

ART. XI.—*Geographical Notices.* No. XVII.KILIMANJARO, THE SNOW COVERED EQUATORIAL PEAK OF
AFRICA.

THE proceedings of the London Geographical Society, vol. vi. No. 2, 1862, contain a very important letter from Mr. R. Thornton, F.R.G.S., (lately attached to Dr. Livingstone's Zambesi Expedition as Geologist) respecting his visit, in company with Baron Carl von der Decken to the much talked of snow-covered mountain, near the equator on the eastern coast of Africa.

The existence of such a mountain, named Kilimanjaro, was reported several years ago by the missionaries of the London Church Missionary Society at Rabbai Mpia. One of them, Mr. Rebmann, saw the snowy peak for the first time in May, 1848, and subsequently saw it again. The next year in November, his colleague, Dr. Krapf, saw the same white-topped summit. Neither of them ascended the mountain,—but the natives gave an account of their experience in going up it. They said that “the silver like stuff when brought down proved to be nothing but water,” and that many who climbed the mountain returned with frozen extremities which some ascribed to evil spirits. These reports awakened much ridicule in England. The exist-

ence of a snow peak was declared by excellent authority to be highly improbable; the story of the natives was laughed at, and the missionaries were said to have mistaken white stones and rock for snow. Dr. Petermann however and some others defended the probability that the missionaries were right, but on both sides there has been a desire to have the question settled.

At last we have a satisfactory confirmation that there is such a snow-covered mountain, twenty thousand feet high, more or less, lying almost exactly on the equator. Baron von der Decken, who had expected to follow up Dr. Roscher's explorations of the Southern central lakes, being frustrated in this plan, went north with the English geologist who had left Dr. Livingstone's party, and together they have visited Kilimanjaro, or Mount Ndjaro. Von der Decken has written Dr. Barth an account of their observations, (see *Berlin Zeitschrift*, Dec. 1861,) and Thornton has written to London. We append the letter of the latter, as we find it,—his geological observations having not yet been made public. The reading of the letter at the meeting of the Royal Geographical Society called forth some strong expressions of satisfaction from several distinguished geographers. Mr. W. D. Cooley still disputes (in the *London Athenæum*) the truth of the reports.

"Our route lay from Mombas to the southwest over the Shimba, thence northwest to the Kadiaro, then southwest to the Pare, then north to the Lake Yipe, thence through Dafeta to Kilema, where we made one attempt to ascend the Kilimanjaro, but had to turn back at about 8000 feet. We then went round by the foot of the mountain to Madjami; thence we returned by Dafeta, Lake Yipe, Pare, and the north foot of Usambara, to Wanga on the coast, which we reached on the 101st day from Mombas. We have made a tolerable map of our journey, the country through which we passed being very favorable for triangulation; though, from not being allowed to ascend the mountains of Pare and Usambara, and the want of two or three stations which circumstances prevented our taking, the map is not nearly so complete as I could wish it to be. The triangulation is checked by several latitudes and a lunar distance at Kilema. I have not yet plotted out the whole of the map, but I hope to complete and send it shortly.

Our journey, on the whole, has been tolerably successful. We did not succeed in reaching to top of Kilimanjaro; but I have its altitude from six different stations, connected by tolerable triangles, at distances varying from 15 to 50 miles. From these I believe the height of the Kilimanjaro to be about 20,000 feet. Its shape varies much, as seen from different points of view; but, from all places we have seen it, its base rises very gradually from a great plane. The outline of the top, as seen from Madjami, is a great dome (but this face is nearly flat): as seen from the east, it is conical, with the apex cut off, forming a little plane, sloping a little to the north. The southern slope of this cone is much steeper than the northern. Several miles to the northeast of the top a great conical peak rises to about 17,000 feet; and about 50 miles to the

west of Kilimanjaro a great conical mountain, named Meru, rises from the great plain of the Massai to perhaps 18,000 feet.

As seen from the east, the snow forms only a thick cap to the Kilimanjaro, with a broad tongue creeping down the south slope; and when the sun is high, several long streaks of snow are seen lying in small ravines descending from the cap. As seen from Madjami, the snow partially covers the southwest face of the dome (about a quarter the height of the mountain), but several large bare patches of rock show out above the snow. The snow here seems to lie at its steepest possible angle, so that fresh snow falling on this slide must at once slip down to the foot of the face of the dome. In one evening, at Madjami, we saw three such slips of snow in about an hour's time. On the eastern peak a few patches of snow are seen when the sun is high.

