

Sea of Aral is very stormy and turbulent, but the climate of its shores, however little agreeable, is not unhealthy.

Finally, I adjoin the astronomical points which I determined, adding to them the latitudes and longitudes of Aralsk (Raïm) and Ak-Djulpass, determined by M. Lemm, as before mentioned. I thought it useless to enumerate those points of which I had only latitudes without longitudes.

Astronomical Points.	Latitudes N.			Longitudes E. from Greenwich.		
	°	'	''	°	'	''
The fort Koss-Aral (by distances ☉ D)	46	1	17.7	61	1	44.6
Aralsk or Raïm) by M. Lemm	46	4	19	61	41	48
Ak-Djulpass	46	41	32	61	43	43
The southern coast of the entrance into Tchubar-Tarauz	46	44	42.2	60	30	59.6
Cape Uzun-Kair (S. point of Kulandy)	45	46	3.5	59	17	44.9
Cape Ak-Tumsuk (on the Ustyurt)	44	36	1.8	58	18	47.7
Cape Ak-Sgat (S. W. corner of the sea)	43	42	41.2	58	22	6.5
Isle Nicholas I. (southern bay)	44	59	4.6	59	16	54.6
Isle Bellingshausen	44	35	35	58	56	11
Isle Yermoloff (mouth of Djan-Dariá)	43	43	23.3	60	18	30.6
Cape Kungan-Sandau (eastern extremity of the sea)	44	52	43	61	46	44.8

V.—Notes on the Possessions of the Imaun of Muskat, on the Climate and Productions of Zanzibar, and on the prospects of African Discovery from Mombas. By Colonel SYKES, F.R.S., F.R.G.S.

Read June 14, 1852.

LIEUTENANT FERGUSSON, of the Indian Navy, at present in charge of the magnetic and meteorological observatory at Bombay, lately transmitted to me a record, during eleven months in 1850, of the indications of several meteorological instruments kept at Zanzibar. As far as I am informed, nothing of the kind has ever been before attempted, the understood extreme insalubrity of the climate for European constitutions having deterred any competent and willing person from a residence at Zanzibar for any length of time sufficient to render meteorological observations of any scientific or normal value. In the present instance, the apothecary (I believe an Eurasian, or half caste) who made the observations was compelled in the twelfth month of his residence to abandon his post, his medical duties, and his meteorology to save his life. A glance of the eye over the observations satisfied me that the atmospheric phenomena were not of a usual character for the

latitude; but before discussing them in detail, I sought in geographical works for information which might enable me to refer to local physical circumstances the cause or causes of the unusual meteorological phenomena: but I looked in vain; for, to my surprise, the information regarding Zanzibar and the N.E. coast of Africa, with the exception of the soundings along the E. coast of Central Africa, scarcely exceeds meagre phrases destitute of precision. This is the more remarkable, considering that the E. coast of Africa—at least from the Red Sea to the equator—has been known to Europeans from the earliest times. It is mentioned in the Periplus of the Erythræan Sea; in Pliny; Vasco de Gama visited the coast in his voyage to India; the Portuguese held possessions and forts for at least half a century; the French formerly visited Zanzibar and the coast of the main for slaves from Bourbon and the Mauritius; and the English and Americans continue to trade with Zanzibar. Opportunities have not been wanting, therefore, for obtaining facts upon all points, instead of “hearsays” upon most points. All that Reece’s Cyclopædia communicates is—

“That Zanzibar is an island of Africa, on the coast of Zanguebar, governed by a king who is tributary to the Portuguese.”

The modern Penny Cyclopædia, quoting Capt. Owen’s ‘Voyage to survey the Eastern Coast of Africa,’ is a little more instructive—at least as far as the region of Zanguebar is concerned; but there are very indefinite expressions about Zanzibar; for instance, it is said to be twice the size of the island of Pemba, which is represented to be 30 miles long and 10 wide; while the length and breadth of Zanzibar, from Capt. Owen’s chart, is 48 geographical miles long and 18½ broad in the widest part. Zanzibar is said also to produce every kind of grain grown in the tropics, besides great quantities of sugar, which is exported to Arabia, the Red Sea, and even to Egypt, but upon what authority does not appear. The channel between Zanzibar and the main is studded with islands, and is about 15 miles wide. One branch of manufacture is carried to a considerable extent, that of round shields 18 inches in diameter, made from the hide of the rhinoceros, which, after being soaked or boiled, can be moulded into any form; but in the general account the phraseology is frequently so indefinite that little weight can attach to the descriptions; for instance, Monteca “is little known;” it seems to be somewhat smaller than Pemba; it rises abruptly from an unfathomable depth, and is based upon a coral formation; the surface is covered with trees, and it appears to be tolerably well peopled. A little farther on, speaking of the region of Zanguebar, the account says, “the productions are various, but very little known;” yet various grains and fruits are mentioned, the sea abounding with fish, the rivers with

hippopotami, and the forests with elephants, rhinoceri, lions, and leopards; that the year is divided between the dry (which is not the fact, however) and rainy seasons: the rainy season generally commencing, *it is said*, four or six weeks after the sun has passed the zenith. Now the sun passes the zenith of Zanzibar in going south about the 9th of October, and again in going north about the 4th of March; and though there is rain in every month of the year, according to the meteorological record, yet the great falls are in the months of March, April, May, October, and November. The two monsoons, therefore, if they may be so called, would appear to be coincident with the two passages of the sun over the zenith of Zanzibar; the fall increasing, certainly, with the increasing declination of the sun for 10 or 12 degrees; but the year is plainly not divided into the dry and wet seasons. Again the heat is *said* to be very great in summer, but it is not really so, as the maximum is only 88° Fahr., and the mean temperature of the hottest month (February) is only 83°·4; while on the continent of India the heat in many places frequently exceeds 100° Fahr.; and at Bagdad, on the Tigris, in the second story of a house on the river, on the 19th of July, 1848, at 2 P.M., the thermometer stood at 122°·9, and the *lowest* heat in the month, at 2 P.M., was 101°·3; and Colonel Rawlinson has told me that he has known it at 125° in a house!

