Cape Observatory, the difference of which, from the standard of the Royal Society, had been previously ascertained by two distinct comparisons, agreeing perfectly *inter se*, made by the intervention of the above mentioned portable barometer which had been brought to the Cape by Mr. Henderson and again transported by him to London. By these comparisons, it was found that Sir E. Ryan's barometer required a correction of—0.116 in. to reduce it to the Royal Society's standard. This correction being applied, and the reading so corrected being reduced to the freezing temperature, and classed into groups in zones of 10° in breadth, proceeding northwards and southwards from the equatorial zone (between the latitudes 5° N. and 5° S.) according to the observed latitudes of the ship at noon of each day, give as follows:—

Limits of the Zone of Latitude.	Number of Days' Observations.	Mean Pressure observed in Inches.	Mean corresponding observed Latitude.
Equatorial Zone.			
Lat. 5° N. to 5° S.	7	29.821	0° 41'
— 5 — to 15 —	10	29.819	9 50
— 15 — to 25 —	8	30.040	19 12
— — — to 35 —	10	30.125	31 0
— 35 — to 40 —	24	29.931	38 25

The observations of Mr. McHardy, though extending only to latitudes south of the equator, and, though evidently made with far less care, and with an instrument in which the fluctuations arising from the motion of the ship are very imperfectly destroyed, yet, when reduced and grouped in a similar manner, afford a result agreeing in their general tenor very satisfactorily with those of Sir E. Ryan. To render them comparable, as the zero of Mr. McHardy's barometer is unknown, a correction of--0.188 has been applied to all his reduced observations, by which the equatorial indications of the two barometers are made to agree, and the following table exhibits their results when so reduced, grouped, and corrected:--

Limits of the Zone of Latitude.	Number of Days' Observations.	Mean Pressure in Inches.	Mean corresponding Latitude.
Lat. 0° N. to 5° S.	8	29.821	1° 42'
— 5 — to 15 —	5	29.802	9 20
— 15 — to 25 —	6	29.960	19 41
— 25 — to 35 —	16	29.685	31 20

The total depression concluded from the latter series of observations agrees very nearly in amount with that stated by Sir J. Herschel, as the result of his own observations during his voyage from England. The general fact may now therefore be looked upon as unequivocally established, and it is hoped that it will henceforth attract the attention of all voyagers; and that observations will be diligently accumulated for the purpose of ascertaining the law of variation of atmospheric pressure in all latitudes both within and beyond the tropics, and in either hemisphere, since it is very possible that the same exact law may not be found to apply to both, and that the Atlantic, Indian, and Pacific Oceans may offer differences depending on their different extent and relation to the continents adjacent to them.

If, in a report like this, it be allowed to speculate on the causes of meteorological phenomena, it appears extremely probable that the equatorial depression in question arises from the same cause which produces the trade winds, viz. the rarefaction and consequent ascent of the equatorial air, which, although constantly supplied from the extra-tropical latitudes, is yet not supplied *instantly*, nor without a due dynamical motive force, which, in a free elastic fluid, can be no other than an excess of pressure on the side from which the supply is drawn, or (which comes to the same thing) a diminution of it, in the nature of a "suction," on that side towards which the superficial currents rush; which excess and diminution obviously arise from the overflow of the unsustained portion of atmosphere above the equatorial zone into the regions beyond. The inquiry, therefore, connecting itself as it does,

with all the greater phenomena of meteorology, assumes a high degree of interest, and will no doubt be studied with the perseverance and exactness it merits.

A series of observations of the heights and times of high and low water at Simon's Bay, extending from January 26, to June 30, has been obligingly submitted to the consideration of the Meteorological Committee, by J. Deas Thomson, Esq. and the Astronomer-Royal. It has not yet been possible to compare them with any theory, and indeed it would be premature to attempt it here, as they will require to be combined with the mass of knowledge now accumulating on this subject in Europe, to render them in any degree available. One remarkable result, however, may be mentioned here, which offers itself on a very cursory inspection of the heights, as compared with the declinations of the Sun and Moon, viz. that while the monthly fluctuation of the mean sea-level, arising from the moon's alternate occupation of the northern and southern hemisphere, is scarcely perceptible, amounting hardly to two inches, its annual variation, due to the similar approach of the sun to the northern and southern solstice, is much more considerable, and forms indeed a prominent feature in the Tides of this coast, amounting to no less than eight inches, or nearly a fifth of the average difference between high and low water—as the following brief Table will shew—in which the interval embraced by the observations is divided, not as usual into lunations from full to full or from new to new Moon, but into periods marked by the moon's passing from south to north of the equinoctial. By this division the effect (if any) of the moon's change of declination compensates itself, and leaves the solar effect in evidence. The cause of the prominence thus given to this part of the sun's agency, appears to lie in the length of its period compared with the moon's, which gives time for the waters of the whole ocean to accommodate their general level to the actual force, by bodily transfer from one part of the globe to another, and by assuming, at each instant (what the tides of short period have never time to do), very nearly the figure of equilibrium due to this particular modification of the disturbing forces.

Observed Mean Positions of the Mid-water mark on the Float of the Tide-gauge at Simon's Bay, during successive intervals of the Moon's Transit from North to South of the Equinoctial.

Limits of Intervals	No. of Tides observed.	Heights of Mid-water on the Gauge.	REMARKS.
Jan. 26 to Feb. 16	22	4 feet 4.38 in.	period incomplete.
Feb. 17 to Mar. 15	27	4 .. 2.35 ..	
Mar. 16 to April 11	27	3 .. 10.83 ..	
April 12 to May 9	28	4 .. 0.22 ..	period incomplete.
May 10 to June 5	27	3 .. 9.52 ..	
June 6 to June 30	25	3 .. 8.37 ..	

At the meetings of the Institution of Wednesday September 3, and October 1, Sir J. Herschel stated that he had examined the Meteorological Journal kept at the Port-Office by Mr. McCleod, under the direction and superintendence of Captain Bance, during 58 months, commencing with October 15, 1828, in which are registered the heights of the barometer with the temperature of the instrument, for the hour of 9 A. M., noon, and 3 P. M., with the usual notices of wind and weather, and that having reduced and interpolated them by graphical projection, he had been led to the following conclusions:—

1st, That the atmospheric pressure at Cape Town is subject to a considerable and very regular annual fluctuation, amounting (when reduced to a temperature of 32° Fahrenheit) to 0.287 in.—the highest level being attained about the 16th of July, and the lowest about the 16th of January, on an average of five years.

2d, That the barometric pressure is also subject to a regular diurnal fluctuation, whose average amount, on a mean of the whole year, may be stated at 0.027 in.; the highest pressure taking place at or about 9 A. M., and the lowest (so far as can be gathered from observations made only at the hours above named) at 3 P. M.

3d, That this daily oscillation is itself subject to an annual alternate increase and diminution—the limits being 0.0198 in. and 0.0322—the former, or lesser diurnal variation, corresponding to the middle of January, and the latter or greater to the beginning of July.

4th, That these fluctuations are maintained with such regularity, that there is not a single month in the fifty-eight examined, in the mean of which the daily oscillation does not appear; and that in the annual oscillation (with exception of one remarkable anomaly, produced by the tremendous storm of July 1831) not only does every year exhibit the fluctuations in question, but its progress is marked by similar stages, or phases of increase and diminution; the most remarkable of which is a temporary suspension of the regular rapid rise of the mercury towards its maximum, usually taking place about the latter end of May or beginning of June.

5th, That, contrary to usually received notions, the rainy season at the Cape corresponds to a generally elevated state of the barometer, although it is true that particular storms of wind and rain are often marked by a temporary depression.

Sir J. Herschel further observed, that the amount of the annual barometric variation at the Cape corresponds pretty nearly with the amount of a depression of the mercury, which he stated to have been observed by himself in his voyage hither, at and near the equator, below its habitual state in the extra-tropical regions—a depression then

noticed, as he at that time supposed for the first time, but which it appears had also been (very recently) noticed and made the subject of inquiry and numerical computation by Professor Schow of Copenhagen, in a paper published in the *Annales de Chimie* for June 1833.

Sir J. Herschel also farther stated, that the mean annual barometric fluctuation at Calcutta, on the average of between two and three years' observations made by Mr. Prinsep, examined by him, appears to be much greater than that at the Cape, and, what is very remarkable, in a contrary direction, the maximum of Calcutta corresponding to the minimum at the Cape. And he attributes this to an actual bodily transfer of a portion of air from hemisphere to hemisphere, by the alternate heating and cooling of the two hemispheres, as the sun crosses from side to side of the equator. The effect of this cause, which he considers to be general over the whole earth, will be to modify the regular and constant effects of the Trades, by a set of periodical winds differing materially in their character from local monsoons, and to this cause he is disposed to attribute the observed annual oscillation of the extreme north and south limits of the Trade winds.

The northern hemisphere, he further observed, being, by reason of its greater quantity of land, more superficially heated than the southern, it should be expected that the mean pressure beyond the southern tropic should exceed that beyond the northern, and he suggested this as a subject worthy of examination by meteorologists properly situated in both hemispheres.

Lastly, he observed, that severe gales, occurring whether in summer or winter, appear to depend on causes entirely extraneous to the regular periodical fluctuations of pressure, and are probably dependent on causes of a local and transient nature—but that a correspondence of extraordinary seasons in distant parts of the globe, may be expected to accompany great occasional deviations from the usual law of these fluctuations in any given place, and that it is far from impossible that an assiduous attention to this point may ultimately enable us to predict their occurrence.

The series of observations at the Port-Office being still in progress, the foregoing results are not considered as final; but whatever modifications future years' observations may necessitate, will be from time to time inquired into and reported.—*Edinburgh New Philosophical Journal for July—October 1836.*

LITERARY AND SCIENTIFIC INTELLIGENCE, AND MISCELLANEA.

Encouragement to Science by the Honourable the Court of Directors of the East India Company.—Having now dwelt at some length upon those aids and encouragements to science which emanate from public societies and institutes formed for that express purpose, we must be allowed to advert to another association, whose objects, indeed, are commercial, but whose patronage of science in all that relates to the civil and natural history of Asia is without parallel, and entitles THE HONOURABLE COMPANY OF MERCHANTS TRADING TO THE EAST INDIES, not only to a place among the scientific institutions of this empire, but to rank with the first and foremost of those in Europe. We here look to this Company only in its connection with the literature and science of the East. The liberality which the different Courts of Directors have shown, for a long series of years, in bringing to light the ancient records of that vast empire over which their authority extends, is attested by the publications these materials have given rise to, and the efficient patronage that has uniformly been extended to their authors. Every thing, in short, which could illustrate the ancient state of those singular nations now under the dominion of Britain, has been studiously sought for by the servants of the Company, and deposited in their archives. The Asiatic Society, celebrated for its learned Transactions since the days of Sir Wm. Jones, owed its origin to their fostering care; while the splendid library and collection of Oriental MSS. at the India House attest the feelings which have so long pervaded their councils. If we turn, on the other hand, to what has been done for elucidating the natural history of their possessions, the result is still more conspicuous. A botanical garden, worthy of an eastern monarch, superintended by distinguished botanists, having at their command all necessary assistants, has disseminated the splendours of the Indian flora over all similar establishments in Europe. Yet this liberality is not confined to public gardens, or to favoured botanists. Any individual of respectability, upon his return to Europe, may receive a collection of seeds and roots from these gardens, free of expense. Nor are these all the benefits resulting to the botanical world from the munificence of the Company. The different provinces of India have been explored by competent botanists; and thousands and tens of thousands of dried specimens, prepared under their superintendence, have been transmitted to England, arranged into separate collections, and then distributed among the scientific botanists of Europe. The same patronage has been extended to every thing regarding zoology. No sooner had the British arms

taken possession of Java, than arrangements were made for securing the services of Dr. Horsfield, an eminent naturalist then residing in the island, and his valuable collections were made over to the Company. On the arrival of Dr. Horsfield in this country, these scientific treasures were deposited in the India House; and when suitable arrangements had been made in the museum for their reception, they were opened to the public and to men of science: and the "Zoological Researches in Java" were soon after published, under the Company's patronage. The chief results of Dr. Horsfield's discoveries being thus given to the world, the rich collection of duplicate specimens was ordered to be distributed, like those of the plants, among the different public museums, and the eminent zoologists, both in Britain and on the Continent. The splendid collection of insects, equally rich in duplicates, will, no doubt, be employed in a manner equally calculated to benefit science, so soon as the honour attached to their discovery and investigation has been secured. In short, in whatever light we view the scientific patronage exercised by the India Company, it is scarcely possible to do justice to that munificent spirit which is apparent in all the details.—*A Preliminary Discourse on the Study of Natural History.*—By William Swainson, Esq.—*Cab. Cyc.* p. 329—331.