All parts of the mountain we saw are composed of lava of subaric origin. From not reaching the top, and having seen only the south-east, south, and southwest parts of the mountain, I cannot speak with certainty of its structure; but I think that the Kilimanjaro is the north-eastern part of an old subaric volcano, the southwestern and larger part having sunk down several thousand feet, and been partially broken up by faults. The great fault separating these two parts lies about northwest and southeast, and forms a very steep, long flat southwest face to the mountain; and a high, very rugged mountain mass, lying a few miles to the north of Madjami, may be the relics of the top of the original mountain.

We have not reached the axis of structure of Eastern Africa; but very far to the southwest from Kilema are seen, on a clear day, three very high rugged mountains (as high as the Meru mountain), with conical tops, which, if not volcanic—and I think their sides are too steep and shapes too irregular for ordinary volcanoes—may be composed of the axial granite.

The Lake Yipe is shallow, and rapidly filling up. You will see its size and position best when I send you our map. On its north side it receives the River Loomi (of Rebmann), and at its west end sends out a river which, after joining the Jagga river, flows south through the plain lying between the Ugoni and Anuisha ranges to the river of Pangani. Between the Kilimanjaro and Anuisha ranges is a small watershed, which sends the rivers of Western Madjami to the west.

Mr. Rebmann's map and description, as given in the first volume of the 'Missionary Intelligencer,' give a very fair idea of the country, and, considering he had no instruments, his map is very accurate."

LIVINGSTONE'S EXPEDITION.—THE ROVUMA RIVER.

1. The following letter has been published from Dr. Livingstone dated April 9, 1861. It appears in the Proceedings of the London Geographical Society, vol. vi, No. 1.

"On the 9th of April last, Dr. Livingstone's expedition arrived at Pomony Bay in the island of Johanna, from the river Rovuma. They had ascended the river only 30 miles, when, halting to load their ship, a mark made on a tree showed that the water was falling at the rate of

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6 or 7 inches a day. They had found some parts carrying no more than 5 or 6 feet of water, and as they drew nearly 5 feet, they had to return, lest they should be left fixtures till the flood of next year. The cause of this unsuccessful termination is to be attributed to various delays suffered by the *Pioneer* in the voyage out, making her at last quite two months behind the time for a successful trip up the river. After coaling, they left for the Zambesi, intending to go up the Shiré, and then make a road past Murchison Cataract on that river to Lake Nyassa. The distance is only 35 miles, and it is hoped that they will carry a boat up above the cataracts, and by that means explore the lake.

It is also in contemplation to settle the point whether the Rovuma comes out of the Nyassa, as asserted by all the people they met, before going in the *Pioneer* again to that river. The Oxford and Cambridge Mission accompany the expedition up the Shiré, and it is proposed to place these gentlemen on the plateau of 4000 feet above the sea, on which stands Mount Zomba. There they are likely to enjoy good health while pursuing their enterprise. They have had a good deal of fever, but no mortality. The healthy season begins in May.

The Rovuma will probably turn out to be the best entrance into Eastern Africa. It must, however, be navigated with a vessel of light draught, and with the same skill as is required in the London above-bridge passenger-boats. On the question whether it actually derives its waters from Nyassa, the Doctor thinks that it cannot come out of the Nyassa he discovered, but from some other lake. The reasons he adduces are: the Nyassa is already known to give off one large river the Shiré. This river never rises nor falls more than 3 feet, nor is its water ever discolored. The Rovuma rises and falls 6 or more feet, becomes very muddy, and no instance is known of one lake giving off two large rivers. The probability, therefore, is, that if the Rovuma does come out of a Nyassa or Nyanza (lake, or piece of water), it is some other than that discovered by the expedition. It is well known that lakes having no outlets become brackish in the course of ages. This is the case with Shirwa, but Nyassa and Tanganyika are sweet. The former owes its sweetness to the Shiré flowing out of it. Does Tanganyika owe its sweetness to the Rovuma?"

2. The same number of the Proceedings contains an interesting report, extending through several pages, from Mr. John Kirk, Botanist of the Livingstone expedition, chiefly in respect to such vegetable products of the Shiré and lower Zambesi Rivers, as are in demand in Europe. He reports much of this region as favorable to the growth of cotton, sugar, ground nuts, indigo and cereals. India rubber, coffee, ebony, lignum vitæ are also produced. We copy a few paragraphs on the productions of the Zambesi delta, chiefly for what it says of the cotton culture.

"The countries examined have been those bordering the Zambesi from the east coast to Sesheke, a Makolo town, situated in the centre of the African continent; likewise the valley of a tributary river, the Shiré, from Lake Nyassa to its confluence with the Zambesi near Moramballa Hill. The highlands of the Batoka and Manganja countries have also been vis-

ited. The area thus included extends over 11° of longitude and 5° of latitude; the greatest height above the sea level being 8000 feet.