The account goes on to say that on the main land horses are not frequent, and are generally small; asses large; that cattle abound of the humped kind; sheep very small, with fat tails, and fowls very abundant; that Zanzibar is really possessed by the Sultan of Oman, otherwise known as the Imaun of Muskat, and that he has possessions, chiefly nominal, on the main, the rest of the coast being possessed by independent chiefs and tribes, Somali, Galla, Dowla, Wanyekas, and Sowhylees, of whom, however, not much appears to be known. The Portuguese, who had numerous settlements in the 16th and 17th centuries, which they abandoned, do not appear to have left any descendants, and they, as conquerors, have been succeeded by the Arabs. An explanation, however, of the frequent expressions of vagueness and uncertainty is afforded in a subsequent passage in the account, namely, in speaking in reference to the climate, that—

“during the last century and a half no European has resided there [either at Zanzibar or on the coast, I suppose] for any length of time, and therefore no meteorological observations have been made. . . . It is, however, certain that the climate is very unfavourable to Europeans, even where the country is not low and swampy.”

Expecting that Horsburgh might add something to the preceding meagre details, I looked into the sixth edition of his ‘Sailing Directions,’ but there is little to quote. He says Zanzibar has

a beautiful appearance, and is everywhere woody. He mentions that, from religious motives, European ships are not allowed to water from the wells about the town, and that watering at the river should be at low tide, otherwise the water is brackish. Capt. Owen is cited as saying that—

“the crews of all vessels, after having watered at Zanzibar, have been subject to dysentery and fever, which applies more particularly to the river-water, as that procured by digging or from wells does not appear to possess the same deleterious property.”

Horsburgh adds that—

“Europeans not seasoned to the climate ought not to sleep on shore if it can possibly be avoided.”

The third volume of the *Journal of the Royal Geographical Society*—in which is an analysis of Capt. Owen’s surveying voyage along the E. coast of Africa—affords only a short passage devoted to Zanzibar; a glance over the soundings in Capt. Owen’s charts, however, combined with notices of the shores of some of the Zanguebar islands being steep to, with deep water along shore and unfathomable depths a little way off, opens to us a remarkable physical fact, namely, that the surface of these islands consists of nests of corals, perched on the summits of submarine mountains which rise from very great depths.

The British Government have long had a consul resident with the Imaun of Muskat; the consul is also an officer of the East India Company’s Bombay army, and agent for the Company at Muskat, and in constant communication with the Government of India. The Indian Government, however, appear to have known so little about the Sultan of Oman, his dominions in Arabia or Africa, and his politics, that in March, 1844, Sir George Arthur, the Governor of Bombay, and his Council, called upon Capt. Hamerton, Her Majesty’s Consul and the Company’s agent at Muskat, to report, for the information of the Government of India, upon the political relations of the Imaun of Muskat, and to give a concise history of Zanzibar, its climate, form of government, population, trade, products, &c. Capt. Hamerton responded to this call on the 5th of September, 1844, dated Zanzibar; but the report, which is still in manuscript, is chiefly devoted to the history, politics, and conflicts of the Imaun’s government.

“The British connexion with the present Imaun commenced in 1803, when he commenced his reign at sixteen years of age, on the murder of his maternal uncle the regent. The Imaun’s father had been murdered in 1802 by the Wahabee pirates. The early years of his reign witnessed disaffection, turbulence, and rebellion, until the aid of the English, in 1820 and 1822, in destroying the Imaun’s enemies the pirates of Rass al Khymah, and the Arab tribe of Beni boo Ali, gave him some repose, and he was enabled to turn his attention to his African possessions, from which he had obtained little revenue, and that little chiefly from Zanzibar. His subjects on the main land opposed him, and his hostile operations had only the effect of driving them from the

coast, so that his authority is even now almost nominal, excepting at Zanzibar and Mombassa; for rebellion in his Arabian possessions divided his attention, and Restock, the capital where his family had resided for centuries, was wrested from him by his cousin Hamaad bin Azau. The exports from Muskat are wheats, hides, asses, a few horses, dates, and salt; and the imports comprise all the necessaries and luxuries of life."

With respect to Zanzibar and the Imaun's African possessions, Capt. Hamerton says,—

"The Imaun appears not to have estimated their great value; in fact, that the trade on the coast of Africa subject to the Imaun may be considered as not yet fully developed. The principal articles of merchandise to be procured on the main are gum copal, hides, bees-wax, tallow, corn (the Jowaree of India, *Holcus sorghum*), oil-seeds, some timber, and slaves. The chief articles of export, the produce of the islands of Zanzibar and Pemba, are cloves, cocoa-nuts, and, ere long, sugar may become of importance, as it is understood to be very fine; but as the people want energy, are proud and indolent, and addicted to abominable vices, and are of a mean description, particularly the cross between the Arab and the African, the extended cultivation of the sugar-cane and manufacture of sugar is not of early promise. The imports into Zanzibar are piece-goods, coarse cottons, woollen cloth, muskets, beads, brass-ware, iron, earthenware, hardware, glass, rice, wheat, soap, and candles, and fancy articles in small quantities. The customs are farmed to a Banian (a Hindoo of India) for about 150,000 dollars annually. There are about 500 Banians and between 600 and 700 Indian Mohammedans resident at Zanzibar and at the other African ports of the Imaun, who are the chief traders."

Contrary to all other testimony, Capt. Hamerton says,—

"The climate of Zanzibar on the coast is not unhealthy for Europeans, but it is impossible for white men to live in the interior of the island, the vegetation being rank, and appearing always to be going on, and generally fever contracted in the interior is fatal to Europeans. All fruits and vegetables which grow in tropical climates thrive well."

He adds—

"The damp during the S.W. monsoon is extraordinary. The heat is not at any time of the year oppressive, at least it certainly would not be considered so by people accustomed to the heat of India. It is remarkable, although there does not exist anything like a police, that the crimes of murder and robbery are very rare, but petty thefts are frequent. There are five persons authorized to administer justice, but the best evidence a man can produce of his innocence is *found in his own pocket*."

Captain Hamerton does not mention the size of Zanzibar.

I had lastly recourse to the Journals of the missionaries Krapf and Rebmann, of the London Missionary Society, who are now located near to Mombas, a little to the N. of Zanzibar. These Journals contain a great amount of interesting geographical information; but the primary objects and labours of the missionaries were necessarily not for the instruction of the geographer or physicist, and several days' reading only afforded me incidental notices upon some points of my inquiries; the Journals, nevertheless, open up to us a vast horizon of geographical discovery in

Eastern Africa, of which I may be permitted to say a few words in concluding this paper.

