

ART. IX.—*Geographical Notices.* No. XIX.SPEKE AND GRANT'S EXPLORATION OF THE SOURCES OF
THE NILE.

THE great event of the year 1862, in geographical exploration, has been the reported discovery of the sources of the Nile by the perseverance and boldness of two English officers, Capt. J. H. Speke, and his associate Capt. J. A. Grant.

A telegraphic despatch from Alexandria to London brought, in May, the brief announcement, "The Nile is settled;" shortly afterward the journal of the travellers was communicated to the Royal Geographical Society, and finally, on the 17th of June last, the explorers themselves arrived at Southampton. A meeting of the Society just mentioned, under whose auspices the expedition had been sent out, was immediately called, and in it Capt. Speke made a statement full of interesting particulars in regard to the route he had followed and the discoveries he had made.

Those of our readers who have followed the progress of African exploration will remember that in 1858, Capt. Speke (then travelling in company with Capt. Burton) discovered the head of a great, fresh-water lake lying close on 3° south lat., and at an elevation of about 4000 feet above the sea line, which he at once conjectured, from its size and position, as well as from all which the natives told him of its extent, to be a principal source of the river Nile. This lake was called by the natives Nyanza, a term signifying Water, Lake, Pond, or River, to which the English discoverer added the name of his sovereign, christening it Victoria Nyanza. Being prevented at that time from putting his conjecture to the proof, Capt. Speke returned to England, and with the patronage of the London Geographical Society and the British Government, went forth in 1860, on a new expedition, having for his chief object the determination of this specific question. Reaching the coast of East Africa about the first of October, 1860, Messrs. Speke and Grant made their way to the southern point of the Nyanza, and thence going northward they traced one of the principal affluents of the Nile from its source in the lake to its union with the great river itself. This result has been heralded everywhere, in general terms, but having received Capt. Speke's own Report of the journey we prefer to place its details on record here.¹ Their sagacity, perseverance, bravery and success elicit universal commendation. We understand that a volume may be expected from the explorers at an early day, from the press of Wm. Blackwood, Edinburgh.

¹ v. Proceedings Roy. Geog. Soc., Lond., vii, 212-217.

For an illustration of the relations of the Victoria Nyanza to Lake Tanganika, and the River Shire, the reader may consult to advantage a map by Mr. Ernest Sandoz in the American Geographical Society's Proceedings, October, 1862.

Capt. Speke's narrative begins with reminding his hearers that his observations are the results of two visits to the region, and that he has not followed the river from head to foot, but has tracked it down, occasionally touching upon it. His statement blends native information with his own experiences. He then continues,—

“ After returning to Unyanyembi (the old point) 3° S. of the lake, in 1861, I struck upon a new route, which I imagined, from the unsophisticated depositions of the ivory merchants, would lead me to a creek on the westerly flank of the Nyanza, situated on the southern boundary of Karagwé. Geographical definitions were here again found wanting, for, instead of the creek to the great lake appearing, a new lake was found, called Luero-lo-Urigi, or White Lake of Urigi, which appeared to have formerly contained a considerable amount of water, but is now fast drying up. Its head lies in Urundi, and, circling round the south and east flanks of Karagwé, in form a mountain valley, is subsequently drained by the Kitangulú River into the Nyanza, but not in sufficient quantity to make any sensible impression on the perennial contents of the Nyanza basin. It is to the west and south of Karagwé that the lake receives its greatest terrestrial supply of water, through the medium of the Kitangulú River, which, in draining the aforesaid Luero-lo-Urigi, drains off the superfluous waters of many minor lakes, as the Akenyara in Urundi; the Luchuru, which is the second of a chain including the Akenyara; the Ingezi and Karagimé; and the little Winandermere, which in Karagwé lies below the capital on its southeastern corner. None of these lakes are large—mere puddles in comparison to the great Victoria Nyanza; but still the Kitangulú, after receiving all their contributions, is a noble river, low sunk like a huge canal, about 80 yards across, with a velocity of about 4 miles an hour, which appears equal to the Nile itself, as soon as it issues from the lake by the Ripon Falls. The question naturally suggests itself, What forms these lakes?—whence originate their waters? It is simply this: the Mountains of the Moon, in which they lie, encircling the northern end and the Tanganyika Lake, are exposed to the influences of the rainy zone, where I observed, in 1862, no less than 238 days out of the year were more or less wet ones. Mashondé, in the upper portion of Uganda, is the first place where, in this second expedition, I obtained a view of the Victoria Lake, called in these more northern countries Luero-White (lo-of) Luta (dead) Nzigé (locust), in consequence of the reputed fact that flights of locusts, in endeavoring to cross these waters, have dropped down from fatigue, unable to accomplish such an extended journey on wing, and, perishing in the lake, have been found dead in dense masses by the boatmen. But, like the word Nyanza, it is also applied to the Nile and its tributaries, thus confounding all inquiry. This is the explorer's greatest difficulty in endeavoring to put together the information which he hears, though it may be overcome by close questioning, even