The Zambesi forms a large Delta, commencing 60 miles from its mouth; the coast for about 8 miles inland is muddy, wooded with mangrove, avicennia, and other trees peculiar to such places within the tropics; the remainder of the Delta consists of rich flat alluvial lands, intersected by many branches of the river. This great tract is covered almost exclusively with gigantic grasses, which keep down all other forms of vegetation, only borassus palms, with a few figs, acacias, or *lignum vitæ* trees, being able to resist the fires which sweep over these plains during the dry season. The people at present inhabiting the Delta are for the most part fugitives; the slave trade and war have combined to desolate this rich country, which once produced corn, vegetables, and fruits in abundance. Near the coast cotton of an inch staple is found growing wild, having sprung up from seed accidentally scattered; this equals in value much of the Egyptian. Climate and soil are admirably suited, seeing that the plant succeeds so well without cultivation, surrounded by weeds. In the more inland districts it could not raise its head above the dense luxuriance of the other vegetation. The labor required to cultivate cotton here is very small, and the Delta might be made a vast cotton field by encouraging the natives to industry. Many parts of these lands are also suited for the growth of the sugar cane; a little is now raised near the coast, and succeeds well; and it might be raised in most parts even without irrigation. Besides sorghum, pennisetum, maize, setaria, eleusine, and various other sorts of native corn, the Delta also yields wheat during the cold season. Rice of good quality is also cultivated. Tropical fruits succeed well, and near the coast mangos, pine-apples, guavas, cashews, lemons, oranges, and cocoa-nuts are still found where Portuguese settlements had existed in former times.

The climate of the Delta is mild, presenting neither the excessive heat nor cold of the interior; the atmosphere is much moister, and heavy dews are frequent; the prevalence of a sea breeze renders the parts near the coast more healthy than those within the mangroves. The malaria, although an obstacle to the settlement of Europeans, is by no means so intense as that of the west coast; and we have not found a case which resisted treatment, while a cure is commonly effected on the third day. To those passing through or remaining for a short time, there seems to be no danger. But in order that this might become an extensive source of cotton, the permanent residence of Europeans is not necessary; if it were raised by the natives and purchased from them by agents, a steady supply might be depended on; but time would be needed, even under a wise government, to bring the Delta back to a flourishing state." * *

"*Cotton*.—There are two species of the cotton plant cultivated in the countries explored: one of these, known as *Tonje Kaja*, has been in existence for a long time, and may be indigenous; no trace of its introduction can be found; it is found everywhere, but is being replaced by a better sort named *Tonje Manga*, which signifies foreign cotton, and is of modern introduction, having come from the various towns on the east coast. A variety of the *Tonje Manga* is met with in the interior of the continent, but not found much further east on the Zambesi than the

confluence of the Kafué. This may have been introduced from the west coast.

The Tonje Kaja is, according to situation, either perennial or annual; on the Mangauja Hills it is an annual from 2 to 4 feet high, sown in March and gathered in August. In the valleys it forms a shrub, remaining several years in the soil. It is readily known from the other sort by leaf and seed. The cotton is of very short staple, seldom exceeding half an inch; it very much resembles wool, and adheres strongly to the seed, from which it cannot be entirely removed: this renders it much more troublesome to pick, and an iron roller is employed to facilitate the separation.

The plant is much less prolific than the other, and the only good quality possessed by it is superior strength, on which account some still prefer it. It is the most universally distributed, being seen everywhere from the coast to the valley above the Victoria Falls and along the course of the Shiré. In the region shut off from the coast by Lake Shirwa, it becomes the only sort grown; but the foreign kind is advancing from both north and south, and fast displacing it.

Tonje Manga, the sort of recent introduction, is, like the other, annual or perennial; it is superior in every respect, and attains a much greater size. The staple varies from half an inch to an inch and a quarter, has great luster, and separates from the seed, which has a clean black coat. What is now produced on the Zambesi and Shiré equals much of the Egyptian, and might be improved by the judicious selection of seed. But there is no necessity for the introduction of new seed, what is now grown on the Shiré being of good quality and very prolific. The variety of Tonje Manga found in the central African valley above the Victoria Falls and as far down as the confluence of the Kafué, differs in the cohesion of the seeds of each cell which form a mass, from the exterior of which the cotton separates easily. The plant attains a great size, and continues seemingly for an indefinite time. Among the ruins of the old town of Sesheke a single plant was measured with a woody stem 8 inches diameter and covering a space of 12 feet. This year it had yielded an abundant crop of cotton $\frac{3}{4}$ of an inch in fiber.