Dr. Krapf would appear to have coasted the Imaun of Muskat's supposed possessions from the Red Sea to 10° S.; the general impression being that the Imaun really was master of the coast to 10° S., but Dr. Krapf says—

“The Imaun of Muskat has not an inch of ground on the coast between the island of Wassin and the Pangani river; this tract in fact belonging to King Kmeri of Usambará down from $4^{\circ} 30'$ to $5^{\circ} 30'$ S. (vol. i. p. 203.—1850.) The tract, which is very low, is inhabited by the Wasequa tribes, and is the chief slave-market for supplying Zanzibar.”

As Dr. Krapf embarked from the Pangani river for Zanzibar, after his visit to King Kmeri, he speaks from personal knowledge. He reached Zanzibar in one day, on the 22nd of August, 1850; had interviews with the Imaun and Captain Hamerton, who were then at Zanzibar; on the 29th embarked in one of the Imaun's vessels for Mombas, and arrived on the 30th, the vessel having on board slave boys and girls belonging to a native of Mombas, who were bought at Zanzibar.

Since the above was written Lieutenant Fergusson has transmitted to me, under date 3rd May, 1852, the following account of Zanzibar, condensed from the oral testimony of a Mahomedan merchant of the island:—

“The following information relative to Zanzibar has been afforded by a respectable native of that place, who commands a ship, and is in the habit of going constantly from Bombay to Zanzibar, and *vice versa*:—

“The island of Zanzibar is situated off that deep bight or bend on the eastern coast of Africa a few degrees S. of the equator. It belongs to the Imaun of Muscat, who is said to be rather partial to the place as a residence; and when his presence is not required at the head of his army, which it sometimes is, to quiet some of the unruly tribes in his dominions, he loves to spend a life of quiet in his palace at Zanzibar, giving himself, however, a change about every other year to visit the town of Muskat, situated on the N.E. coast of Arabia, on one side of the entrance to the Gulf of Persia.

“The appearance of the island of Zanzibar, as approached from seaward, is certainly pretty, having all the charms that the tints of foliage and grandeur of forest trees can give to it.

“The town stands out in bold relief as it comes gradually in sight, although it is not of very great extent. The Imaun's palace and a large mosque are the two principal buildings which attract the eye; there are four smaller mosques, and a very large number of stone-built houses of one story high, and, as in all native towns, the whole is hemmed in by innumerable mud huts, and a common mud wall or fortification.

“In landing the appearance of the town quickly loses all the beauty which a distant view had given to it. The streets are dirty and irregular, the widest being only 20 feet; the others are all lanes. There is no drainage of any sort, either under the town or at the sides of the streets, except at the Imaun's palace and grounds, and the scavenger's duty is a voluntary one, dependent on the inhabitants themselves. There are no public buildings in the town except the arsenal, which is well stocked with arms.

“The Imaun's palace has a fine large drain or sluice running under it, and is.

further well supplied with water for the use of the ladies in his harem. The palace is well built of stone, and is three stories high.

"There is also a large wharf at the waterside belonging to the Imaun, and used solely for government purposes.

"The town may be said to be thickly populated, estimated at 200,000 inhabitants, but the majority are very poor.

"Of those that actually belong to the place there are two classes: one, the 'Mizarri,' who are rich, trade largely, and are great landowners; the other, the 'Hürth,' a portion of whom are well to do, and others only a few degrees above poverty.

"The number of 'Ceedies,' or 'Moorimā,' is immense, but these come from Africa, and do not belong to the place.

"The actual natives of Zanzibar are tall and lean, but very muscular. The women are only of moderate stature, well made, rather plump, and, in many instances, very pretty. The features both of men and women are well proportioned and defined, with fine jet-black hair and eyes, good teeth, and, in general, small hands and feet. The men all wear beards and moustaches, and the higher ranks, as also many who can afford it, dress very neatly after the Arab fashion; the poorer classes are in a state next to nudity. All classes love indolence, and the men are sadly given to intemperance and lust, but, notwithstanding this, they live to a great age; the average of life with both sexes is 50 to 60; many reach 80 and 90, and some solitary instances of 100 years are to be met with.

"The fecundity of the women cannot be correctly ascertained, as polygamy exists to such a great extent; they are, however, not celebrated for having very numerous offspring, and the average may be taken at four to five children each.

"The law permits only four wives per man, transferable, changeable, or saleable at his pleasure, but more may be had by bribing the priests, who are also the administrators of justice.

"As a man who wishes to engage a wife has to give money to her parents or guardians, according to her beauty, it may be termed, in one sense, 'a purchase.' A pretty girl realises from 100 to 200 dollars.

"Girls are married (*in fact*) at the ages of 13 and 14; the event is always one of rejoicing, and, if the means of the parties allow it, great display, with native music and processions through the town, take place; but the lady never joins the street party, and, in fact, never shows herself to any but her own intimate circle of friends and relatives and to her husband.

"The higher orders of the people are very cleanly in their habits and in their dress, but the lower classes never trouble themselves as to comfort or cleanliness.

"The food of the natives consists of poultry, eggs, dried-salt and fresh fish, mutton, goats' flesh, and rice. No vegetables are grown in the place, but small quantities are imported from other ports. Only one sort of eatable fish (unless the shark be so considered) is caught at Zanzibar, and that is but a small one, black in colour, and without scales, but said to be well tasted. The higher orders only can afford to luxuriate on mutton, goats' flesh, and the fresh fish, these being all dear and not over-plentiful.

"Bullocks, cows, and water-buffaloes are to be had at Zanzibar, but are seldom or never killed for food; they are used to carry loads (but not for draught), and are as dear as 50 dollars each. Horses are also to be had, but not of a first-rate description; they are valued at about 100 dollars each.

"All birds common to places within the tropics are to be found here, excepting the crow, which is unknown to the natives. Hawks, vultures, and eagles are very plentiful. The jungle on the island abounds with black monkeys. The tiger and the rhinoceros are occasionally to be met with, but these, as also the elephant, abound more profusely on the main land of Africa, which is

but a few miles off. A large black snake, about six to eight feet long, as also the cobra, are found in the jungle.