DR. BUCKLAND'S *Geology and Mineralogy*—THE SIVATHERIUM.—The long expected volumes of the Bridgewater Treatises, containing DR. BUCKLAND'S treatise on Geology and Mineralogy, have, at length, reached India. The following passage relates to the interesting fossil, an account of which appeared in the 12th number of this Journal.

"An account has recently been received from India of the discovery of an unknown and very curious fossil ruminating animal, nearly as large as an elephant, which supplies a new and important link in the Order of Mammalia, between the Ruminantia and Pachydermata. A detailed description of this animal has been published by Dr. Falconer and Captain Cautley, who have given it the name of Sivatherium, from the Sivalic or Sub-Himalayan range of hills in which it was found, between the Jumna and the Ganges. In size it exceeded the largest Rhinoceros. The head has been discovered nearly entire. The front of the skull is remarkably wide, and retains the bony cores of two short thick and straight horns, similar in position to those of the four-horned Antelope of Hindostan. The nasal bones are salient in a degree without example among Ruminants, and exceeding in this respect those of the Rhinoceros, Tapir, and Palæotherium, the only herbivorous animals that have this sort of structure. Hence there is no doubt that the Sivatherium was invested with a trunk like the Tapir. Its jaw is twice as large as that of a Buffalo, and larger than that of a Rhinoceros. The

remains of the Sivatherium were accompanied by those of the Elephant, Mastodon, Rhinoceros, Hippopotamus, several Ruminantia, &c.

"It is stated (p. 89) that there is a wider distance between the living Genera of the Order Pachydermata than between those of any other Order of Mammalia, and that many intervals in the series of these animals have been filled up by extinct Genera and Species, discovered in strata of the Tertiary series. The Sivatherium forms an important addition to the extinct Genera of this intermediate and connecting character."—*Supplementary Notes.*

In the number of the *Journal of the Asiatic Society of Bengal* for February 1837, we find an account and representations of further fragments of this very interesting fossil animal, from which we extract the following.

"Additional fragments of the Sivatherium.—Before Colonel COLVIN's departure for Europe, we requested permission to take a cast of the beautifully preserved lower jaw of the Sivatherium which he exhibited at the Government House scientific party in January last. In further token of his zeal for science, and of his ever readiness to oblige, he has, even in the hurry of embarkation, favoured us with the accompanying lithographic drawings of the same jaw, and of the larger fragment of the occiput also on its way to adorn some cabinet of fossil osteology of his native land. This fragment is the more valuable on account of its being perfect in the parts deficient in Dr. FALCONER's specimen.

"I herewith send you two plates of the Sivatherium, one of the portion of the head I was fortunate in having brought in from the lower hills below and west of Nahan just before I left Dádúpur. It arrived encumbered with a good deal of hard sandstone matrix, most of which I had cleared away. This specimen is valuable, though it has no teeth, from having the occiput very entire, and from its proving the accuracy of Dr. FALCONER's assumption, founded on examination of the original head, that the animal had four horns with bony cores, as this has the offset of one of the back branched horns very clearly marked; suitable to which I may mention that Captain CAUTLEY has found in his collection a large flat horn.

"For the left lower jaw of the Sivatherium, I am indebted to Conductor W. DAWE, of the Canal Department, for whom it was brought in, inclosed in a mass of similar sandstone, from near the sources of the Sombe river, north of Dádúpur and east of Nahan, shortly before I came away. It is a very perfect and beautiful specimen, with its molars, four in number, almost quite entire, and is the specimen which you have moulded."

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Fossil Remains of naked Mollusks, Pens, and Ink-Bags of Loligo.
—It is well known that the common Cuttle Fish, and other living species of Cephalopods,* which have no external shell, are protected from their enemies by a peculiar internal provision, consisting of a bladder-shaped sac, containing a black and viscid ink, the ejection of which defends them, by rendering opaque the water in which they thus become concealed. The most familiar examples of this contrivance are found in the Sepia vulgaris, and Loligo of our own seas.

It was hardly to be expected that we should find, amid the petrified remains of animals of the ancient world (remains which have been buried for countless centuries in the deep foundations of the earth), traces of so delicate a fluid as the ink which was contained within the bodies of extinct species of Cephalopods, that perished at periods so incalculably remote; yet the preservation of this substance is established beyond the possibility of doubt, by the recent discovery of numerous specimens in the Lias of Lyme Regis,† in which the ink-bags are preserved in a fossil state, still distended, as when they formed parts of the organization of living bodies, and retaining the same juxtaposition to a horny pen, which the ink-bag of the existing Loligo bears to the pen within the body of that animal.

Having before us the fact of the preservation of this fossil-ink, we find a ready explanation of it, in the indestructible nature of the carbon of which it was chiefly composed. Cuvier describes the ink of the recent Cuttle Fish as being a dense fluid of the consistence of pap "bouillie," suspended in the cells of a thin net-work that pervades the interior of the ink-bag; it very much resembles common printers' ink. A substance of this nature would readily be transferred to a fossil state, without much diminution of its bulk.‡

* The figure of the common Calmar, or Squid (Loligo Vulgaris Lam.—Sepia loligo of Linnæus), illustrates the origin of the term Cephalopod, a term applied to a large family of molluscous animals, from the fact of their feet being placed around their heads. The feet are lined internally with ranges of horny cups, or suckers, by which the animal seizes on its prey, and adheres to extraneous bodies. The mouth, in form and substance resembles a Parrot's beak, and is surrounded by the feet. By means of these feet and suckers the Sepia octopus, or common Poulpe (the Polypus of the ancients), crawls with its head downwards, along the bottom of the sea.

† We owe this discovery to the industry and skill of Miss Mary Anning, to whom the scientific world is largely indebted, for having brought to light so many interesting remains of fossil Reptiles from the Lias at Lyme Regis.

‡ So completely are the character and qualities of the ink retained in its fossil state, that when, in 1826, I submitted a portion of it to my friend Sir Francis Chantrey, requesting him to try its power as a pigment, and he had prepared a drawing with a triturated portion of this fossil substance; the drawing was shown to a celebrated painter, without any information as to its origin, and he immediately pronounced it to be tinted

In a communication to the Geological Society, February 1829, I announced that these fossil ink-bags had been discovered in the Lias at Lyme Regis, in connexion with horny bodies, resembling the pen of a recent *Loligo*.

These fossil pens are without any trace of nacre, and are composed of a thin, laminated, semi-transparent substance, resembling horn. Their state of preservation is such as to admit of a minute comparison of their internal structure with that of the pen of the recent *Loligo*; and leads to the same result which we have collected from the examination of so many other examples of fossil organic remains; namely, that although fossil species usually differ from their living representatives, still the same principles of construction have prevailed through every cognate genus, and often also through the entire families under which these genera are comprehended.

The petrified remains of fossil *Loligo*, therefore, add another link to the chain of argument which we are pursuing, and aid us in connecting successive systems of creation which have followed each other upon our Planet, as parts of one grand and uniform Design. Thus the union of a bag of ink with an organ resembling a pen in the recent *Loligo*, is a peculiar, and striking association of contrivances, affording compensation for the deficiency of an external shell, to an animal much exposed to destruction from its fellow-tenants of the deep; we find a similar association of the same organs in the petrified remains of extinct species of the same family, that are preserved in the ancient marl and limestone strata of the Lias. Cuvier drew his figures of the recent *Sepia* with ink extracted from its own body. I have drawings of the remains of extinct species prepared also with their own ink; with this fossil ink I might record the fact, and explain the causes of its wonderful preservation. I might register the proofs of instantaneous death detected in these ink-bags, for they contain the fluid which the living *sepia* emits in the moment of alarm; and might detail further evidence of their immediate burial, in the retention of the forms of these distended membranes; since they would speedily have decayed, and have spilt their ink, had they been exposed but a few hours to decomposition in the water. The animals must therefore have died suddenly, and been quickly buried in the sediment that formed the strata, in which their petrified ink and ink-bags are thus preserved. The preservation also of so fragile a substance as the pen of a *Loligo*, retaining traces even of its minutest fibres of growth, is not

with *sepia* of excellent quality, and begged to be informed by what colour-man it was prepared. The common *sepia* used in drawing is from the ink-bag of an oriental species of cuttle-fish. The ink of the cuttle-fishes, in its natural state, is said to be soluble only in water, through which it diffuses itself instantaneously; being thus remarkably adapted to its peculiar service in the only fluid wherein it is naturally employed.

much less remarkable than the fossil condition of the ink-bags, and leads to similar conclusions.*

We learn from a recent German publication (*Zeiten's Versteinerungen Württembergs*. Stuttgart, 1832, Pl. 25 and Pl. 37), that similar remains of pens and ink-bags are of frequent occurrence in the Lias shale of Aalen and Boll.† Hence it is clear that the same causes which produced these effects during the deposition of the Lias at Lyme Regis, produced similar and nearly contemporaneous effects, in that part of Germany which presents such identity in the character and circumstances of these delicate organic remains.

Paley has beautifully, and with his usual felicity, described the Unity and Universality of Providential care, as extending from the construction of a ring of two hundred thousand miles diameter, to surround the body of Saturn, and be suspended, like a magnificent arch, above the heads of his inhabitants, to the concerting and providing an appropriate mechanism for the clasping and reclasping of the filaments in the feather of the Humming-bird. The geologist describes a no less striking assemblage of curious provisions, and delicate mechanisms, extending from the entire circumference of the crust of our planet, to the minutest curl of the smallest fibre in each component lamina of the pen of the fossil *Loligo*. He finds these pens uniformly associated with the same peculiar defensive provision of an internal ink-bag, which is similarly associated with the pen of the living *Loligo* in our actual seas; and hence he concludes, that such a union of contrivances, so nicely adjusted to the wants and weaknesses of the creatures in which they occur, could never have resulted from the blindness of chance, but could only have originated in the will and intention of the Creator.—*Bridgewater Treatises*.—*Buckland's Geology and Mineralogy*. Vol. I. p. 303—310.

* We have elsewhere applied this line of argument to prove the sudden destruction and burial of the Saurians, whose skeletons we find entire in the same Lias that contains the pens and ink-bags of *Loligo*. On the other hand, we have proofs of intervals between the depositions of the component strata of the Lias, in the fact, that many beds of this formation have become the repository of Coprolites, dispersed singly and irregularly at intervals far distant from one another, and at a distance from any entire skeletons of the Saurians, from which they were derived; and in the further fact, that those surfaces only of the Coprolites, which lay uppermost at the bottom of the sea, have often suffered partial destruction from the action of water before they were covered and protected by the muddy sediment that has afterwards permanently enveloped them. Further proof of the duration of time, during the intervals of the deposition of the Lias, is formed in the innumerable multitudes of the shells of various Mollusks and Conchifers which had time to arrive at maturity, at the bottom of the sea, during the quiescent periods which intervened between the muddy invasions that destroyed, and buried suddenly the creatures inhabiting the waters, at the time and place of their arrival.

† As far as we can judge from the delineations and lines of structure in *Zeiten's* plate, our species from Lyme Regis is the same with that which he has designated by the name of *Loligo Aalensis*; but I have yet seen no structure in English specimens like that of his *Loligo Bollensis*.