Having found cotton throughout the whole extent of country explored, we know what quality may certainly be obtained, while much more may be expected from careful cultivation. The only cotton seed brought by us, superior to that already in the country, was the Sea Island variety: this yielded excellent cotton $1\frac{1}{2}$ inch long when grown under the most disadvantageous circumstances, and the plant still continues at Tetté, although uncared for. Nowhere have we seen cotton which would not be worth exportation, but the best is that of the Manganja country, where the people have given it much attention; thence it might also be exported with least expense, while Europeans, settled in the neighboring highlands, could direct and superintend the natives of the valleys.

The Delta is excellent cotton ground, but unfit for Europeans, and the present population is very thin and unsettled. Beyond Kebrabassa the Zambesi valley both below and above the Victoria Falls, with the Batoka highlands, might produce a vast supply, and the Batoka hills present a healthy station for residents; but the difficulties at present connected with

the rapids of Kebrabassa render this an inferior position in which to commence such an undertaking, which is to be regretted, as the people of the interior seem more disposed to industry than those of the coast.

The specimens of cotton contained in the collection sent to the Royal Gardens at Kew exhibit fully the different qualities found on the Lower Zambesi and on the Shiré. Since then, others have been added from the interior, showing that the cotton grown there is but little inferior."

3. Following this report of Mr. Kirk, is an entertaining account by Mr. Charles Livingstone of the Batokas and the country they inhabit, lying between the 25th and 29th degrees E. long., and 16th and 18th degrees S. lat.,—west and north of the Zambesi.

YORUBA AND THE NIGER VALLEY.

The British government for a number of years past has bestowed much attention upon the commercial aspects of Western Central Africa, and especially upon the region bordering upon the Gulf of Guinea, including the Valley of the Niger and its great confluent the Benue, and also the countries west of these rivers, comprising Yoruba, Dahomey and Ashantee.

1. The expedition of Dr. Baikie up the Niger has been repeatedly mentioned in these notices. Although it gave promise of important results, we have but little information in respect to what it has accomplished and there is reason to apprehend that it has failed to perform what was expected. Dr. Baikie has been recalled by the Foreign Office, and his apology for not complying with their order has recently been made public.

2. Two intelligent men of color from this country, Dr. M. R. Delany and Mr. Robert Campbell, having visited the Yoruba district with a view to ascertain its fitness for African colonists from the United States, have done much to awaken an interest in that part of Africa and to direct the attention of observing persons to its commercial capacity. A volume published by the latter and a pamphlet by the former of these travelers have contributed to this result. Their impressions of its attractiveness to colonists are decided, and they urge upon their countrymen to go out and engage in trade and manufacture under formal assurances of welcome and protection from the chiefs of Abeokuta, the chief town of Yoruba. Since the return of Messrs. Delany and Campbell at the end of 1860, the condition of our country has been such as to absorb completely the attention of those who would otherwise have been interested in their statements. But public men in England, with their usual commercial sagacity, have been quick to recognize the opening of a new and rich centre of trade, and to appreciate the importance of establishing over it the influence if not the dominion of British power. Shortly after, perhaps in consequence of the publication of Dr.

Delany's observations, the British government seized the little island of Lagos, which is the key to the rich Yoruba lands. Since the seizure, various explorations have been made of the adjacent country. It is not the place to discuss here the political objects of these investigations, but they are well worthy of notice.

3. Captain Richard Burton, the well known traveler, having returned to England from his visit to Salt Lake City, Utah, has been appointed British Consul at Fernando Po. His energy and his practical acquaintance with the difficulties of African travel will enable him to help forward efficiently, from that post, investigations of the interior. He has signalized the beginning of his consulship by visiting Abeokuta, and making in connection with Captain Bedingfield, a minute survey of the River Ogun, on which the town is situated. His visit was made in October and November last. The mouth of the Ogun or Abeokuta he found very much choked up by the delta deposits and the growth of grass,—but beyond he found the main river, a goodly stream one hundred yards broad, skirted by fine forests and little affected by the tide. A brief account of his journey was communicated in a letter to Dr. Norton Shaw and printed in the *Proceedings of the London Geog. Soc.*, vol. vi. no. 2. His impressions of Abeokuta were not very agreeable, but he confirms the estimate of its immense size, saying that travelers have underrated its population at 100,000,—it is probably 150,000. Dr. Delany estimates the number of inhabitants at 110,000; Mr. Bowen, in his "*Central Africa*," at from 60,000 to 100,000. The extreme circumference of the walls is about 27 miles. We make one extract from Burton's short and rambling letter.