"Some of the trees in the jungle are very large and spreading, and afford good timber; the wood is, however, peculiarly hard and heavy, and will not float in water. It is used for building purposes, both for houses and ships, and its bark is used for tanning hides. The girth of these larger trees varies from 12 to 20 feet. Sandal-wood also abounds; also the wild citron (the fruit is large, but without flavour). Cocoa-nut and palm trees are also plentiful.

"The unhealthy season is at the close of the rains, the same as in India. The only diseases prevalent here are fever and small-pox. There are no professed doctors amongst the natives, and only one medicine appears to be known or used by them; namely, the senna-leaf. The men suffer much from swollen testicles. The natives do not burn their dead, but inter them in graves, as Europeans.

"Within the town there is a very good bazaar, or market, which is supplied with a fair sprinkling of English and French articles; the goods and wares come principally from America, Egypt, Persia, and India. They are not, however, all disposed of to the natives on the island, but are carried into the interior of Africa by the itinerant merchants of that great continent.

"The trades carried on by the natives at Zanzibar are building, carpentering, stone-masonry, ship-building, and the manufacture of inferior cotton goods and trinkets, worn by the inhabitants. We also find goldsmiths, silversmiths, coppersmiths, and blacksmiths. Large quantities of toddy (an intoxicating liquor) are made of the sap of the cocoa-nut; date, or palm trees (*Borassus flabelliformis*), the same as in India, and there is a constant demand for it in the bazaar.

"There are no public schools, or system of education, although the children of the higher orders are taught to read and write Arabic. Some of the natives speak two or three languages, but Arabic is the one generally spoken.

"The whole of the natives declare themselves to be the followers of Mahomet, but their morality is at such a low ebb that they may be considered infidels of the worst order.

"A few European missionaries visit the place occasionally; the natives do not court their society, and they are allowed to exercise their vocations without insult or molestation.

"Zanzibar cannot boast of as many exports as imports; they consist principally in elephants' teeth, dried sharks' fins and tails (caught off the island and coast), sandal-wood, amber, shells, and cocoa-nuts; also a scent obtained from the body of the civet, which fetches a high price.

"From twenty to thirty ships arrive at Zanzibar annually, some American, some French; the rest are native ships from Bombay and Calcutta; but innumerable buggalows arrive from Surat, Cutch, Cochin, the Gulf of Persia, and the Red Sea.

"The slave trade with foreigners is forbidden by the Imaun, on the penalty of death, but amongst the natives it is of usual occurrence, the Seedies, or Moorimā tribe, being bought as servants by the higher orders, who treat them very kindly. The owners of slaves have not the power of life and death over them. A few slaves (principally children) are exported to Persia every year, where they find a ready market.

"The mode of government at Zanzibar is almost necessarily a despotic one; the Imaun having the power of life and death over all his subjects, but which power (to his honour!) he has never misused. In his absence his son holds the reins of government. Justice (if it may be so termed) is administered publicly in the town by the priests, to whom all complaints and all offenders are taken; but their proneness to bribery is so publicly known that a man's doom may be decided by the magic power of money.

“Considering the nature of the people, and the vast population of the place, very few are ever tried for murder; in some years none at all; and the most ever known in one year was only ten. If, however, a man is condemned for murder, he may either give a substitute or the market value of the person he killed.

“To guard the town, and keep peace and order among the people, there are 500 police and 1000 soldiers always kept in the town for this especial purpose. The Imaun’s army in Arabia, however, consists of 20,000 men.

“The town is nearly surrounded with water, and there is good anchorage for shipping all the year round. There is also a good landing-place off the town, with a rise and fall of tide of 9 feet. Outside the town-fortifications we find a few gardens, belonging to the Imaun and opulent classes; but it is not safe to venture any distance inland alone, as there are most desperate robbers in the country all round. There are no made roads from the town into the interior, but beaten tracks are here and there visible. The country is flat for a long way in, and the soil is of different kinds in different places—sandy, stony, and in some parts good arable land. Rice is grown by the natives, and plentiful crops obtained every year.

“No precious stones or fossils have ever been found; but most beautiful shells may be gathered along the sea-beach. The hills on the main land are high, but not always visible. The coast is said to be free from pirates.

“E. F. P. FERGUSSON.

“To Col. Sykes, F.R.S., F.R.G.S., &c. &c. &c.,
East India House, London.”

It will be observed from the preceding extracts that nothing satisfactory is known of the topography, geology, number of rivers or rivulets, depth of wells, real quality of the water, forests and forest products, soils, diseases and physical characteristics of the people, and of many other matters of interest to the geographer, the naturalist, and the trader, respecting Zanzibar. In short, a comprehensive and accurate view of the territories of the Imaun of Muskat, whether in Arabia or on the N.E. coast of Africa, is still a desideratum.

With respect to the climate of Zanzibar, it is necessary to preface a consideration of the meteorological records by a notice of the instruments used by the observer, a subordinate but competent medical officer. These were standard and maximum and minimum thermometers for the temperature, wet and dry bulb thermometers for the temperature of evaporation and simultaneous temperature of the air, and a rain gauge. It is much to be regretted that the observer had not a barometer, as the necessarily high tension of vapour would have put to a satisfactory test a theory on the effect of this tension upon the height of the mercury. The observer recorded the direction of the wind and the daily amount of cloud; and in the column of remarks there is the solitary entry of a thunder-storm on the 27th of February.

MONTHLY METEOROLOGICAL TABLE for the Station of Zanzibar in Lat. 6° 28' S., Long. 39° 30' E., reduced from Observations made at that place daily during the year 1850 by a Medical Officer under the direction of Lieut. FERGUSON, I.N., F.R.A.S., Superintendent H.E.I. Co.'s Observatory at Bombay.