New method of Boring.—An economical and easy method of sinking Artesian Wells and boring for coal, &c. has recently been practised near Saarbrück, by M. Sellow. Instead of the tardy and costly process of boring with a number of iron rods screwed to each other, one heavy bar of cast-iron about six feet long and four inches in diameter, armed at its lower end with a cutting chisel, and surrounded by a hollow chamber, to receive through valves, and bring up the detritus of the perforated stratum, is suspended from the end of a strong rope, which passes over a wheel or pulley fixed above the spot in which the hole is made. As this rope is raised up and down over the wheel, its torsion gives to the bar of iron a circular motion, sufficient to vary the place of the cutting chisel at each descent.

When the chamber is full, the whole apparatus is raised quickly to the surface to be unloaded, and is again let down by the action of the same wheel. This process has long been practised in China, from whence the report of its use has been brought to Europe. The Chinese are said to have bored in this manner to the depth of 1000 feet. M. Sellow has with this instrument lately made perforations 18 inches in diameter, and several hundred feet deep, for the purpose of ventilating coal mines at Saarbrück. The general substitution of this method for the costly process of boring with rods of iron, may be of much public importance, especially where water can only be obtained from great depths.—*Ibid.*—p. 568.

Proceedings of the Zoological Society of London.—Indian Antelope. —Mr. Bennett directed the attention of the Meeting to an interesting series of the *Indian Antelope*, *Antelope Cervicapra*, Pall., now at the Society's Gardens. It consists of four individuals: an adult and aged male, brought by Col. Sykes from Bombay, and presented by him to the Society nearly five years ago; a younger, yet adult, male, which was presented, in an immature condition, about two years since; an immature male, lately arrived in the Menagerie, and in about the same state of development as that in which the last-mentioned individual was when it was originally presented; and an emasculated individual of full growth. In the older of these *Antelopes* the rich deep colour of the body generally is so intense as almost to approach to black, and the horns are strong and fully developed: the possession of horns and the depth of colouring, which are peculiar to the male sex, are exhibited in it at their maximum. The second individual approximates nearly to it in the degree in which these secondary sexual characters are developed. In the third, the youngest of the series, there exist the horns

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characteristic of the male, but these organs are yet of small growth, are only beginning to be annulated at their base, and are commencing their first spiral turn; its colour, as is very generally the case among the young of animals that in adult age are differently coloured in the sexes, is that of the female, which in this instance is a dull fawn with a pale stripe along the side: it has, consequently, in these two striking particulars, full evidence of immaturity. The emasculated individual was probably, at the period when that accident or operation occurred which prevented the development of its sexual characters, at nearly the same age as the one last adverted to: it has since continued to increase in bulk, and it even exceeds in size, as often happens in castrated animals, the perfect adult male of the same species: but the secondary sexual characters of the male have not been developed in it: it retains the dull fawn colour of immaturity, and its horns have not acquired the strength, the annulation, or the spiral turns which belong to those of the adult and perfect male. One of the horns has been broken off; perhaps the more readily from some weakness in its structure, consequent on its unimportance to an animal so degenerated: the other retains at a short distance from its normally formed tip, a few rings, but beyond these the surface has become smooth, the substance remains weak and comparatively small, and the direction, instead of being in a succession of spiral turns, is in a single sweep, passing backwards above the base of the ear and then descending along the curve of the neck: it has, though weaker, much of the character of the horns of the African race of *Sheep*. The general appearance of the animal is also sheep-like and tame.

Mr. Bennett proceeded to remark that these animals, although curious and interesting on account of the variations exhibited by them, in accordance with their several conditions, in those acknowledged secondary sexual characters, colour and horns, were yet more interesting when considered with reference to the state of another organ, the use of which has long remained a problem to zoologists, but which, it appeared to him, must be referred to sexual relations; he alluded now to the lacrymal sinus. Referring to its structure as to that of a sac, opening externally by a lengthened slit, but perfectly closed within, he remarked, that that organ could not possibly be in any degree connected with the functions of respiration; there being no aperture through it for the passage of air. Its inner surface is covered by a smooth skin, with a few scattered and very short bristles, and is defended by a dark coloured and copious secretion of ceruminous matter, which has a slight urinous or sexual odour. He did not feel himself competent, he stated, to explain the precise manner in which this organ is available for sexual purposes; yet he felt convinced that such is its use, from the consider-

ation of its relative development in the several *Indian Antelopes* of the Society's Menagerie.

In the more aged of these individuals, as indeed in the adult *Indian Antelope* generally, the large cutaneous follicle beneath the eye known as the lacrymal sinus, is so prominent as to form a most striking feature in the animal's physiognomy: it never appears as a simple slit, its thickened edges pouting so widely as to be at all times partially everted. When the animal is excited, and it is constantly highly excitable, the eversion of the bag becomes complete, and its thick lips being thrown widely back, the intervening space is actually forced forwards so as to form a projection instead of a hollow: the animal is, on such occasions, delighted to thrust repeatedly the naked lining of the sac against any substance that is offered to him, which soon becomes loaded with the odour that has been referred to as belonging to the secretion. In the second individual, although it is perfectly mature, the protrusion of the inner surface of the sac is not quite to so great an extent as in the more aged male; and the less thickened edges of the sinus allow of a nearer approximation to its closure in the unexcited state of the animal. The youngest male has the lips of the sinus small and closely applied to each other, so as to hide completely the whole of the internal lining of the sac, and to exhibit, externally, a mere fissure: in it the lips are but slightly moved when the animal is interested. The emasculated individual, notwithstanding its full growth, has its suborbital sinus, nearly in the same condition as that of the immature male: it is merely a slight fissure, the edges of which are closely applied to each other; and in it those edges do not appear to be at all moved, the animal being generally careless and inanimate. It would consequently seem that the same cause which induced the retention, by this individual, of its immature colours, and which arrested the perfect growth of its horns, was adequate also for the checking of the development of the suborbital sinuses. Those organs, therefore, would appear to be dependent on sexual perfection; and consequently to be, in some manner yet to be ascertained, subservient to sexual purposes, with the capacity for which they are evidently, in the phases of their development, essentially connected.

Mr. Owen, who had conceived it possible that the secretion of these glands, when rubbed upon projecting bodies, might serve to direct individuals of the same species to each other, remarked that he had endeavoured to test the probability of this supposition by preparing a tabular view of the relations between the habits and habitats of the several species of *Antelope*, and their suborbital, maxillary, post-auditory, and inguinal glands; in order to be able to compare the presence and degrees of development of these glands with the gregarious and other

habits of the *Antelope* tribe. He stated, however, that it was evident from this table, that there is no relation between the gregarious habits of the *Antelopes* which frequent the plains, and the presence of the suborbital and maxillary sinuses; since these, besides being altogether wanting in some of the gregarious species, are present in many of the solitary frequenters of rocky mountainous districts. The supposition, therefore, that the secretion may serve, when left on shrubs or stones, to direct a straggler to the general herd, falls to the ground.

Mr. Ogilby remarked, with reference to this subject, that he had had opportunities of observing, at the Surrey Zoological Gardens, a female of the *Indian Antelope*, in which, when he first saw her, the lacrymal sinus was in a state of quiescence: but when he observed her again, a month afterwards, and probably in improved condition, that organ was in a state as excitable as it is in the old male of the Society's Gardens.

He added, as a general remark, which, however, he stated was not universal, that in intertropical animals the lacrymal sinus is larger than in more northern species, and in those whose range is limited to mountainous districts.

He also described the lacrymal sinus of a species of *Gazelle*, which he had observed after death: it consisted of a gland furnished with six excretory ducts placed nearly in a circle, and with one central duct: from the orifices of these ducts, when squeezed, there issued out strings of a dense ceruminous matter.

Mr. Bennett stated in conclusion, that since making his observations on the *Indian Antelope*, which had led him to form the opinion he had advanced with respect to the use of the lacrymal sinus, he had received from Mr. Hodgson of Nepal, a Corresponding Member of the Society, a letter in which, among other subjects, some remarks are made on this organ as it exists in the *Thar Antelope*, and in the *Cervus Aristotelis*: in the former of those animals, Mr. Hodgson's observations prove that during the breeding-season the lacrymal sinus is in a high state of activity. Mr. Hodgson's letter, which is dated Nepal, June 18, 1835, refers also to other glands in some other *Antelopes*, as will be seen by the following extract.

"The *Chiru Antelope* has exceedingly large inguinal sacs, which hang by a long narrow neck from the loins. The longitudinal quasi maxillary gland of the *Cambin Otan* I doubt the existence of, and believe its 'suborbital sinus' to be similar to that of *Thar*.

"The latter differs essentially from that organ in any *Deer* or *Antelope* I have seen; being furnished with a huge gland, filling the whole cavity or depression on the skull, and leaving the cuticular fold void of hollowness: it is filled up, like the bony depression, by the gland;

whereas the gland of this sinus, in most *Deer* and *Antelopes*, is a tiny thing, and a dubious one. As to any *Cervine* or *Antilopine* animal breathing through the suborbital sinus, it cannot be, unless they can breathe through bone and skin! If you pass a fine probe down the lacrymal duct, you see the probe through the bottom of the osseous depression holding the cuticular fold called the suborbital sinus. But, however thin the plate of bone at the bottom of the former, it is there, without breach of continuity; and the cuticular portion of the apparatus has a continuous course throughout, leaving no access to the inside of the head. I am watching closely a live specimen of *Cervus Aristotelis*, to discover, if I can, the use of this organ. In a recently killed male of this species, I passed a pipe into the nose, up to the site of the suborbital sinus, and tried, in vain, for half an hour, with the aid of a dozen men's lungs, to inflate the sinus. Not a particle of air would pass; nor could I cause the sinus to unfold itself, as the live animal unfolds it, by means of a set of muscles disposed crosswise round the rim of it. In dissecting the sinus, I found only a feeble trace of a gland; so, also, in the *Muntjac*.

"But in the *Thar*, the gland is conspicuous, being a huge lump of flesh, bigger than, and like in shape to, the yolk of an egg. The live *Thar*, too, in the spring especially, pours out a continuous stream of thin viscid matter from the sinus; not so in any *Deer*. The *Thar's* gland seems to me connected with the generative organs: and I take its profuse secretion to be a means of relieving the animal (when it has no mate particularly) from the extraordinary excitement to which it is liable in the courting-season. I have witnessed that excitement, and have been amazed at its fearful extent, topical and general, for six weeks and more.

"The *Chiru's* labial sacs, or intermaxillary pouches, are, most clearly, accessory nostrils, designed to assist breathing at speed. They spread with the dilatation of the true nostril, and contract with its contraction. This species has but five molar teeth on each side of either jaw." B. H. H.—*Philosophical Magazine*, No. 54, October 1836.

A paper by B. H. Hodgson, Esq., Corr. Memb. Z. S., on some of the *Scolopacidae* of Nipál, was read; the copy transmitted by that gentleman to the Society containing various corrections of his memoir which was published at Calcutta in the 'Gleanings of Science' for August, 1831.

Mr. Hodgson's object in the present paper is to bring under the notice of zoologists the various species of the family referred to which occur in Nipál, on the natural history of which country he has, during a residence of several years, been engaged in making most extensive re-

searches. The result of these it is his intention immediately to publish, accompanied by finished representations of the animals, taken from drawings made in almost every instance from numerous living individuals of the several races.*

Mr. Hodgson first describes in detail the common *Woodcock*, *Scolopax Rusticola*, Linn., as it occurs in Nipál; where it is, in every respect of form and colour, evidently identical with the European bird. In Nipál also it seems to be, as it is in Western Europe, of migratory habits: and the periods of its arrival in, and departure from, Nipál, correspond altogether with the seasons of its appearance and disappearance in England.

He then proceeds to describe in detail the several kinds of *Snipe* which occur in Nipál.

Two of these are so nearly related to the common *Snipe* of Europe, *Gallinago media*, Ray, that Mr. Hodgson is induced to regard them as being probably specifically identical with that bird: and he accordingly refers them to it as varieties, which are constantly distinguished from each other by the structure of the tail. In one of them the tail-feathers are fourteen or sixteen in number, and are all of the same form: in the other the tail-feathers vary in number from twenty-two to twenty-eight; and the outer ones on either side, to the number of six, eight, or ten, differ remarkably from those of the middle, being narrow, hard, and acuminate. The latter bird may, however, be regarded as the representative of a species to which the name of *Gall. heterura* may be given.