"There is no mistake, however, about cotton growing in these regions. It can be carried out all over Yoruba; a kingdom once extending from the Volta river to the Niger, and including Benin and Dahomey: but, to give it due extension, wars must cease and treaties must be made with the several chiefs. I would here correct a mistake, universally made by those who have written upon the subject. The land is not, as stated by Mr. Campbell and others, common property, nor will the people allow strangers to take it. Litigation upon the subject is quite as general as in England; and if, as Sir Culling Eardley proposes, free negroes and mulattos were sent here from America, there would follow the agrarian wars and troubles of New Zealand. Even in the towns a stranger cannot obtain building ground, except it be granted with the understanding that it is not alienated in perpetuity, but shall revert, when no longer in use, to the original proprietor.

If you want a colony in West Africa, send it to me, near the Cameroons. At some future time I will (D. V.) enter fully into the subject. Suffice it to say for the present that Lagos requires a sanatorium—the nearest now being Teneriffe and Ascension: and the Oil rivers want a

key, after losing Fernando Po. At Abeokuta the cotton is grown in the farms. I was shown the green seed or upland (short staple), and the black seed or long staple. There is, moreover, a very valuable kind, called "akashe," soft as silk. Eight seeds are sold for a penny. Before the war, the export was doubling every year; since then it has declined. The Cotton Association of Manchester exported 20,000 bales in 1859-60, and received only 3447. With the return of peace it will revive. The wars are conducted in the usual African style. Seventeen thousand men meet, blaze away with "long Danes" from the hip all the day, retire and advance, as if by mutual consent, and separate with the loss of half a dozen killed and wounded: and this stuff they call fighting! It is serious only to the allies, who, being weaker than those who assist them, are sold off by way of commissariat. The Egbas of Abeokuta are nominally fighting to defend their friends the Ijáyes against a common foe, the Ibadans. It is generally asserted that the unhappy Ijáyes have at this time lost 20,000 of their number by famine and the slave market. The real *casus belli* lies deep; the Abeokutans are determined to monopolize transit dues by keeping the northern people from the coast. Every African tribe knows that it cannot prosper without seaboard, and then the war began."

4. Commander Dolben, R. N., in H. M. S. Bloodhound, has recently visited the river Volta, which empties into the Gulf of Guinea, near Lagos, a little west of the Ogun river. He found the bed not impassable, as had been reported, but covered with eleven feet of water. Four of his boats manned by thirty nine men went up the river in October last. The party ascended the stream 120 miles when their voyage was brought to an abrupt close by rapids,

"Though impracticable to ship's boats, the rapids are not absolutely impassable, for the small strong native canoes can be forced through them to Pong, a town which is situated at their head, 5 miles above the furthest point reached by the expedition. Above Pong the Volta is again navigable. Its stream was considerable. Immediately below the rapids it had a depth of 10 feet right across from bank to bank and a width of three-quarters of a mile. The natives were a fine race of men. The climate appeared healthy; for none of the party suffered during the five days they were in the river, notwithstanding exposure and severe work. The principal products were cotton, palm oil, Indian corn, and cassava. The water of the river was palatable, and fish abundant."

DR. HAYES'S ARCTIC VOYAGE.

Dr. Hayes's engagements have been such that no full record of his voyage to the North has yet been prepared. In a private letter received from him he says that the report of his remarks published in the Proceedings of the American Philosophical Society is the most trustworthy account of his journey. "One thing," he continues, "does not appear to have been noticed which is of some national importance, though of none commer-

cially. The land which I discovered and surveyed during this cruise is the most northern land known on the globe. I have traced it to $82^{\circ} 40'$ and have planted the flag of the Union ('with not a single star erased') upon it."

METEOROLOGICAL RECORD AT KANAGAWA, JAPAN, 1860.

In the absence of much trustworthy information in respect to the meteorology of Japan, the following table, recently communicated to us in the Japan Herald, vol. i, No. 2, possesses interest. The Register was kept by Rev. Mr. Hepburn, a missionary of the American Presbyterian Board. We understand that he continues to keep a like record. It is to be regretted that a barometric register does not accompany the other observations.

Table of Meteorological Observations at Kanagawa, from 1st November, 1860, to 1st November, 1861.