MONTHS.	Mean Reading of the Barometer, corrected and reduced to 32° Fahrenheit.	Mean Elastic Force of Vapour.	TEMPERATURE OF AIR.					MEAN TEMPERATURE OF AIR.		Mean Weight of Water in a Cubic Foot of Air.	Mean Additional Weight of Water required to saturate a Cubic Foot of Air.	Mean Degree of Humidity (Saturation = 1).	Mean Weight of a Cubic Foot of Air.	WIND.		RAINS.		REMARKS.	
			Highest.	Lowest.	Mean of all the Highest.	Mean of all the Lowest.	Mean Daily Range.	Mean.	Evaporation.					Dew Point.	Direction.	Strength.	Number of Days it fell.		Amount fallen.
January . .	in. 0.99587	in. 0.79188	80	85.7	81.2	4	5.83	3.79	9.78	2	9.95	0.88	0.91	lbs. 0-4	N.E.	2	2.70	4-6	
February . .	0.96888	0.79188	79	86.2	80.7	5	5.83	4.76	4.72	9	8.27	1.53	0.87	0-4	N.E.	1	2.10	4-6	27th, Thunder-storm.
March . .	1.04286	0.96888	78	83	80	3	0.81	5.80	5.79	3	10.35	0.60	0.96	0-2	Easterly, Variable.	10	6.31	4-6	
April . .	0.92883	0.92883	70	79.5	77.6	1	9.78	0.77	5.77	3	9.80	0.16	0.99	2-4	S. to S.W.	16	16.30	5-6	
May . .	0.87982	0.87982	57.5	68.0	76.8	3	2.78	4.76	8.76	0	9.44	0.10	0.96	4-6	S.W. to S.S.W.	15	39.18	5-6	
June . .	0.91381	0.91381	57.4	79	75.3	3	7.77	1.77	0.77	0	9.89	..	1.00	2-4	S.W. Variable.	3	0.55	5-6	
July . .	0.89181	0.89181	57.4	78.8	75.8	3	0.77	3.76	8.76	6	9.40	0.10	0.99	2-4	Variable. { S.W. to S.S.E. }	9	3.42	5-6	
August . .	0.88382	0.88382	57.4	78.8	75.8	3	0.77	3.76	8.76	6	9.40	0.10	0.99	2-5	Variable. { S.W. to S.S.E. }	6	3.12	4-6	
September . .	0.85583	0.85583	73	81.2	77.1	4	1.79	1.76	4.74	5	9.74	0.85	0.91	2-4	S.W. to E.S.E.	12	3.80	4-6	
October . .	0.84484	0.84484	57.6	80.8	78.8	2	0.79	8.78	5.77	8	10.01	0.35	0.97	1-3	S.W. to E.S.E.	15	11.83	4-6	8th, 17th, & 19th, Stormy.
November . .														1-4	S.W. to E.S.E.	14	8.39	4-6	
December . .																			

(No Observations for December, the person who took them being obliged to quit the place on account of ill-health.)

E. F. F. FERGUSSON.

Temperature.—In the year 1850, from the 1st of January to the 30th of November, the extremes of the temperature, as shown by self-registering max. and min. thermometers, were 88° and 73°.5; the former in the months of February and March, the latter in September: the annual range, therefore, was 14°.5. But—

The mean of all the highest readings of the max. ther. for	}	81.8
the year was		
And the mean of all the lowest readings of the min. ther. was		78.1
Consequently, the mean range for the year was only		
And the mean range for the year, deduced from the mean		3.7
monthly range in the aforesaid months, was	}	3.66
The lowest monthly range of temperature was in May, when		
it was only		1.9
The highest monthly range of temperature was in February,	}	
when it was only		5.5

Moisture.—The mean temperature of the air for the above period, deduced from the monthly means, was 79°.9, and the mean temperature of evaporation 77°.7; the mean depression was only 22°; and, consequently, the mean temperature of the dew point, by Glaisher's factors, was 76°.6. By Apjohn's formula it would be 76°.85; and as the monthly mean depressions of the wet bulb were respectively—

January	3.4	}	July	0.1
February	7.0		August	0.5
March	2.7		September	2.2
April	1.0		October	2.7
May	0.5		November	1.3
June	1.6			

—it would appear, then, that the air in the months of May, July, and August was absolutely saturated with moisture, and it could hold no more water in suspension, and yet in these three months only 30 inches of rain were precipitated; while in September, October, and November 41 inches fell. The greatest monthly mean dryness in the whole year amounted only to a depression of the wet bulb of 7°.0, which would give a dew point by Glaisher's factors of 72°.9, and by Apjohn of 73°.45, with a tension of vapour in the first case of 0.79796, and in the second of 0.81232, balancing, according to a received theory, 8-10ths of an inch of mercury; the highest mean dew point was 79°.3 in April; tension, 0.97903; equivalent to an inch of mercury.

Winds.—The winds, with the exception of the months of April, May, June, July, and part of August (during which the so-called S.W. monsoon may be said to prevail), are the land and sea breezes peculiar to most tropical shores. These latter, however, are said to have no influence in diminishing the sun's heat from those who are exposed openly to it, although

within doors and under sheds, when artificially shielded from the sun's rays, they are most reviving and grateful to the constitutions of even the natives. It is only in January and February that the N.E. wind prevails; resembling, in this respect, the Coromandel coast. In March it is from the E. (variable), and on the Coromandel coast from the S.E. In every other month at Zanzibar the wind is from the S.W. to S.S.E.

Another peculiar feature in the climatology of Zanzibar is that there is seldom any dew experienced; a fact readily explained by the very limited ranges of diurnal and monthly temperature. The air, as the table indicates, always remains hot, and always wet, and there is no sufficient lowering of temperature to cause the precipitation of dew. This quality of the air must be most prejudicial to the health of Europeans, the effects of which have been felt by hundreds in fatal fevers. Indeed, as a seaport, Zanzibar is most insalubrious; and commanders of British vessels have pronounced it unsafe to pass the night on shore, or even to remain on shore after sunset, and many fatal cases, as well as fevers and illness, have been traced to this cause.

Lieut. Fergusson recommends that commanders of vessels or other persons who intend visiting this port should pay great attention to the aforesaid fact, and that care should be taken in avoiding everything likely to derange the stomach, especially alcoholic beverages, as fever of the worst kind is almost sure to follow any derangement of stomach or unnatural excitement of the system.

Rain.—Showers of rain are experienced in every month of the year. They tend to cool the atmosphere while they last; but Lieutenant Fergusson says the after effects from evaporation have an oppressive and disagreeable effect on the lungs.