The other two *Snipes* of Nipál are unquestionably distinct from those of Europe. They are described as the *solitary Snipe*, *Gall. solitaria*, Hodgs., and the *Wood Snipe*, *Gall. nemoricola*, Ej.

In the *solitary Snipe* the wings are remarkably long; the upper surface, especially on the wings, is minutely dotted, barred, and streaked, with white intermingled with buff and brown; and the *abdomen* is white, barred along the flanks with brown.

The *Wood Snipe* has the general colouring of the plumage dark and sombre; the wings short; the *abdomen* and the whole of the under sur-

* We learn from Mr. Hodgson, and from the *Journal of the Asiatic Society of Bengal*, that many of the drawings to serve as illustrations to the projected work, have been sent to Europe from Calcutta, to be put into the hands of Artists there. These drawings were exhibited at the scientific *soirees* of Lord Auckland, and excited general admiration. The Editor of the Bengal Journal designates them as a "magnificent series of illustrations." The indefatigable industry, great talents, and extraordinary tact in the observation of the natural forms and habits of animals, possessed by Mr. Hodgson, render it quite certain that this work will far surpass any that have yet appeared on Indian Zoology. We cannot too much admire the conduct of this high civil functionary, in thus devoting the time which he can spare from the official duties of his exalted station, to the prosecution of scientific labours of this kind. The Indian community, and the cultivators and admirers of science, should testify their appreciation of such exertions, by subscribing to the work, so as to prevent the chance of any pecuniary loss to the disinterested author in the prosecution of his costly undertaking.—*Editor Madras Journal*.

face thickly barred with transverse lines of dark brown, on a dusky white ground; and a tail of sixteen or eighteen, or very rarely twenty feathers.

Mr. Hodgson describes, with the greatest minuteness, each of these birds, and adverts with the fullest detail to their several habits and distinguishing peculiarities, as well of manners and of seasons as of form and plumage.—*Ibid*, No. 52.

Proceedings of the Royal Astronomical Society of London.—Sir J. Herschel states, that he has nearly gone over the whole south circumpolar region, to 60° from the pole; the observations of which are in the course of arrangement. He is somewhat surprised at the extraordinary paucity of *close double stars*, which cannot arise from want of power in the telescope, or from the nature of the climate: for he considers his mirrors as perfect as it is possible to make them; and he represents the beauty and tranquility of the climate to be such, that the stars are reduced to all but mathematical points, and thus allow of their being viewed like objects under a microscope. But although the number of double stars is so small, considering the richness of the southern heavens in stars, yet he represents the *nebulae* as very copious; and has accordingly collected a numerous list, which will doubtless, in due time, be laid before the public.

Extract of a Letter from Captain Smyth to the President, containing the translation of a notice from M. Cacciatore:

"One important thing I must communicate to you. In the month of May I was observing the stars that have proper motion; a labour that has employed me several years. Near the 17th star, 12th hour, of Piazzi's Catalogue, I saw another, also of the 7-8th magnitude, and noted the approximate distance between them. The weather not having permitted me to observe on the two following nights, it was not till the third night that I saw it again, when it had advanced a good deal, having gone further to the eastward and towards the equator. But clouds obliged me to trust to the following night. Then, up to the end of May, the weather was horrible; it seemed in Palermo as if winter had returned: heavy rains and impetuous winds succeeded each other, so as to leave no opportunity of attempting anything. When at last the weather permitted observations at the end of a fortnight, the star was already in the evening twilight, and all my attempts to recover it were fruitless: stars of that magnitude being no longer visible. Meanwhile the estimated movement, in three days, was 10" in AR, and about a minute, or rather less, towards the north. So slow a motion would make me suspect the situation to be beyond *Uranus*. I was exceedingly grieved at not being able to follow up so important an examination."—*Ibid*.

On the discovery of the Tea Plant in a Province of British India.

(Extract from an Article by M. Alphonse De Candolle in the *Bibliothèque Universelle* of Geneva).

A Committee, established at Calcutta for the culture of Tea, has been employed in seeking, in the vast extent of the Anglo-Indian territory, the best locality for cultivating the precious shrub of China. To this end the Committee directed its attention to the Province of Assam on the borders of the Chinese Empire, and required from the European Officers stationed there information on the nature of the country. In reply, Captain Jenkins, in a letter, dated 7th January 1834, states that the mountainous region situated between Cachar and Assam, must be extremely favourable to the culture of Tea, as there are found there numerous species of *Camellia*, a genus much resembling the Tea, and that, in the district of Beesa, "a coarse variety of the tea plant is indigenous."

Notwithstanding, the celebrated Dr. Wallich, Superintendent of the Botanic Garden of Calcutta, appears to have doubted this assertion, emanating from an officer who is no botanist. He knew how much the leaf of the Tea plant resembles that of certain *Camellias* which grow in the mountains to the north of India, and he deferred a decision until he had seen specimens. Captain Jenkins was not slow in forwarding them. After an examination which he was then enabled to make of the leaf and fruit of the Assam tea, Dr. Wallich entertained no further doubt. It is indeed the Tea of China which grows in this part of the English territory, as the figure and brief notice of Dr. Wallich,* which we have before us, plainly testify. It remains to know whether this wild tea possesses the perfume of that cultivated in China, and whether the province of Assam offers favourable conditions for the culture of Tea, and for the delicate preparation of the leaves.

Captain Jenkins, having communicated the circular of the Calcutta Committee to Lieutenant Charlton, established in the province of Upper Assam, speedily procured accounts full of interest. Lieutenant Charlton was already aware of the existence of tea in Assam. He had even despatched living plants of it to the Calcutta Garden three years before, which he understood to have decayed. It was from the hills of Beesa that they were obtained. Many plants attain the height of 12 or 14 feet. He describes them from memory, in a letter to Captain Jenkins, and declares that he has no doubt of its being a species of tea. "I have not had an opportunity" says he "of making any experiment on the leaves; they are described as small in their green state, but

* Journal of the Asiatic Society of Bengal, Jan. 1835.

acquire the fragrance and flavour of Chinese tea when dried. The Singphos and Kamtees are in the habit of drinking an infusion of the leaves, which I have lately understood they prepare by cutting them into small pieces, taking out the stalks and fibres, boiling and then squeezing them into a ball, which they dry in the sun and retain for use."

This coarse mode of preparing tea is not unfrequent in the countries which surround China. It is said that the Tartars harden it with a kind of argillaceous earth, which they convey about in the shape of cakes, and that they eat it in that form, or drink it in infusion. We can testify from experience that it is a detestable beverage; but the palate of these barbarians is more gratified by the pungent flavour of the leaf, than by the delicious aroma, which exhales when it is carefully selected and well prepared. The same kind of men, among ourselves, prefer gross brandy to the evanescent fragrance of choice wine.

The Burmans use the tea in all fashions—As their country borders the province of Assam towards the north, and their capital, Ava, is distant only a hundred leagues, it may be useful to cite a passage from Crawford's Journey, concerning the indigenous tea of those regions.*

"Tea is cultivated on the hills by some of the mountain races, but it does not exist nearer Ava than five days' journey, and we consequently saw none of it growing. The best is grown by the race called D'hanu, whose country lies to the north-east of Ava, distant about ten days' journey. The leaves are elliptic, oblong, and serrated like the Chinese plant; and the Burmese, not following the practice of other nations, designate the latter by the native name of their own plant, Lap'het. There is little doubt, therefore, but that it is a genuine *Thea*, and most probably a native of the country. The Burmese eat the leaf prepared with oil and garlic, and never use the infusion as they do that of Chinese tea, which they call Lap'het-re, or tea-water." The author mentions elsewhere the frequent importation of China tea to Ava by the route of internal commerce.

The difference which the Burmans make between these two teas, valuing the infusion of the China leaf, makes me fear that the wild plant, which grows to the north of their country and in the province contiguous to Assam, yields tea of but an inferior quality. I do not mean to say that it is of a different species from the true tea, in the botanical sense of the word species; but it may be a less fragrant

* Journal of an Embassy to the Court of Ava, by J. Crawford, Esq.

+ In fact, Dr. Wallich, naturalist of the expedition, did not find it in the Burmese country. There is not a trace of it in the herbarium of that country, which he has confided to us, nor in the manuscript of his voyage.

variety. We know already that, in the interior of China itself, the selling price of tea varies much in different places. It is with the tea plant as with the vine, which yields very different products in places near to each other; which should not surprise us, for, besides the diversities of soil and situation, there are many differences in the period of gathering the leaves, in the number of crops, in the preparation of the leaves, and perhaps also in the kinds or varieties which have been cultivated from time immemorial in each locality. The wild tea may very likely afford a stronger and more pungent flavour, and a less delicate perfume.

This consideration, however, does not diminish, in our eyes, the interest of the English discovery. If the province of Assam which touches China, affords the tea plant spontaneously, it must be eminently fit for the culture of the plant. Supposing that the wild plant may prove of little use, the cultivated plant, especially that which may be brought from China, may prove of great advantage.

The Calcutta Committee has well determined. It has despatched Dr. Wallich to Assam. It is not the first mission of the kind of that zealous naturalist. He was sent, in 1827, to the province of Martaban, to explore the forests of teak wood. He has in like manner visited other regions of the vast empire of the British, to report on their natural resources, and he has always acquitted himself in these missions, with the ardour and talent which characterize him.

We are able to say nothing more of the results of the expedition to Assam, which is still going on.* †

Extract of a letter from Dr. Wallich, Superintendent of the Botanic Garden of Calcutta, to M. Benjamin Delessert, dated 10th August 1835.

"I purpose to start in four days, first for the mountains neighbouring Silhet, particularly Churra-Poonje, and Myrung, where I remain until October. Traversing then the mountains of Kliasiya, I proceed straight to Gowahutty in Assam, and thence to Suddiya in Upper Assam on the Burrampooter, where I shall commence my investigations for the report on Tea. I shall be accompanied by a medical gentleman whose name is well known to you, as well as to M.M. Mirbel and Brongni-

* Subjoined to the above we publish an extract from a letter from Dr. Wallich, which gives some details of the early results of the journey.—*Editor Annales.*

† The particulars of this interesting expedition, so important to Commerce as well as to Science, remain to this time unknown to the public. From the talents of the gentlemen of the deputation there is no doubt but that the Reports to Government have been most ample and satisfactory, and would prove highly interesting. Incidentally something has been made known by Mr. Griffiths, through our pages and those of the Bengal Journal, on the botany of Assam; but nothing like a narrative of the expedition has yet been promulgated.—*Editor Madras Journal.*

art, Mr. William Griffith, a young man deeply acquainted with general and physiological botany, who cannot fail to acquire great celebrity. Another gentleman of the East India Company's Medical Service, will accompany me as geologist; this is Mr. John M. Clelland, who is publishing here at this moment a work on the geology of Kemaon. I am proud to say, that it was at my recommendation that these gentlemen are attached to the mission.