	Average of Ther- mometer at sun- rise.	Average of ther- mometer at 2 P. M.	Maxim'm of ther- mometer for the month.	Minimum of ther- mometer for the month.	No. of clear days.	Cloudy days.	Rainy days.	Inches of Rain.	No. of shocks of earthquake.	Snowy days.	Inches of Snow.
1860.											
November.....	45.80	58.35	68.00	36.00	18	7	5	1.85	4	..	
December.....	38.86	50.87	71.00	22.75	19	4	7	3.40	2	1	50.00
1861.											
January.....	33.00	43.30	55.00	26.50	12	12	3	4.21	1	4	8.50
February.....	37.50	47.00	69.00	27.00	12	4	11	4.20	4	1	2.25
March.....	39.00	52.00	64.00	31.00	13	8	9	3.95	2	1	
April.....	53.00	62.30	73.00	39.00	4	11	15	9.26	2	..	
May.....	60.00	69.30	76.00	44.00	10	10	11	5.42	1	..	
June.....	69.00	79.00	88.00	60.00	15	3	12	9.33	3	..	
July.....	76.00	85.00	91.30	71.00	15	8	8	1.33	2	..	
August.....	79.00	87.00	90.00	75.00	17	4	10	4.79	1	..	
September....	71.00	87.00	89.00	61.00	13	6	11	4.54	2	..	
October.....	58.30	67.30	75.00	47.00	11	7	13	6.50	2	..	
Yearly average.	55.03	65.70			159	84	115	59.28	26	7	11.20

SCHLAGINTWEIT'S INDIA AND HIGH ASIA, VOL. II.

The second volume of the text and the second number of the atlas of the truly imperial work on India by the Brothers Schlagintweit has recently been given to the public. The text is devoted to the Hypsometry of the regions visited. It contains in all the heights of 3,495 points, of which 1,615 belong to India, and 1,880 to High Asia, the area over which they are distributed extending from the southern part of Ceylon to the environs of Kashgar in Turkistan (from 6° to 39° N. lat.) and from the Eastern boundaries of Assam to Sindh (from 97° to $70\frac{1}{2}^{\circ}$ long. E. Gr.). The authors state that of the 3,495 points above mentioned there are 1113 for which they had no other

determination than their own; of these new data 378 belong to India and 735 to High Asia. Besides these they had occasion to add 144 points, some of which were determined anew and others were points for which differential values only had been formerly given and which were now connected with the level of the sea. It is said to have been a matter of serious consideration how to arrange so large a number of heights,—and the plan finally adopted does not seem to us free from weighty objections. India and High Asia are divided into Areas, upon principles which the authors do not mention. Through each of these eleven areas, a line is drawn connecting some of the principal places, and the succession of the heights determined to the right and left of this line, follows its mean direction as indicated by an arrow. These areas are designated as meridional, longitudinal, diagonal or transversal according to the relative position of the leading lines, and are enumerated as follows:

A. India.

Area I. Assám and delta of the Brahmapútra and Ganges, with the Nága, Khássia and Gára hills, and some remarks about the Iravadi.

Longitudinal, from east to west: Brahmakúnd viâ Rajmahál to the Sänderbans.

“ II. Hindostán along the Ganges. Longitudinal, from west to east: Saháranpur viâ Khánpur to Rajmahál.

“ III. Pánjáb to Gujrát. Meridional, from north to south: Atak viâ Mithánkót to Diú.

“ IV. Central India. Meridional, from north to south: from the Ganges viâ Nágpur and Chánda to Koringa.

“ V. Dékhan and Maissúr. Diagonal, from northwest to southeast: Bombay viâ Púna and Bellári to Madras.

“ VI. Karnátik and Nilgiris, with an appendix on Ceylon. Longitudinal, from west to east: Madras viâ Bangalur and Utakamand to Kalikat.

B. High Asia.

Area VII. Himálaya of Bhután, Sikkím, and Nepál. Longitudinal, from east to west: Bhután viâ Darjiling to west of Kathmándu.

“ VIII. Western Himálaya, from Kámáon to Hazára. Diagonal, from southeast to northwest: Almóra viâ Símla and Srinaggar to Rajáur.

“ IX. Central chain of Western Tibet. From southeast to northwest: east of the Mansaráur lake to Skárdo.

“ X. Principal snow peaks of the western parts of the Karakórum chain. From east to west: east of the Namur lake to west of the lake Sirikúl.

Area XI. Transversal sections across Tibet, partially continued across the Kuenlün. *a.* Niti—Gártok. *b.* Vángtu—Pangkóng. *c.* Kárdong—Karakorúm chain. *d.* Pádum—Leh. *e.* Múlbe—Kiúk Kiol—Elchi. *f.* Dras—Shigar—Yárkand. *a-e*, are diagonal lines from southwest to northeast, *f*, is a meridional line from south to north.