The fall of rain during the months of June, July, August, and September, the S.W. monsoon months of the Malabar coast, was only 10.89 inches; while during those months on the Malabar coast the fall ranges from 70 to 114 inches; the same wind (S.W.) blowing on the African and Malabar coasts. From the 1st to the 15th of May there was a fall of 39.18 inches, which shows that the full burst of the rain-clouds happens at Zanzibar at about the period the S.W. monsoon commences at Cochin, on the coast of Malabar; but the real S.W. monsoon of Zanzibar would appear to be in the months of March, April, and May, when 61.79 inches fell; months during which in India there is neither a N.E. nor a S.W. monsoon, and the only rain is from a few and uncertain violent, but short, thunder-storms. At Zanzibar, however, in the months of October, November (and, no doubt, December), there is a fall of rain, corresponding to that on the Coromandel coast, of 20.22 inches, although the wind is from the S.W. to E.S.E., but on the Coromandel coast almost entirely from the N.E.

The total fall of rain from the 1st of January to the 30th of November was 97.70 inches; and if we allow December the average due to it in comparison with the other months, we may estimate the annual fall of rain at Zanzibar at above 100 inches. The number of days on which rain fell, exclusive of December, was 103.

Clouds.—The sky seems ever clouded; and after the sun sets there is often a dense haze on the horizon.

In a review of the above meteorological records the following unusual facts appear:—1st. The remarkably limited range of temperature; 2nd. The comparatively high and little-varying mean temperature of the year; 3rd. The extraordinarily continuous amount of humidity, and the consequent very high tension of vapour—humidity so great that in the driest month, February, it amounted to 87 per cent., 100 being saturation; while in every other month of the year it was never less than 91 per cent.; and in the months of April, May, June, July, August, and November, the air may be said to have been constantly saturated with moisture. The measure of this may be appreciated when it is stated that in the driest month (February) it required only the weight of a grain and a half of water to saturate a cubic foot of air. Nothing approaching to these facts occurs on the shores of India even during the monsoons. At Bombay the highest percentage of humidity was 88 in July, and the mean of the year 76, in 1844. At Madras, in the same year, 83 per cent. in December (a monsoon month), and the mean of the year $74\frac{1}{2}$ per cent. At Calcutta, in 1844, in August, the percentage was 94 (in the preceding year, in the same month, it was only 85), and the mean of the year 84 per cent. At Aden, in Arabia, in 1848, the highest percentage was $77\frac{1}{2}$, and the mean of the year 71 per cent. In the tablelands of India the mean annual percentage of humidity ranges from 55 to 60. In India the only approach to the humidity of Zanzibar is met with in the cloud-capped summit of Dodabetta, in the Neilgherries, at 8640 feet above the sea; in October, 1847, a monsoon month, it amounted to 97 per cent.; and the mean of the year was 90 per cent. Not varying greatly from the latitude of Zanzibar, but far to the eastward, in the islands of the Indian Archipelago, Captain Elliott, in his magnetic survey, observed the dew points and the tension of vapour for the few days, or weeks, or months, at which he set up his observatory, and in the following table I have collected the mean maxima of the wet and dry bulb, dew point, and consequent tension of vapour, at the hours at which these maxima occur. Sarawak is nearly on the equator, $1^{\circ} 33' N.$, long. $110^{\circ} 29' E.$; but the mean maximum tension of vapour is not so great as at Keemup (lat. $1^{\circ} 22'$,

long. 125° 08'), or at Zanzibar, and the percentage or degree of humidity was less than at Zanzibar.

TABLE of the Mean Maximum Dew Points, Tension of Vapour, and Degree of Humidity, from Hourly Observations made by CAPTAIN ELLIOTT, Madras Engineers — Zanzibar excepted.

	Month.	Year.	Dry Thermo- meter.	Wet Thermo- meter.	Dew Point.	Hour.	Means of No. of Days.	Degree of Hu- midity.	Latitude.	Longitude East.
Zanzibar . . .	April.	1850	81·50	80·5	79·3	Mean of Hours.	30	96	0 28 0 S.	39 30
Sarawak . . .	July.	1846	80·2	79·4	77·8	6 P.M.	27	91	1 33 54 N.	110 29
Sarawak . . .	August.	1846	79·3	78·1	77·5	6 P.M.	19			
Keemah . . .	January.	1848	81·6	83·4	80·8	Noon.	10	83	1 21 55	125 03
Sincapoor . . .	Nov.	1848	81·7	77·9	76·5	2 P.M.	16	95	1 18 32	103 56
Catimon Island . . .	January.	1846	89·6	80·9	77·8	2 P.M.	6	79	0 59 22	103 27
Padang . . .	January.	1848	90·9	81·5	78·3	1 P.M.	13	83	0 58 58 S.	109 31
Batavia . . .	March.	1847	85·8	79·4	76·95	2 P.M.	27	33 to 37	6 09 52 N.	106 58
Cape Nicobar . . .	Feb.	1843	87·6	80·8	78·4	1 P.M.	5			
Moulmein . . .	April.	1849	100·9	83·3	76·95	Noon.	7	66	16 29 46 N.	97 45
Cocos Island . . .	Aug. & Sept.	1848	83·8	77·6	75·15	Noon.	27	84	12 05 38 S.	96 50

The limited and fluctuating periods for which Captain Elliott's observations were made do not admit of any very precise or satisfactory comparison between the continuous records at Zanzibar and his snatches of meteorological phenomena; nevertheless they are approximatively equatorial, although for various months in the year, and in different years, and on the whole we may infer that a difference of from 70' to 90' of longitude does not create any very great difference in the tension of vapour in the atmosphere, but, as far as the imperfect means of judging afford, the atmosphere of Zanzibar would seem to be more continuously loaded with vapour than any place to the eastward; this may not account for the alleged deteriorating effects upon the health of Europeans, and we must probably look to other causes of the unhealthiness of the littoral, not only of Eastern but of Western Africa; the more remarkable as this unhealthiness would not seem to characterise Sarawak, Sincapoor, or Batavia, whose physical accompaniments of low woody land, high temperature, and great moisture do not separate them much from the coasts of Africa.

It does not necessarily follow that the highest temperature of the air and the highest temperature of evaporation give the highest dew point and consequent tension of vapour: witness Batavia and Moulmein; at the former the temperature of the air and evaporation was 85°·8 and 79°·4, and at the latter 100°·9 and 83°·3, yet the tension of vapour and dew point were identical at

both places, viz. .909; and dew point $76^{\circ}.95$; while at neither place was the degree of humidity equal to that at Zanzibar.