"We hope to be on our return in the month of April next year, by which time the principal end of our journey will, I think, be accomplished in a satisfactory manner. This end is to make every possible research as to the locality of the true tea (wild and spontaneous) in Upper Assam. It is unnecessary to say that I calculate on making with Mr. Griffith an extensive collection of plants, and I need not add that I hope to send you specimens. I shall send the whole to the East India Company, but I shall take care expressly to request that you may have the duplicates, and I know too well the munificence of the Directors to doubt that my desire will be attended to. The government has been very liberal in the dispositions made for our mission to Assam, as well regarding me as my assistants. I take with me many draughtsmen and gardeners, and if I am able to exert the same ardour and energy as in my early expeditions, I believe we shall obtain good results. But I assure you that twenty-eight years' sojourn in India have enfeebled my mind and body; so that the best assurance of success lies in the incalculable advantage of being assisted by such excellent companions."*

Abstract of a Report on the Climate and Diseases of Van Dieman's Land, by W. Milligan, Esq. M.D., Assistant Surgeon, H. M. 63d Regiment.—The new colony of Western Australia, according to Dr. Milligan, is situated on the Western Coast of New Holland, and extends from Cape Londonderry, in latitude $13^{\circ} 44'$ South, to West Cape Horne, in latitude $33^{\circ} 8'$, and from longitude $112^{\circ} 52'$ to 129° from the meridian of Greenwich. The Swan River district, the one first settled, and still the most important, is situated in between latitude 32° and 33° ; the entire area being about 50 miles long by 30 in breadth. The country is generally of the open forest description, the surface undulating, and covered with a great profusion of trees, shrubs, and herbaceous plants. Three rivers intersect this valley, the Swan, the Canning, and the Murray. They are subject to the influence of the tides, abound with fish, and, though generally shallow, are subject to occasional inundations, which leave extensive alluvial deposits. The Swan is navigable for

* Translated from the *Annales des Sciences Naturelles*, Ferrier, 1836.—Editor Madras Journal.

boats of four or five tons as high up as Perth, which is about 12 miles from the Sea Coast. Fresh water lagoons are numerous; there are also others containing salt-water. The water of the wells, though at first indifferent, from not having been procured from a sufficient depth, is excellent. It sparkles in the glass, cooks food, and washes linen well and speedily, and may be drank freely without relaxing the stomach. The strongest winds are from the north-west and south-west. The north wind is the hottest, and is very sultry during summer, destroying vegetation if long continued. During the summer, there is a regular land and sea breeze, the former prevailing in the morning from the east, and the latter setting in about noon from south-west. The mornings and evenings are pleasant, and the nights cool. The sky is clear, and of a beautiful azure without cloud or rain: moderate dews descend at night. As the autumn approaches, the weather becomes less serene. The sky is occasionally overcast, with thunder-storms, which prove acceptable, however, and beneficial, mitigating the excessive heat, and rendering the fields fit for the labours of the husbandman. In winter, the winds are occasionally boisterous, endangering the shipping if exposed; it rains for the most part two or three days together, and then clears up for a somewhat longer period. In wet weather, fogs are not uncommon in the mornings and evenings in the low grounds, or along the banks of the rivers. Hail of a large size occasionally falls; snow is unknown, and ice is but rarely met with. Fires are not unwelcome in the mornings and evenings; but on the whole are to be looked on more as a luxury than a necessary. Such is the nature of the climate and locality to which Sir James Stirling proceeded in June 1829, accompanied by a detachment of His Majesty's 63d Regiment, to establish a new colony. Settlers soon commenced to arrive, and poured in rapidly, till the end of 1830, at which time, the population amounted to about two thousand. The vessels which brought them out, resembled in some measure Noah's ark, being crowded to excess with animals, birds, and plants, as well as men, women, and children, with provisions and household goods. If we can fancy the population of one of the parishes in England, mixed with a sprinkling of half pay officers, some gentlemen from the East and West Indies, and a few Cockneys, put down on the shores of a wilderness, we shall have some idea of the founders of this interesting colony. Their first object on landing was to get under shelter. Their domiciles were of course at first of a wretched description. Some had single tents; others huts of green-wood, pervious to every shower; while many had no other covering night or day than the wide canopy of heaven. Afterwards, when the settlers got on their own grants of land, their houses improved, by successive gradations, from the wooden house they had imported, or had made in the colony, to that of wattle and dab, and finally to the

more durable structure of brick or stone. As might be expected, losses from the straying of cattle in the bush, and disagreeable adventures from the travellers losing their way, were far from uncommon; accidents from explosions of gun-powder, and from the use of fire-arms by persons unaccustomed to handle them, were likewise far from unfrequent; in no instance however did any tetanic affection follow. Notwithstanding these little mishaps, matters continued to go on pleasantly enough till the beginning of the winter of 1830, when the supplies brought from England, consisting principally of salt meat, biscuit, and rum, began to fail; the harvest was indifferent; and to crown their misfortunes, after heavy rain, the rivers rose from fifteen to twenty feet above their usual level, and all who had commenced buildings on the lower grounds were obliged to desert them. From these various causes much personal fatigue and exposure were encountered, the hopes of the settlers damped, and their energies depressed; scurvy, fever, and dysentery consequently showed themselves. These diseases were principally confined to the lower orders; among the higher classes, who were better provided with the necessaries and comforts of life, and who were more temperate in their habits, there was little sickness and less mortality. With successive seasons, the harvest became more bountiful, the flocks more numerous, and scurvy has disappeared in consequence. The fevers have likewise become less prevalent, as the country has been more widely cleared and better drained. The Endemic diseases of the country appear to be principally inflammatory affections of the mucous membranes, Ophthalmia, Dysentery and Catarrh. Rheumatism is occasionally met with, in damp weather, in autumn and winter, of rather an obstinate description; and also a low fever, the *Gastro-Enterite*. Dr. Milligan's observations on these diseases have principally reference to the locality of Perth, the capital of the colony. This town is situated on the banks of the Swan river, on a gentle elevation, 30 feet above the level of the river, and about 40 above that of the sea. It is bounded to the south by the Swan, which is here three quarters of a mile broad; to the north by a string of fresh water Lagoons, which run up to the mountains; to the east by an extensive plain terminated, by the Darling range; and to the west by Mount Eliza, which running north and south, affords considerable protection from the strong gales coming in that direction. The Swan and the Canning unite immediately below the town in a large estuary, called Melville water, which still farther reduces the temperature of the sea-breeze in its progress inland. The soil is light and sandy, with the exception of the banks of the river, which are alluvial. The substratum is sandstone.

The climate agrees with the European constitution; and every description of live stock, and of vegetable production, though collected from different climates, finds there a congenial locality. The annual mean tem-

perature is from 60° to 64°. A great advantage, which the Swan River possesses to the Indian invalid, is its proximity, the voyage from Madras having several times been performed in 25 or 30 days; it is said to be shorter by one half, than either to Sydney or Van Dieman's Land. The society is good and respectable. The best period for leaving India is February, as the intensity of the summer heat in both countries is thus avoided.

Among much other valuable information in Dr. Milligan's elaborate paper, is an interesting account of the Aborigines of the country.*—*Transactions of the Medical and Physical Society of Calcutta*, Vol. VIII. p. vi. Appendix.

Description of a Post Mortem Examination of a Tiger—By Dr. Benza, Surgeon to the Right Honourable the Governor of Madras.—The subject of the case was a full-grown male, which died in the Government Park at Madras. This animal for some days before his death had refused his food, and appeared very ill; his breathing was deep and quick, he was hot and feverish, and his belly tense and painful. In this state he remained for several days, never attempting to change his position. The body was examined twelve hours after death. The abdomen contained about five pints of very offensive thin yellow fluid. The abdominal and visceral peritoneum were highly inflamed. The ilium for about three inches of its lower third was swollen, and converted into a hard tumour, having six perforations through its coats; the widest (more than three lines in diameter), was closed by a portion of bone, and sharp pointed spiculae were seen projecting through the other foramina: the colon and ilium were much contracted. Within the swollen part of intestine were many loose pieces of bone, and a round ball formed of several angular bits of bone, agglutinated and bound together by a kind of net-work of hair and wool. This ball adhered slightly to the intestines by means of an adventitious

* The paper of Dr. Milligan, which, from the brief abstract given by the Medical and Physical Society, (of which the above is a fragment), promises to afford great interest in its entire shape, must have contained much matter irrelevant to the medical pages of the Transactions, which accounts for its not having been introduced wholly. The author has promised to make over the manuscript to us when he recovers it from Calcutta; when that portion which treats of climatology, and of the Aborigines of the country, will no doubt be found suited to our pages. Australia is an interesting country, demanding enquiry and observation from all, but we have an additional motive here, from the circumstance of its being so frequently the resort of Indian invalids. Though it may seem, therefore, that we are, geographically, travelling somewhat out of our way, to introduce accounts of this country into the Journal of an *Asiatic Society*; yet we may do so with perfect propriety, as it is within our bounds politically (being to the eastward of the Cape), and, moreover, has numerous affinities to the Islands of the Eastern Archipelago, and these, again, to the continent of India, the relations of which, to Australia and to each other, it is important for the philologist and the naturalist to enquire into.—*Editor Madras Journal*.

tissue, which was highly injected. Dr. Benza remarks on the singular anomaly of finding undigested bones so low down in the intestine of an animal possessed of such digestive power as the tiger, and accounts for it by supposing, that these pieces of bone became entangled in the stomach with the wool and hair of the sheep, which formed the ordinary food of the animal; these latter substances being more indigestible than the bones, covering them with a sort of felt coat protected them from the action of the gastric juice, and thus the whole ball passed down unchanged into the intestines. At length this ball being deprived of the greater portion of its woolly covering, the spiculæ became exposed, and protruded against the intestine, greatly irritating it, thereby causing a thickening and constriction, by which the pieces of bone were held in one position, until they produced ulceration. Dr. Benza's account was accompanied by a preparation of the perforated intestine.—*Ibid*, p. xxiii.

Fall of part of Dent du Midi.—M. Elie de Beaumont read to the Geological Society of France a communication from M. Lardy upon the fall of a part of the *Dent du Midi*, one of the high Alps. This fall took place on the 26th of August 1835. M. Lardy states, that on Tuesday the 25th of August there was a violent storm in the evening all round the *Dent du Midi*; and it was asserted that its peak was often struck by the thunderbolt. Next day, the 26th, between ten and eleven o'clock in the morning, a very considerable portion of this peak suddenly broke off from its eastern edge, and precipitated itself with a dreadful crash upon the glacier which is situated upon the southern side of the *Dent*, and in its descent drew along with it an immense proportion of this glacier. This enormous mass of stone and ice fell into the deep ravine which separates the *Dent du Midi* from the *Col de Salenfe*, into which the torrent of St. Barthelemy runs. Speedily there issued from this gorge, through which this torrent flows to the valley of the Rhone, as it were, a mountain of black and viscid mire, on the surface of which there floated vast masses of rock of all dimensions, some of them as much as twelve feet high. This liquid mass, like a flow of lava, directed itself towards the Rhone, across the forest of pines which covers this part of the valley, drawing along with it every thing it met in its way. Trees of the largest size were overturned, and crushed like reeds. On reaching the bank of the river, it precipitated itself into it, thus forming an expanse of mud, which was fearful to behold. The fragments of rock contained in the mud were also impelled into the Rhone, whose waters were thrown to the opposite bank, and forced to re-ascend their channel to a considerable distance. The great road covered by this mire and these stones became impracticable, and it was

necessary to construct, by means of fagots, &c. a new road on this elastic soil. For many days the communications between the high and low Valais were effected by means of a bridge which was far from being stable, thrown across the torrent at the commencement of the gorge. It is impossible to conceive any thing more frightful than this ravine of from sixty to a hundred feet deep, with a breadth of from two to three hundred feet, and which augments in size as far as the Rhone, choked up with this really frozen mire, with its surface studded with great blocks of stone, and the trunks of trees. A small portion only of the peak fell to the northern side of the *Dent du Midi*, which, descending by a slope, covered a part of a glacier which is on that side. After reading this notice from M. Lardy, M. Elie de Beaumont gave some additional details regarding the phenomena, a part of which he had witnessed. He particularly insisted on what appeared especially curious as to the mode in which the muddy currents, produced by the fall, spread themselves over the great cone of debris of the torrent of St. Barthelemy, and which is at an inclination of from five to seven degrees. These torrents of mud did not contain perhaps a tenth part of water, and yet they displaced blocks of limestone several yards long, and even floated them on their surface for considerable distances, almost as easily as a river floats ice. Notwithstanding its comparatively small dimensions, this phenomenon appeared to M. Elie de Beaumont to possess a peculiar interest, as leading to conclusions respecting the mode by which the transport of diluvian blocks or boulders is effected. M. Huot, who was also an eye-witness of a part of this phenomenon, added some facts to the communication. The nature of the soil, which was composed of calcareous schist and of a black marl, must have necessarily facilitated the ecoulement. A cloud of dust rose to a great height for many days after the event, which, from a distance, had all the appearance of a volcanic eruption. It was remarked, that a person might walk upon the fluid mass almost at the same instant as it was extending itself in all dimensions. At the extremity of the valley, a deep valley of erosion was hollowed out in the Taswey.—*Edinburgh New Philosophical Journal* for July—October 1836.