These lines are considered to be situated in the centre of an area, limited by half their mutual distance.

At the conclusion of the tables of measurements which occupy the greater portion of the volume, some general remarks are made in respect to (A.) the different varieties of Elevated Habitation, (B.) the Geographical Configurations, and (C.) Physical Phenomena.

The volume of plates which accompanies this text contains several Panoramic Profiles of the snowy ranges of High Asia, and six landscapes beautifully printed in oil colors.

Following these Geographical Notices, will be found an extract from the text presenting in a condensed form the general conclusions of the authors on the Indian Himalayan hypsometry, with comparisons of the Alps and Andes.

UNITED STATES GOVERNMENT SURVEYS.

For the following information the readers of the Journal are indebted to Dr. F. V. Hayden.

The following is a brief synopsis of the contents of the several scientific reports, either already prepared or in an advanced state of preparation, for the U. S. Government :

(1.) *North-Pacific Exploring Expedition*, under the command of Commodore JOHN RODGERS, U. S. N. The war has interfered with the completion of this report, as the Commander of the Expedition, with several of his officers, are in active service on the Southern coast, and the appropriations for the department of Natural Science have ceased. The narrative by Capt. Rodgers has not yet been written. Many charts of portions of the Chinese and Japanese seas, and also of parts of the N. E. Asiatic coast to the Aleutian Islands, are finished.

The following reports on the Natural History are in progress : On the Zoology, by Dr. Wm. Stimpson, assisted by Dr. A. A. Gould, Mr. John Cassin, Dr. Hallowell, Dr. Uhler, Mr. Barnard and Prof. Theo. Gill. The zoological portion will probably comprise about 3 vols. 4to, with an atlas of plates for each.

A Report on the Botany, by Prof. Asa Gray and Charles Wright, is in progress.

(2.) *San Juan Exploring Expedition*—Col. J. MACOMB, U. S. Topographical Engineer, commanding. A very beautiful map of the region explored has been constructed, comprising Northern New Mexico and Southern Utah. The report of Col. Macomb is not yet completed, as he is at this time in active service with the Army of the Potomac.

The Geological Report by Dr. J. S. Newberry is finished. The Carbon-

iferous fossils and fossil plants are described by Dr. Newberry, and the Cretaceous fossils by Mr. F. B. Meek. The whole occupy ten quarto plates.

(3.) *Report on Wagon-road Routes in Utah Territory*, under the command of Capt. JAMES H. SIMPSON, Topographical Engineer, U. S. A. This report is quite voluminous, 2 vols. 4to, finely illustrated with plates of scenery, Indians, &c., including a narrative, itineraries, tables of temperature and weather, vocabularies of the Indian languages, maps and charts, by Capt. SIMPSON; a detailed Geological memoir by Mr. H. ENGELMANN; Palæontology, by F. B. MEEK, with 5 quarto plates of fossils; a report on Fishes, by THEO. GILL; Birds and Mammals, by Professor S. F. BAIRD; Botany, by Dr. GEORGE ENGELMANN, of St. Louis. This report has been completed for over a year, and is now in the hands of one of the Congressional Committees, awaiting the order of Congress for its publication.

(4.) *Explorations in Nebraska and Dakota, in the years 1855-56-57*, by Lieut. G. K. WARREN, Topographical Engineer, U. S. Army. Two brief preliminary reports have already been published by the U. S. Government. Whether the entire report will be printed will depend upon the action of Congress. The work will doubtless be resumed again after the war. The Report in progress consists of the narrative of the different expeditions—three in number,—Astronomical, Barometrical and Meteorological observations, and maps, profiles, &c., by Lieut. Warren; a report on the Geology of the district traversed, by Dr. F. V. HAYDEN, (completed); Palæontology; report on the Molluscan fossils, 45 quarto plates, over 1,000 figures, between 400 and 500 species new to science, by F. B. MEEK and F. V. HAYDEN, (completed); report on the Fossil plants, by Dr. J. S. NEWBERRY, about 25 plates, 4to, and from 60 to 70 species new to science; Report on the Fossil Vertebrata, by Prof. JOSEPH LEIDY, 10 plates, 4to, (prepared); Reports on the Zoology and Botany, by various authors.