Some previous general idea of the climate of a country which travellers, merchants, or navigators are to visit is of much more importance than is usually attached to it. It is quite as necessary that they should not be disquieted by possibly groundless fears, as that they should not expose themselves to unnecessary hazards by a misplaced confidence in a supposed salubrity. In the first case their energies are paralyzed, and what is done is done with doubt and hesitation; and in the second case a career may be cut short, which a little fore-knowledge might have averted. But it is much to be feared that a good deal of the mortality which occurs amongst Europeans in intertropical regions is partly to be attributed to the inflexibility of European habits, which does not admit of a *quasi* adaptation of food, beverage, clothing, usages, and modes of life to those of the natives whom they visit, particularly in a guarded use of stimulants, and in a careful choice of good potable water. A climate, therefore, is not infrequently wrongly accused, when the accusation ought properly to rest upon the accuser. The average annual loss of the European troops in India is about $5\frac{1}{2}$ per cent., while that of the native troops is not 2 per cent.

Dove, in his 'Isothermes,' has not any records whatever for the E. coast of Africa: he has one, however, on the parallel of latitude of Zanzibar, but 71° of longitude to the E. of Zanzibar: this place is Samarang. The mean temperature of the year is only $81^{\circ}.87$; the difference between the hottest and the coldest months only $4^{\circ}.10$, and the difference between summer and winter only $0^{\circ}.46$ —less than half a degree of Fahr. On the Niger, W. coast of Africa, lat. $5^{\circ} 9' N.$, the mean temperature of the year is $85^{\circ}.27$; the difference between the hottest and coldest months $9^{\circ}.0$, and between summer and winter $1^{\circ}.65$. At Madras the difference between summer and winter is $12^{\circ}.99$, and the mean temperature 82° . On the whole, therefore, the unhealthiness of these African littorals must be looked for in other causes than in a constant high temperature and atmosphere teeming with moisture alone. Captain Owen speaks of ships' crews being attacked by fever and dysentery when the vessels have been watered from the river at Zanzibar, but not so if watered from wells; and this offers a plausible explanation of much of the unhealthiness attributed to atmospheric causes alone; for where river water has its sources in rank swamps, or runs through luxuriant vegetation, it may be poisoned by decaying and decomposing ligneous and vegetable matters, and consequently be detrimental to health, particularly to strangers; and this applies not only to the torrid zone, but to all parts of the world where water and rich vegetation are so asso-

ciated. Major Hamerton, contrary to all other authorities, says the coast of Zanzibar is healthy, but the interior unhealthy. The missionaries Krapf and Rebmann, owing to the serious loss of life in their mission, were compelled to abandon the coast of the main and fix themselves upon the mountain of Rabbai, a few miles inland, and both there and in their journeys into the interior they have since kept their health.

I pass now to the third division of these notes, the prospects of African discovery from Mombas, and it will be necessary to give a running commentary from the journals of Krapf and Rebmann upon the bordering territories and their inhabitants. The East African mission commenced in 1844, and its location near to Mombas was accidental. Dr. Krapf had left Zanzibar in a native vessel belonging to Lanios, intending to examine the coast northwards, but having got a little to the N. of Mombas, the captain told him that in case he went farther N. at that season he would not be able to return to Zanzibar for many months, as the wind called Koss or S. wind would soon replace the E. wind, and blow for 6 or 7 months, and he therefore landed at Mombas. But Mrs. Krapf died, and himself and Mr. Rebmann were enfeebled by repeated attacks of fever in 1846, and they in consequence went over to the main land, and at a short distance from the coast located the mission upon the mountain of Rabbai, a shoulder apparently of the eastern edge of the mountainous region which rises into the eternal snows of Kilimanjaro and Kenia, discovered by Krapf and Rebmann upon the equator. Krapf and Rebmann recovered, and they pronounce both Rabbai and the interior from its elevation healthy: nevertheless, on the 30th of June, 1851, Krapf wrote to say the country fever had carried off the Rev. Mr. Pfefferdi, and had driven home the three European mechanics attached to the mission; in short, all who had belonged to it had died or been dispersed. The fever appeared to resolve itself into a low typhus. I gather from Dr. Krapf's voyages along the coast that the inhabitants who fringe it are mostly Mahomedans, forming a thin edging, but that immediately inland numerous Pagan tribes are located—Wanikas, Wakambas, Wasaquas, &c.—and N. of the equator the Gallas encroach upon the Somalis. Of the Wanikas, amongst whom he lived, he says—

“They are great drunkards, revengeful, highly irascible, sunk in venality to a terrible extent, thievish, treacherous, unbounded liars, and very feeble minded.” (April 1852, p. 72.) “They marry at 12 or 15, but both males and females are sometimes unmarried at 20 to 25. The same applies to the Jaggas of the interior; but the Jaggas have a king, and cheerfully submit to be his slaves. No woman can marry without his consent; and the men serve him as soldiers at his pleasure. The Wakamba, who reside amongst the Wanika, come from 400 or 500 miles in the interior, and remain on the coast off Mombas as agents for their countrymen, and trade in ivory. They have large

flocks of humped cattle, sheep, and the largest goats in Africa, and, as somewhat remarkable for an uncivilised people, they make butter." (March, 1851, p. 56.) "The Wakamba of the interior barter their cattle, sheep, or goats, for ivory, as more acceptable to obtain the cotton cloth, chiefly of American manufacture, beads, brass wire, red ochre, black pepper, salt, blue zinc, kenike, called Nile stuff, and cloths of colours. They have been taught the value of coin, and accept Maria Teresa dollars, which are the chief currency on the coast; also quarter Spanish dollars. On the coast the East India Company's small coin, the anna, has been introduced by order of the Imaun of Muskat. The Banians accept rupees, but at a great depreciation. The Wakamba in no way belong to the Negro, or black Nigrotic race, as distinguished from the brown or Nilotic race from the estuary of the Nile to its sources, and south of its sources as far as the Cape of Good Hope. This race (the Nilotic) differ from the Nigrotic by colour, less projecting lips, less woolly hair, shape of head, &c. The Wakamba have long hair which they twist into strings; they anoint their bodies with butter and red ochre, wear loads of beads of colours on the neck, loins, and ankles: their bit of clothing is over the shoulders, but females wear a leathern apron. The Wakambas have no king or chiefs, but patriarchy or family government obtains. They have not any images or pictures to worship. They use bedsteads of bamboo, made on an inclined plane, and do not sit on the ground, but carry a little chair about with them. They make an intoxicating drink from sugarcane. They kill their enemies, and wild animals, the elephant, rhinoceros, buffaloes, &c., with poisoned arrows. The iron of Ukambani is preferred on the coast to that from India." (March, 1851, p. 59.)