Trade in Chromate of Iron.—Many years ago chromate of iron was discovered by Professor Jameson in the serpentine rocks of the Shetlands, and afterwards on the mainland of Scotland. This observation was in 1820 mentioned in one of the editions of his *System of Mineralogy*. Afterwards, his pupil, the now well known and distinguished geologist, Dr. Hibbert, found chrome-ore in such quantities in the Shetland groups, that the quarries of it opened after his visit have realized a very considerable return to the proprietors. It is exported from the Shetlands as a raw material. Since the year 1826 this ore of iron has

become in Norway, where it was discovered by the celebrated geologist Esmark, an article of trade. It was, until the year 1831, exported in the rough state, and with but comparatively little profit to the proprietors of the ground, to Altona, Hamburg, Petersburg, England, and Holland. In the year 1830 not less than 1133 ship-pounds were sent to Havre de Grace alone. It being considered more profitable to export the prepared chrome in place of the crude ore, a company has been got up at Drontheim for this purpose, which purposes to supply the cotton printers in Britain, France, and Germany, and also the porcelain manufactories, with prepared chrome. *—*Ibid.*

Delightful Smell on approaching tropical lands from sea.—The coast of Chili, says Poeppig, "appeared nearly to resemble the desolate region of Terra del Fuego." Even the peculiar smell was wanting which is usually perceived on approaching the coasts of countries between the tropics, and of which even animals are so sensible that they become restless, appearing to have a presentiment of the termination of their long confinement, and often boldly leap overboard to reach the shore, which they suppose to be close at hand. On this passage Poeppig says in a note,—"Whoever has made a voyage to the tropical countries of South America, or the West Indies, will always remember with pleasure the sensation which he experienced on approaching the land. Perhaps no sense is then so strongly affected as the smell, especially if you approach the coast in the early hours of a fine summer's morning. On the coasts of Cuba, the first land I saw in America, on the 30th of June 1822, all on board were struck with the very strong smell, like that of violets, which, as the day grew more warm, either ceased, or was lost amidst a variety of others, which were perceptible as we drew nearer the coast. During a long stay in the interior of this island, I became acquainted with the plant which emits such an intense perfume as to be perceived at the distance of two or three miles. It is of the species *Tetracera*, and remarkable for bearing leaves so hard that they are used by the native cabinet-makers, and other mechanics, for various kinds of work. It is a climbing plant, which reaches the tops of the loftiest trees of the forest, then spreads far around, and in the rainy seasons is covered with innumerable bunches of sweet-smelling flowers, which, however, dispense their perfume during the night only, and are almost without scent in the daytime."—*Ibid.*

* Why should Norway supply chrome to the *British* cotton printers and porcelain manufacturers, when *British* India produces abundance for the consumption of the mother country? The district of Salem, would supply all Europe, we suppose, with the ore, and the various beautiful dyes produced therefrom.—*Editor Madras Journal.*

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.
Sixth Meeting.

The sixth meeting of this Association, held at Bristol, has been highly satisfactory in every respect, both as regards the number and the eminence of the men of science who attended, the quantity and value of the communications, and the zeal and cordiality which were manifested. A general outline of the proceedings has been given in the daily and weekly papers: we shall, we conceive, best promote the interest of science by reserving our pages as last year for authentic and official details. We may, however, just notice the subjects of two of the communications, on account of the lively interest which they excited.*

On the change in the chemical character of Minerals induced by Galvanism.—By R. W. Fox.

Mr. Fox mentioned the fact, long known to miners, of metalliferous veins intersecting different rocks containing ore in some of these rocks, and being nearly barren or entirely so in others. This circumstance suggested the idea of some definite cause; and his experiments on the electrical magnetic condition of metalliferous veins, and also on the electric conditions of various ores to each other, seemed to have supplied an answer, in as much as it was thus proved that electro-magnetism was in a state of great activity under the earth's surface; and that it was independent of mere local action between the plates of copper and the ore with which they were in contact, was shown by the occasional substitution of plates of zinc for those of copper producing no change in the direction of the voltaic currents. He also referred to other experiments, in which two different varieties of copper ore, with water taken from the same mine, as the only exciting fluid, produced considerable voltaic action. The various kinds of saline matter which he had detected in water taken from different mines, and from different parts of the same mine, seemed to indicate another probable source of

* Influenced by the same feelings which actuate the Editor of the *Philosophical Magazine*, we have abstained from alluding to the Proceedings of the Association, further than to give the above extracts. When the authentic reports reach us, we shall give such an account of the volume, in successive numbers of this Journal, as will afford our readers a view of the present state of Science, in its various branches. By thus treating the annual publication of the Association, we shall be enabled to keep pace with the advance of knowledge, and to impart to our readers, not our own feeble ideas, but the statements of those leviathans of science, who have been selected by a congress of all the learned men of the British Isles, to report on the present state and prospects of Science, and the desiderata to which the attention of its cultivators should be directed.—*Editor Madras Journal.*

electricity; for, can it now be doubted, that rocks impregnated with or holding in their minute fissures different kinds of mineral waters, must be in different electrical conditions or relations to each other? A general conclusion is, that in these fissures metalliferous deposits will be determined according to their relative electrical conditions; and that the direction of those deposits must have been influenced by the direction of the magnetic meridian. Thus we find the metallic deposits in most parts of the world having a general tendency to an E. and W. or a N.E. and S. W. bearing. Mr. Fox added, that it was a curious fact, that on submitting the muriate of tin in solution to voltaic action, to the negative pole of the battery, and another to the positive, a portion of the tin was determined, like the copper, the former in a metallic state, and the latter in that of an oxide, showing a remarkable analogy to the relative position of tin and copper ore with respect to each other as they are found in the mineral veins.

The Chairman (Dr. Buckland) said, it had been observed to them last evening, that the tests of some of the highest truths which philosophy had brought to light was their simplicity. He held in his hand a blacking-pot, which Mr. Fox had bought yesterday for a penny, a little water, clay, zinc, and copper; by which humble means he had imitated one of the most secret and wonderful processes of nature, her mode of making metallic veins. It was with peculiar satisfaction he contemplated the valuable results of this meeting of the Association. There was also a gentleman now at his right hand, whose name he had never heard till yesterday, a man unconnected with any Society, but possessing the true spirit of a philosopher; this gentleman had actually made no less than 24 minerals, and even crystalline quartz. He (Dr. B.) knew not how he had made them, but he pronounced them to be discoveries of the highest order: they were not made with a blacking-pot and clay, like Mr. Fox's, but the apparatus was equally humble; a bucket of water and a brickbat had sufficed to produce the wonderful effects which he would detail to them.

Artificial Crystals and Minerals.—A. Crosse, Esq., of Broomfield, Somerset, then came forward, and stated that he came to Bristol to be a listener only, and with no idea that he should be called upon to address a Section. He was no geologist, and but little of a mineralogist; he had, however, devoted much of his time to electricity, and he had latterly been occupied in improvements in the voltaic power, employing a battery which he had succeeded in keeping in full force for twelve months by water alone, rejecting acids entirely. Mr. C. then proceeded to state that he had obtained water from a finely crystallized cave at Holway, and by the action of the voltaic battery had succeeded in producing from that water in the course of ten days numerous rhomboidal

crystals, resembling those of the cave: in order to ascertain whether light had any influence in the process, he tried it again in a dark cellar, and produced similar crystals in six days, with one fourth of the voltaic power. He had repeated the experiments a hundred times, and always with the same results. He was fully convinced that it was possible to make even diamonds, and that at no distant period every kind of mineral would be formed by the ingenuity of man. By a variation of his experiments he had obtained green and blue carbonate of copper, phosphate of soda, and 20 or 30 other specimens.

Mr. Crosse having also observed in a cavern in the Quantock Hills near his residence that the part of it which consisted of slate was studded with crystals of arragonite, while the limestone part was covered with crystals of ordinary carbonate of lime or calcareous spar, subjected portions of each of these substances in water to long-continued galvanic action, and obtained from the—

Slate	Limestone
Crystals of Arragonite.	Calcareous Spar.

It was mentioned to the Section on the following day, that although no doubt could be entertained of the independence and originality of Mr. Crosse's experiments, yet that he had been anticipated, in the artificial production of many of the crystallized bodies which he had formed, by M. Becquerel, and some other French chemists.—*Phil. Mag. No. 53, Sept, 1836*—p. 223, 230.

The following is a statement of the new and renewed Grants of Money for the advancement of particular branches of science, which have been made by the Association at this Meeting.

Mathematical and Physical Science.

- 250*l.* For the discussion of Observations of the Tides; at the disposal of J. W. Lubbock, Esq.
- 150*l.* For the discussion of Observations of the Tides in the port of Bristol; at the disposal of the Rev. W. Whewell.
- 70*l.* For the Deduction of the Constant of Lunar Nutation; under direction of Sir T. Brisbane, Mr. Baily, and Rev. Dr. Robinson.
- 30*l.* For Hourly Observations of the Barometer and Wet-bulb Hygrometer; at the disposal of W. S. Harris, Esq.
- 100*l.* Renewed grant for the establishment of Meteorological Observations and Experiments on Subterranean Temperature; at the disposal of a Committee, consisting of Prof. Forbes, W. S. Har-

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ris, Esq., Prof. Powell, Col. Sykes, and Prof. Phillips, who will act as Secretary.

500*l.* Enlarged grant for the procurement of accurate Data to determine the question of the Permanence or Variability of the Relative Level of Land and Sea. The Committee consists of Mr. Baily, Mr. De la Beche, Col. Colby, Mr. Cubitt, Mr. Greenough, Mr. Griffith, Mr. Lubbock, Capt. Portlock, Mr. G. Rennie, Rev. Dr. Robinson, Prof. Sedgwick, Mr. Stevenson, and Rev. Wm. Whewell, who will act as Secretary.

100*l.* For Experimental Investigations on the Form of Waves; at the disposal of John Robison, Esq., and J. S. Russell, Esq.

500*l.* Renewed grant for the Reduction of Observations in the *Hist. Céleste* and in the volumes of the *Académie des Sciences* for 1789 and 1790; under the direction of the Astronomer Royal, F. Baily, Esq., J. W. Lubbock, Esq., and Rev. Dr. Robinson.

150*l.* For Experiments on Vittrification; under the direction of Dr. Faraday, Rev. W. V. Harcourt, and Dr. Turner.

80*l.* Renewed grant for the construction of a rock-salt Lens; under the direction of Sir D. Brewster.

Chemical and Mineralogical Science.

50*l.* Renewed grant for Researches on the Specific Gravity of Gases; under the direction of Dr. Dalton and Dr. C. Henry.

30*l.* For Researches on the Quantities of Heat developed in Combustion and other chemical Combinations; at the disposal of Dr. Turner.

15*l.* For Researches on the Composition of Atmospheric Air; at the disposal of Dr. Dalton, and Mr. W. West.

24*l.* 13*l.* For the publication of Tables of Chemical Constants drawn up by Prof. Johnston.

60*l.* For Researches on the Strength of Iron made with hot and cold blast; at the disposal of Messrs. Fairburn and Hodgkinson.

Geology and Geography.

20*l.* Renewed grant for Experiments on the Quantity of Mud suspended in the water of Rivers; under the direction of Mr. De la Beche, Mr. G. Rennie, and Rev. J. Yates.

30*l.* For special Researches on Subterranean Temperature and Electricity; at the disposal of Mr. R. W. Fox.

50*l.* For Researches into the Nature and Origin of Peat Mosses in Ireland; under the direction of Col. Colby.

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Botany.