(5.) *Report of the North-West Boundary Survey*—ARCHIBALD CAMPBELL, Esq., Commissioner. The field work of the survey of the North-West Boundary has been completed, furnishing data for a topographical report, embracing the country from the Pacific Coast to the summit of the Rocky Mountains, extending to the north and south of the 49th parallel, north latitude. Astronomical observations locate the Boundary at all the important points, and the surveys and actual measurements connecting these points, extending over 9° of longitude, embrace the topography on and near the line, while the reconnaissances extend to the north and south, thus affording data for the maps that are now in progress to illustrate the report. The report will consist of magnetic observations for declination, also observations for dip and horizontal intensity, made at nearly all the astronomical stations; and, finally, a magnetic survey, extending from the line near the summit of the Rocky Mountains along the usual route of travel, in a southwest direction, to Walla-Walla, crossing several lines of equal degrees of magnetic declination and dip, over a distance of four or five hundred miles.

Meteorological observations have also been made at all the camps; a continuous record kept at the principal depots, as at Simiahnoo, for three

years, and at Colville depot during eighteen months, furnishing corresponding observations for the barometrical readings taken by the different parties along the line and other routes of travel, thus affording the material not only for a report on the Meteorology of the country, but also for barometrical profiles of the different routes. The work will also be illustrated by a number of views, showing the physical character of the country.

During the progress of the work the eclipse of the sun of July 18th, 1860, occurred, and every exertion was made to secure observations as complete as possible, with a view not only to the difference of longitude along the line, but also to their value as a contribution to science. As the eclipse occurred early in the working season, and the parties were at that time in the most rugged portion of the country, it was with great difficulty that they could reach suitable points on the boundary in time. However, the two astronomical parties were able to get in position, but on account of an unavoidable accident to some of the delicate instruments, only one of the parties succeeded in obtaining observations, and these were made at Camp Mooyie in approximate lon. $116^{\circ} 10'$, west of Greenwich.

In the department of natural history reports have been finished, or are in progress, of the following gentlemen:

Botany, by Dr. JOHN TORRY; Fossil Plants, with plates of new species, by Dr. J. S. NEWBERRY; Marine Invertebrata, excepting Mollusca, by Dr. WM. STIMPSON, with plates; Recent Shells, with plates, by PHILIP P. CARPENTER; Fossil Invertebrata, with plates, by F. B. MEEK; Fossil Infusoria, Mr. ARTHUR M. EDWARDS; Fishes, with the exception of the Salmonidæ, THEODORE GILL, with plates; Monograph of the Salmonidæ, Dr. GEORGE SUCKLEY, with plates of new and unfigured species; Birds, by Dr. GEORGE SUCKLEY and ELLIOT COWES, with special monographs of the Grouse family, by Dr. S., and of the Gulls, Divers and Grelles, by Mr. C., illustrated with plates showing the specific differences of these complicated families; Report on Mammals, by Dr. SUCKLEY, with monographs of some of the smaller animals, by Prof. S. F. BAIRD; Coleopterous insects, by Dr. J. L. LECONTE, and non-Coleopterous, by Mr. P. R. UHLER; several reports on the Geology of the country explored, by GEORGE GIBBS.

(6.) *Explorations of the Upper Missouri and Yellow Stone, during the years 1859-60*, under the command of Capt. WM. F. RAYNOLDS, Topographical Engineer, U. S. A. The progress of this report has been suspended for a time, the commanding officer being on duty, as Topographical Engineer of Gen. Rosencrantz's staff. A map of the region explored has been prepared, and the Astronomical, Barometrical and Meteorological observations, with profiles, &c., are completed. The following reports are nearly ready: Reports on the Geology of the district examined, by F. V. HAYDEN; Palæontology, by Prof. LEIDY, Dr. NEWBERRY and MESSRS. MEEK and HAYDEN; Zoology, Mammals, by F. V. HAYDEN; Birds, by ELLIOT COWES; Fishes, by THEO. GILL; Botany, by MESSRS. ENGELMEN, DEWEY, SULLIVANT and TUCKERMAN; also a Report on the Ethnography and Philology of the Indian tribes of the Missouri Valley, by F. V. HAYDEN, (finished).

[It is now probable that the Government will be soon able to resume these and other important scientific labors, as soon as the discharge of the officers before engaged on them from active military service shall render it possible to go forward again with peaceful labors. It is a circumstance of happy augury for science that during the progress of the present war, the Government has found on numerous occasions the value of its labors in science, equally in the data before recorded and in the personal services of those whose experience in the various departments of scientific training in the Government service has enabled them to serve their country with an intelligible efficiency not otherwise attainable. Hereafter we have a right to expect less unwillingness on the part of Congress to the measures involving expenditures for scientific purposes. If it were needful it would not be difficult to unite the plea of science to public consideration as demonstrated by the campaign experiences of the last fifteen months.]