In February and March, 1850, Dr. Krapf made a voyage from Mombas S. to the extremity of the Imaun of Muskat's E. African dominions. He says—

"We anchored opposite several villages near the sea. The captain called one of them Mtotana, where I had the pleasure of meeting a considerable number of Wamamesi, natives of the country of Uniamesi, in the centre of Africa, S. of the equator. Literally it signifies 'Country of the Moon.' The people whom I met at Mtotana belonged to the tribe Ukimba; they said they had spent 3 months in coming down to the coast with ivory and slaves. They had their wives and children with them, and lived in small huts which they had erected for their temporary residence on the coast. Their features were by no means ugly; some were very tall. Of the language I understood a great deal, a fact which convinces me anew of there being one common language at the foundation of all S. African dialects." (p. 88.)

Dr. Krapf does not say anything of the health of these interior people while residing on the coast. The physical development in height and bulk of men living in equatorial regions, characteristics which Dr. Krapf and Mr. Rebmann observed also in Jaggá and Yata, is somewhat remarkable, particularly as Werne, in his ascent of the White Nile, speaks of the inhabitants of the banks beyond the junction of the White and Blue Nile as far as lat. 4° 30' N. as frequently colossal, with raised noses, and hair no more woolly than that of the Arabs of Sudan, some of the men being really handsome (page 82). These facts regarding the great physical development of inter-tropical races militate against common opinion, and there does not appear to be any counterpart of it on the continent of India, or in the Eastern Archipelago.

Between July 12 and September 1, 1848, Dr. Krapf visited the territory of Usambara, lying S.W. from Mombas, whose king was Kmeri. His route lay along the coast for some distance, inhabited by Somalis and Arabs. Off the island of Pemba, in the district of Pemba, he traversed the Wakurfi wilderness, formerly inhabited by this fierce tribe, extending from the coast of Wasseen and Zanga to the interior of Africa, with only an occasional mount towering over the plain, so that this plain would appear to bound the southern extremities of the mountainous regions of the equator. Dr. Krapf was well received by King Kmeri, and as indicative of the progress the knowledge of European arts is making in these regions, the king, on dismissing him, gave him a commission to send him some percussion caps; and on his return journey, in a hamlet at the foot of Kilulu, he put up with a Wanika, and his host served his food upon porcelain plates, with steel knives from Zanzibar.

Dr. Krapf, neither in his voyage along the coast, nor in his land journey by the coast to Usambara, makes mention of the climate or the health of the people.

Both Krapf and Reibmann penetrated also into the interior at different times to Jagga and Yata for more than 300 miles, and they both pronounce the climate to be healthy from the mountainous character of the country, and its general elevation above the sea, even at a comparatively short distance from the coast. The tribes were friendly, and they found trade carried on with the coast by means of caravans.

Mr. Reibmann has recently visited Jagga, about 200 miles inland from Mombas, in which territory he discovered the eternal snow-capped mountain, called Kilimanjaro, apparently in lat. about 3° S. and long. 36° to 37° E.; and Dr. Krapf penetrated to the Dana river, his route being to the N. of Reibmann's, and somewhat more extensive. At this point he saw another snow-capped mountain, called Kenia, apparently on the equator, and in long. 35° to 36° E. If we now consider this mountainous region continued from Abyssinia and Soudan, with its snow-capped mountains, but terminating abruptly about 6° S. of the equator, there is some reason to conclude that it is the location of the watershed of Equatorial Africa to the N., to the E., and probably to the W.; for the missionaries show that the great Dana running to the E. has its sources in the neighbourhood of the Snow Mountains. The mysterious source of the real Nile, which has baffled the explorers of all ages, and which runs to the N. through so many degrees of latitude, is demonstrably traceable to the same snow-capped mountains of Kenia and Kilimanjaro, for Werne ascended the Bahr el Abiad, the White or true Nile, to $4\frac{1}{2}^{\circ}$ N. lat., and about long. 32° ; the stream still running down from the direction of the

newly discovered Snow Mountains. The sources of the White Nile and the Dana, therefore, would seem to be within the comparatively small area of 3° or 4° of lat. under the equator, and the same number of degrees of long. between 32° and 36° E. If we now look to the western watershed of this region, the probabilities are in favour of some of the great western rivers being traceable to it, not excepting even the so-called Niger. Although no European has been to the eastward of Lake Chád in lat. 12° N., and long. 15° E., yet it was ascertained that the Shary entered the lake from the S.E., the very direction of Krapf and Rebmann's Snow Mountains on the equator; and to connect the Shary through the Lake Chád with the Quorra, alias the Niger, we have the authority of Captain Allen, R.N., who, ascending the Niger on the left bank, passed into a river much larger than the Quorra, and with a much greater volume of water, which he ascended for 100 miles, proceeding to the eastward in the direction of Lake Chád—facts which admit of the inference that this river is probably the continuation of the Shary through Lake Chád, and that the sources of the *true* Niger, in common with the true Nile and the Dana, may be found in the Snow Mountains under the equator; for the *minor* stream which runs past Timbuctoo, and has its source in Western Africa, can as little maintain its claim to be the true Niger, against Captain Allen's affluent of greater magnitude than itself, as Bruce's Nile can maintain its claim to be the true Nile since the explorations of Werne and others of the Bahr el Abiad or White Nile. Another important fact mentioned by Krapf, and which is likely to materially facilitate the labours of explorers, is, that one family of languages, with cognate dialects, exists in Africa S. of the equator, excepting I presume the Hottentot and Bushman tongues. With the advantage therefore of ready access to the interior from Mombas, with tribes evidently not hostile to Europeans, from the treatment the missionaries experienced, and with the means of travelling by caravans at least to the Wakambas, circumstances seem to combine to invite exploration in this new field, and doubtless the love of enterprise which characterizes our countrymen will, at an early period, induce some gallant heart to attempt the solution of geographical problems which have baffled inquirers for so many ages past.