25*l.* For experimental Researches on the Growth of Plants, under glass and excluded from air, according to the plan of Mr. Ward; under the direction of Dr. Dalton, Dr. Daubeny, Rev. James Yates, and Prof. Henslow, who will act as Secretary.

Medical Science.

50*l.* Renewed grant to the Committees appointed to investigate the subject of the Anatomical Relations of the Absorbents and Veins.

50*l.* Renewed grant to the Committees appointed to investigate the Motions and Sounds of the Heart.

25*l.* For Researches into the Chemical Composition of Secreting Organs; under the direction of Dr. Hodgkin, Dr. Roget, Dr. G. O. Rees, and Dr. Turner.

25*l.* For Investigations on the Physiological Influence of Cold on Man and Animals in the Arctic Regions; at the disposal of Mr. King.

25*l.* Renewed grant for the Investigation of the Effects of Poisons on the Animal Economy; under the direction of Dr. Roupell and Dr. Hodgkin.

25*l.* Renewed grant to the Committee formerly appointed to investigate the Pathology of the Brain and Nervous System. Of this Committee Dr. O'Beirne has been requested to act as Secretary.

25*l.* For Investigations on the Physiology of the Spinal Nerves; under the direction of Mr. S. D. Broughton, Mr. E. Cock, and Dr. Sharpey.

Statistics.

150*l.* For Inquiries into the actual State of Schools in England, considered merely as to numerical analysis; under the direction of Mr. Hallam, Mr. Porter, and Col. Sykes.

Mechanical Science.

50*l.* Renewed grant for an Analysis of the Reports of the Duty of Steam-Engines in Cornwall; under the direction of Mr. Cubitt, Mr. J. Rennie, and Mr. John Taylor.—*Phil. Mag.* No. 54, Oct. 1836—p. 312, 314.

POSTSCRIPT.

To the Editor of the Madras Journal of Literature and Science.

MY DEAR SIR—Since the publication of my remarks on the Gamboge tree, I have had much correspondence with Colonel Walker respecting it; in the course of which he recalled to my recollection a circumstance which, at the time of writing, had altogether escaped my memory, namely, that he had shown me specimens collected in the cinnamon gardens of Colombo, where he believes it indigenous. He has besides mentioned several other localities in which it is found in the interior, which leaves not the slightest doubt that it is truly a native of Ceylon. In one letter he says, "it is found in great abundance along the western and eastern coast in the neighbourhood of Battacola, but I am assured by natives who know the Kara goraka or Gokatu, that it grows to a very large size in the Seven Korles quite inland, where it could not have been planted by the Dutch. * * * The Gamboge itself is as fine as any in the world. Mrs. Walker has tried the juice of two or three species, none of which mix properly with water or spirit, or are at all fit for the purposes of colouring drawings. That of the tree in question is as good for medicinal purposes and painting as any from Siam or elsewhere, and the great probability is, that, being produced in nearly the same situations, they are identical." In another letter he says, "I think we have ascertained to a certainty that it is indigenous in Ceylon, for the largest trees are found in that part of the interior where the Dutch had no control; its favourite abode, however, seems to be, in low sandy ground, being very abundant about Kaderaane, Negombo, and towards Chilaw, also about Colombo, and not at all confined to gardens. Of all the Garcinæ which are in Ceylon, be assured that *Xanthochymus pictorius* alone is foreign. You may be equally certain that *Stalagmitis Cambogioides*, Moon's Cat., produces as fine Gamboge as any in the world, for what can be finer or more durable, than the colour on the figures of Buddho, painted centuries ago."

The last reference to this tree is in a note received two days ago, in which he remarks—"I have found the *Stalagmitis*, now described by Dr. Graham under a new name, one hundred miles inland, perfectly indigenous, and no other Garcinæ at so high an elevation, 2000 feet above the sea."

We have now irrefragable proof that the tree producing the best kind of Gamboge is a native of Ceylon. I have already proved, I think almost to demonstration, that Murray's *Stalagmitis Cambogioides* is identical with Roxburgh's *Xanthochymus Ovalifolius*, and that this new plant forms the type of a genus quite distinct from both *Xanthochymus* and *Garcinia*, for which I proposed to retain the now vacant name of *Stalagmitis*, combining with it *Garcinia pictoria*

Roxb. and *G. elliptica*, Wall. (fid. Graham), but which, it appears from Col. Walker's note, Dr. Graham has already published under a new name. It is now therefore certain that both Murray and Roxburgh were wrong in assigning the Pentadelphous flowered tree as the source of the true Gamboge of commerce, that Mr. Arnott and myself were equally in error in following them, and, finally, that the world is at last indebted to the industry and observation of Colonel and Mrs. Walker for making it acquainted with the characters of the long sought for genus of plants, which produces this most valuable pigment and medicine.

As a discovery so interesting cannot be too generally known, and as Colonel Walker has promised me a drawing from the accurate pencil of his accomplished lady, I trust you will be able to find room for it in a future number; I hope, accompanied by Dr. Graham's description and name.

I remain, dear Sir, Yours, &c.

R. W.

MADRAS, 15th April 1837.

Errata in my former communication.

Page 304, line 19, from the bottom, for glabose read globose.
— — — 8, — — — putoria — pictoria.

MADRAS, 16th April 1837.

MY DEAR SIR—I yesterday received your note, with the specimens of plants from Goomsoor which accompanied, and was sorry to find them altogether unfit for preservation. Thinking it a subject of regret, that the labour of the few persons, who in this country seem willing to devote their leisure to making us better acquainted with its vegetable productions, should be rendered fruitless for want of a little skill, easily acquired, I have drawn up the following brief and simple instructions for preserving plants (which I hope you will be able to find room for in your forthcoming number) under the conviction, that many are deterred from attempting to form collections, by not knowing how to go about it. Should you think the style I have adopted too homely, pray bear in mind that I do not write for botanists, but for the uninitiated. The instructions are nearly those I give my native collectors, who traverse every part of the country collecting for me, and have made a very large collection indeed.

Yours very truly,
ROBERT WIGHT.

To R. COLE, Esq. &c. &c. &c.

Directions for preserving Plants.—The first point to be attended to in forming collection of plants is the selection of suitable specimens. These, when both are procurable, ought always to present flowers and fruit, but when both cannot be had, invariably one of them, however imperfect, as it is impossible to make out an unknown plant from the leaves only. Flower buds will generally suffice, where full blown ones are not to be had, and immature fruit, where the full grown one is either too large, or so soft and pulpy that it cannot be preserved. The smaller herbaceous plants should have root and stem; but of trees or shrubs, branches, 12 or 18 inches long, are usually sufficient. Many herbaceous plants, too large, even when folded down, to be preserved entire, have the radicle and stem leaves of different shapes; in such cases, two or three of the radicle leaves and flowering branches will form perfect specimens.

For drying, lay one or more of these specimens, according to their size, side by side, not above each other, in the fold of a sheet of paper, and subject them to considerable pressure for some hours. This is necessary to give them form, and fit them for convenient disposal in the herbarium. Where paper is abundant or readily procurable (and any kind serves for drying—common bazar paper answers the purpose perfectly), two or three sheets should be interposed between each paper of plants, to absorb as much as possible of the moisture that exudes.

* When they have been thus pressed from 24 to 36 hours, the papers containing the specimens must then be removed from between the others, and either replaced between fresh dry paper, or spread out in the sun, and covered with a rather thick layer of sand, say about two inches. Two days will generally be found sufficient to dry the thin leaved plants, but if that is not enough they should be so exposed daily till thoroughly dry. Thick succulent ones often require many days. The sand serves the double purpose of preventing the leaves curling and getting out of shape, and of absorbing moisture; while it retains an equable degree of heat long after the rays of the sun have ceased to supply it. If the quantity of sand is considerable, plants may thus be even well dried, without once subjecting them to any other pressure, but as it is always very desirable to preserve the forms of plants it is better to re-press them every night when taken in. The papers that were interposed and have become damp, are in like manner to be exposed to the sun and air to dry, and fit them for re-application; by attending to this rule many thousand specimens may be dried with a few quires of paper. When dry, which is known by the stiffness of the specimens and the leaves not bending or curling on exposure to the air, they may be removed to any more convenient paper for preservation; old newspapers, especially Europe ones, are excellent; but any dry firm paper answers the purpose. My own collections, now

amounting to many thousands of specimens, are all kept in country brown paper—several specimens can thus be kept in one sheet, as they no longer spoil by being laid above each other.

For pressing specimens at home, the most simple method is to lay them between two boards, corresponding in size with the paper, under a large stone or other weight; but, in travelling, it is more convenient to bind them tightly with strong straps and buckles, or cords. For the latter purpose the boards should be made double; that is, of two thinner boards, disposed with the grain of the wood crossing at right angles, and united by a few nails round the edges. A board of this construction, half an inch thick, will resist the utmost force a man can apply in tightening the straps, and may be made up of any number of smaller pieces, in case entire ones are not procurable.

Several specimens of each plant should be taken, to guard against loss, and show variations of form which almost every plant presents, and are apt to mislead describers. Proceeding as above, any native, of ordinary intelligence, can be taught, in the course of a few days, both to collect and to dry plants, and are most valuable assistants in the formation of a herbarium; it being only necessary to give them a good bundle of paper, and send them to the jungle, with instructions to preserve specimens of every plant they can find bearing either flowers or fruit.

In collecting ferns, it is necessary to observe that the fruit are usually situated on the under surface of the leaves, forming scattered dots or lines, or covering the whole under side of the leaf or frond. Specimens of that tribe should always have fruit: but some species have fertile and sterile fronds, growing on the same root, of different forms—both should be taken.

The method of quick drying here recommended, in addition to the great saving of time and labour, possesses the further advantage of preserving the colours, better than the slower one of daily changing the wet papers, but of course does not always succeed; that, however, is a matter of inferior importance as it is by forms not colours that plants are distinguished in the herbarium. In wet or cloudy weather the daily changing process must be adopted.

To the Editor of the Madras Journal of Science and Literature.

SIR.—With reference to a communication from me relative to an iron self-registering barometer, I beg to inform you that a scientific friend of mine at Ootacamund, who has evinced much interest in this matter, and who was good enough to compare and register the indications of a very rough iron one in my possession with his standard instrument, pointed out to me a few days ago in the second volume of the supplement to the Encyclopædia Britannica, a drawing of an iron barometer proposed by Blondeau.

As that instrument was of the syphon kind and was intended to act exactly like the one proposed by myself (the self-registering apparatus excepted), I hasten to assure you that I was perfectly ignorant of Blondeau's recommendation, and had previously made every inquiry in my power as to former suggestions on this head, and, from a correspondence with J. Prinsep, Esq. the Editor of the Calcutta Journal of Science, I was led to believe that iron had neither been tried or suggested, and would most probably be found defective. It does not appear that the iron barometer, alluded to in the Encyclopædia, was ever tried, and as the self-registering portion of my project has not to my knowledge been pointed out by former philosophers, I shall now state that the experiments I have made with the roughly formed instruments manufactured in Coorg, give me the most sanguine hopes of perfect success. The iron has been found to be air tight, but the following improvements to the drawings before sent seem to me essential to the perfection of the instrument.

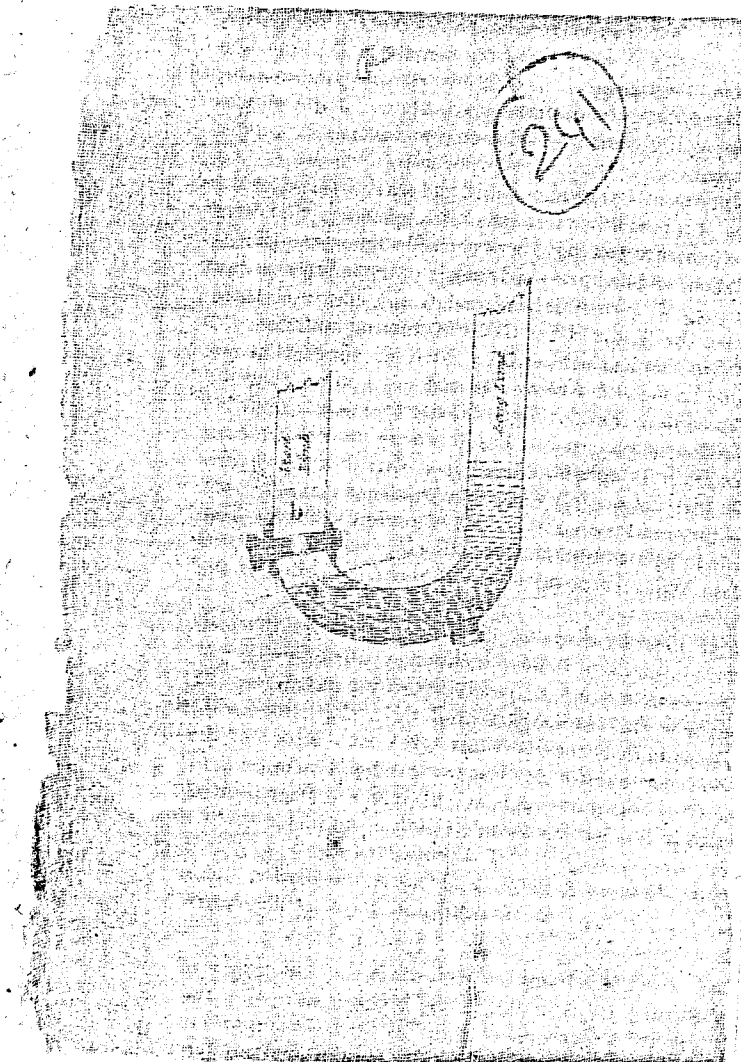
At *a*, a small hole must be made for filling the instrument which must contain mercury sufficient to keep its surface when reversed at the dotted line *c*, to guard against the possibility of air passing up the long limb when set to work. At *b*, a mercurial tight stop cock should be placed taking care to leave ample room for the expansion of the mercury, which however even in this country need not be more than 3-10th of an inch, since about 30° of heat will increase the length of the mercurial column in this barometer only 1-10th of an inch.*

I remain, Sir,

CAMP NEELCHERRIES, January 2, 1837. Yours obediently,
G. UNDERWOOD, Capt. of Engineers.

Mr. Hodgson, of Nipal, in a letter received while the last pages of this Journal were passing through the press, requests us to alter the generic name of the *Perdix* described at page 303 from *Arborophila* to *Dendrophila*. This emendation, we are sorry to say, arrived too late to be introduced into the body of the work.—*Editor*.

* This letter was received when the last number of the Journal was in the press, Captain Underwood's article having been struck off. It might have been introduced in a Postscript to that number, but was overlooked, for which we beg to apologize to the Author.—*Editor*.



Statement of the Population of the Hill Villages in Dindigul District, as obtained with care in 1835.

TALOOKS.	VILLAGES.	HAMLETS.	Number of houses.	POPULATION.				Total.
				Men.	Women.	Boys.	Girls.	
Thenkeenay.....	Thaundaycoody hill.....	Cusbah Thaundaycoody.....	26	37	42	28	16	123
		Kaunanoor.....	11	26	18	10	7	61
		Purnakaudoo.....	49	63	69	54	38	234
		Pepathoor.....	26	41	33	16	7	97
Mynpully.....	Veroopauthio hill.....	Paryoor.....	112	167	162	108	68	505
		Kunnamanoor.....	33	46	43	23	13	125
		Vadakaudo.....	5	8	6	1	1	16
		Pavulathoor.....	7	8	7	2	1	18
Mynpully.....	Poombarah hill.....	Vernaly.....	23	36	30	15	10	91
		Cusbah Poombarah.....	1	1	1	0	0	2
		Painpootoor.....	69	99	87	41	25	252
		Koockanal.....	74	105	103	51	32	291
Mynpully.....	Vilputty hill.....	Painpootoor.....	3	4	4	2	4	14
		Manavangoor.....	11	13	13	5	1	31
		Vilputty.....	91	127	122	59	37	345
		Manavangoor.....	31	33	36	13	5	93
Mynpully.....	Yettoor hill.....	Cavunjevoor.....	33	53	62	22	15	152
		Poonduoor.....	12	23	22	6	5	56
		Palleer.....	15	28	26	18	25	97
		Keelavaunay.....	11	18	17	7	11	53
Mynpully.....	Shombaganoor hill.....	Coombat.....	11	23	20	11	13	67
		Shombaganoor.....	4	6	5	3	4	18
		Total.....	85	151	152	67	73	443
		Shombaganoor.....	389	583	559	286	208	1638
Mynpully.....	Shombaganoor hill.....	Shombaganoor.....	3	3	2	4	1	10
		Total.....	392	586	561	292	209	1648

N. B.—The author of the Paper on the Palacy Mountains had not this table in his possession when the article went to press, or it would have been incorporated with it.—*Page* p. 280.

J. B. BLACKBURN, Principal Collector.

METEOROLOGICAL REGISTER KEPT AT THE MADRAS OBSERVATORY FOR THE MONTH OF MARCH 1837.

METEOROLOGICAL REGISTER KEPT AT THE MADRAS OBSERVATORY FOR THE MONTH OF MARCH 1837.																					
Day.	BAROMETER AT						THERMOMETER AT						RAIN.		DIRECTION OF WIND.				WEATHER AT		REMARKS.
	Sun rise.	10 A. M.	Noon.	2 P. M.	8 P. M.	Inch.	Sun rise.	10 A. M.	Noon.	2 P. M.	8 P. M.	10 P. M.	Inch.	Sun rise.	Sun set.	Direction.	Morning.	Noon.	Evening.		
1837.																					
Mar. 1	59.9	30.04	29.97	29.94	29.92	29.90	59.7	81.5	84.5	86.0	87.3	88.3	—	—	—	—	Clear	Clear	Clear	Dew	
2	59.9	30.04	29.97	29.94	29.92	29.90	59.7	81.5	84.5	86.0	87.3	88.3	—	—	—	—	Clear	Clear	Clear	Dew	
3	59.9	30.04	29.97	29.94	29.92	29.90	59.7	81.5	84.5	86.0	87.3	88.3	—	—	—	—	Clear	Clear	Clear	Dew	
4	59.8	29.98	29.91	29.88	29.85	29.82	59.6	81.4	84.4	85.9	87.2	88.2	—	—	—	—	Clear	Clear	Clear	Dew	
5	59.7	29.97	29.90	29.87	29.84	29.81	59.5	81.3	84.3	85.8	87.1	88.1	—	—	—	—	Clear	Clear	Clear	Dew	
6	59.6	29.96	29.89	29.86	29.83	29.80	59.4	81.2	84.2	85.7	87.0	88.0	—	—	—	—	Clear	Clear	Clear	Dew	
7	59.5	29.95	29.88	29.85	29.82	29.79	59.3	81.1	84.1	85.6	86.9	87.9	—	—	—	—	Clear	Clear	Clear	Dew	
8	59.4	29.94	29.87	29.84	29.81	29.78	59.2	81.0	84.0	85.5	86.8	87.8	—	—	—	—	Clear	Clear	Clear	Dew	
9	59.3	29.93	29.86	29.83	29.80	29.77	59.1	80.9	83.9	85.4	86.7	87.7	—	—	—	—	Clear	Clear	Clear	Dew	
10	59.2	29.92	29.85	29.82	29.79	29.76	59.0	80.8	83.8	85.3	86.6	87.6	—	—	—	—	Clear	Clear	Clear	Dew	
11	59.1	29.91	29.84	29.81	29.78	29.75	58.9	80.7	83.7	85.2	86.5	87.5	—	—	—	—	Clear	Clear	Clear	Dew	
12	59.0	29.90	29.83	29.80	29.77	29.74	58.8	80.6	83.6	85.1	86.4	87.4	—	—	—	—	Clear	Clear	Clear	Dew	
13	58.9	29.89	29.82	29.79	29.76	29.73	58.7	80.5	83.5	85.0	86.3	87.3	—	—	—	—	Clear	Clear	Clear	Dew	
14	58.8	29.88	29.81	29.78	29.75	29.72	58.6	80.4	83.4	84.9	86.2	87.2	—	—	—	—	Clear	Clear	Clear	Dew	
15	58.7	29.87	29.80	29.77	29.74	29.71	58.5	80.3	83.3	84.8	86.1	87.1	—	—	—	—	Clear	Clear	Clear	Dew	
16	58.6	29.86	29.79	29.76	29.73	29.70	58.4	80.2	83.2	84.7	86.0	87.0	—	—	—	—	Clear	Clear	Clear	Dew	
17	58.5	29.85	29.78	29.75	29.72	29.69	58.3	80.1	83.1	84.6	85.9	86.9	—	—	—	—	Clear	Clear	Clear	Dew	
18	58.4	29.84	29.77	29.74	29.71	29.68	58.2	80.0	83.0	84.5	85.8	86.8	—	—	—	—	Clear	Clear	Clear	Dew	
19	58.3	29.83	29.76	29.73	29.70	29.67	58.1	79.9	82.9	84.4	85.7	86.7	—	—	—	—	Clear	Clear	Clear	Dew	
20	58.2	29.82	29.75	29.72	29.69	29.66	58.0	79.8	82.8	84.3	85.6	86.6	—	—	—	—	Clear	Clear	Clear	Dew	
21	58.1	29.81	29.74	29.71	29.68	29.65	57.9	79.7	82.7	84.2	85.5	86.5	—	—	—	—	Clear	Clear	Clear	Dew	
22	58.0	29.80	29.73	29.70	29.67	29.64	57.8	79.6	82.6	84.1	85.4	86.4	—	—	—	—	Clear	Clear	Clear	Dew	
23	57.9	29.79	29.72	29.69	29.66	29.63	57.7	79.5	82.5	84.0	85.3	86.3	—	—	—	—	Clear	Clear	Clear	Dew	
24	57.8	29.78	29.71	29.68	29.65	29.62	57.6	79.4	82.4	83.9	85.2	86.2	—	—	—	—	Clear	Clear	Clear	Dew	
25	57.7	29.77	29.70	29.67	29.64	29.61	57.5	79.3	82.3	83.8	85.1	86.1	—	—	—	—	Clear	Clear	Clear	Dew	
26	57.6	29.76	29.69	29.66	29.63	29.60	57.4	79.2	82.2	83.7	85.0	86.0	—	—	—	—	Clear	Clear	Clear	Dew	
27	57.5	29.75	29.68	29.65	29.62	29.59	57.3	79.1	82.1	83.6	84.9	85.9	—	—	—	—	Clear	Clear	Clear	Dew	
28	57.4	29.74	29.67	29.64	29.61	29.58	57.2	79.0	82.0	83.5	84.8	85.8	—	—	—	—	Clear	Clear	Clear	Dew	
29	57.3	29.73	29.66	29.63	29.60	29.57	57.1	78.9	81.9	83.4	84.7	85.7	—	—	—	—	Clear	Clear	Clear	Dew	
30	57.2	29.72	29.65	29.62	29.59	29.56	57.0	78.8	81.8	83.3	84.6	85.6	—	—	—	—	Clear	Clear	Clear	Dew	
31	57.1	29.71	29.64	29.61	29.58	29.55	56.9	78.7	81.7	83.2	84.5	85.5	—	—	—	—	Clear	Clear	Clear	Dew	
Mean	57.0	29.70	29.63	29.60	29.57	29.54	56.8	78.6	81.6	83.1	84.4	85.4	—	—	—	—	Clear	Clear	Clear	Dew	

192608

The instruments with which the foregoing observations have been made, are placed upon a table about 4 feet above the ground in the western verandah of the Honorable Company's Observatory; which is situated in the longitude of 5h. 21m. 9s. E. and latitude 13° 4' 9" N. at about 2 miles from the sea and about 27 feet above the low water mark.

The Barometrical indications are derived from a Standard of my own construction, and require a correction + .125 inches in addition to that due to temperature. The Thermometrical Observations are, I believe correct, the Thermometer having been found to agree with Troughton's Standard.

T. G. TAYLOR,

1st April, 1837.

H. C.'s Astronomer.