better with the natives than with the Arabs; for whilst the former regard all rivers flowing, as we do, from head to mouth, the Arab invariably says it runs from mouth to head. In a southerly direction the Uganda boatmen go as far as the island of Ukerewé, which I saw on my first journey to Muanzae, the southern extremity of the lake; and to the eastward beyond the escape of the Nile, to the northeastern corner of Victoria Lake, where by a strait they gain access to another lake in quest of salt, possibly the Baringa of Dr. Krapf, which he, from information gained through the natives, called Salt Lake, most likely because there are salt islands on it, which reasoning I deduce from the fact that on my former expedition, when the Arabs first spoke to me of the Little Luta Nzigé, they described it as a salt-lake belonging to the great Nyanza; yet not belonging to it, when further pressed upon the subject. The Great Nyanza waters were purely fresh and sweet. They (the Arabs), like Dr. Krapf, merely narrated what they heard. As salt-islands were visited by the natives in search of that mineral, the surrounding waters naturally were considered salt by them, deprived as they were of its connecting links, which included the whole area of ground under consideration within the limits of the drainage system of the Nile. The Arabs, who, it is now very clear, had heard of everything in connexion with the science of physical geography, were enabled to connect what they had gleaned in detached fragments from it. Dr. Krapf further tells us of a river trending from the river Newey, by Mount Kenia, towards the Nile. If such is the case, it must be a feeder to the Baringa, whose waters pass off by the Asua river into the Nile, for the whole country immediately on the eastern side of the Victoria Nyanza is said by the Arabs, who have traversed it for ivory, to be covered with low rolling hills, intersected only by simple streaks and nullahs from this point in Muanza to the side streak, which is situated on the Equator, on the northern boundary of the Victoria Nyanza. Turning now again to Mashondé, and proceeding north along the boundary coast of Nyanza to the valley of Katonga, which, as situated on the quarter of the lake, is constantly in view, the land above the lake is beautiful, composed of low sandstone hills, streaked down by small streams—the effect of constant rains—grown all over by gigantic grass, except where the numerous villagers have supplanted it by cultivation, or on the deltas, where mighty trees, tall and straight as the blue gums of Australia, usurp the right of vegetation. The bed of the Nyanza has shrunk from its original dimensions, as we saw in the case of the Ujiji Lake; and the moorlands immediately surrounding are covered with a network of large rush-drains, with boggy bottoms, as many as one to every mile, even counting at one period a much fuller stream than at the present day, when the old bed was on the present surface of the water, and its breadth was double that which it now presents. The Mountains of the Moon are wearing down, and so is Africa. Crossing over the Equator altogether, the conformation of the land appeared much the same, but increased in beauty; the drainage system was found the opposite, clearly showing where in the north slope of Africa one stream, the Mweranga, of moderate dimensions, said to arise in the Lake, flowed north, and joined the Nile in the kingdom of Unyroro, where its name is changed to Thafa. Far on, another stream,

the Luajerri, followed its example; and then still further on from the center of the Lake Nyanza's coast, issued the parent stream of the Nile, flowing over rocks of igneous character 12 feet high, which the natives, and also some Arabs, designate by the simple name of "stones." I have done myself the honor to christen it the Ripon Falls, after his Lordship, who was the President of the Royal Geographical Society when the expedition was set on foot. Now, proceeding down the Nile from the Ripon Falls, the river first bisected the sandstone hills which extend continuously into Usoga above the coast-line of the lake, and rushed along northward with mountain torrent beauty; and then, having passed these hills—of no great extent—it turned through long flats more like a lake than a river, where, in Unyoro, it was increased by the contribution of the Kaffu and the Luajerri, and continued in this navigable form to the Karuma Falls in Chopi, where again, the land dropping suddenly to the westward, we saw the river rushing along with boisterous violence, but could not follow it, owing to the war which lay upon the track. It was, indeed, a pity, for by common report, not 60 miles from where we stood, the Little Luta Nzigé, which I had taken so much trouble in tracing down its course from the Lunæ Montes, with its salt islands in it, joined the Nile.

The main river was next met with in the Madi country, due north of the Karuma Falls, where it still bore the unmistakable character of the Nile,—long flats, long rapids. The southern half of the Madi was a flat, extending, we believe, to the junction of the Little Luta Nzigé; the northern, a rapid extending down to the navigable Nile, that is to say, the Nile which is navigable its entire length during the period of its flooding; and here it is that the Asua river of which we have heard, draining from the northeast corner of the Victoria Lake, joins; in a rainy season an important feeder, but when low, fordable. The first great affluent, which, indeed, is the only one worthy of remark on the left of the Nile, is the Bahr el Ghazal. The point of confluence presents the appearance of a diminutive lake at a sharp elbow of the Nile, and has hardly any visible stream of its own, whilst the great river winds round with a considerable velocity, carrying as I have said the palms with it. The second affluent in order of position, which, with all the others, is on the right of the Nile, is the Giraffe River, swirling with a considerable stream and graceful round into the parent Nile. Its magnitude and general appearance is like that of a first-class canal, inferior to the Kitangulé River, although not as much as to equal in volume one-third of the Nile at its point of junction. It is navigable to a great distance south; but where it comes from, nobody knows. It cannot be called a mountain river, as we found it full of rosets floating on its surface as in the Nile, evidently showing that both the trunk and the branch are subjected to the same alternations of sluggish flats and rapids. The third is the Southern Sobat River, which was full and navigable. In breadth it is greater than the Giraffe River, but less in velocity; so that we may infer their perennial contents are much the same. Unfortunately, the Northern Sobat was passed without our knowledge, which also being navigable, would make the Upper Sobat, that is to say, the Sobat above the Delta, of far greater magnitude than the Giraffe, unless, indeed, the three streams may be one river still further south, when in its combination the

comparison would have to be drawn with the Nile above it, which it would very nearly equal; for the Nile, with these additions, has scarcely doubled its importance, considered as it was seen from above entering the Bahr el Ghazal. The Blue River was long assumed to be the Nile only because its perennial powers were never tested. It appears to be a mountain-stream emanating in the country without the rainy zone, but subject to the influence of tropical rains and droughts, at one time full, and empty at another, or so shallow as to be fordable. The suspicion, therefore, that it was the Nile, must of itself appear absurd; for its waters, during the dry seasons, would be absorbed long before they reached the sea. But apart from this feature of the volume of the Blue River, the Nile runs like a sluice in its wonted course; whilst the Blue River, conjoining with the Giraffe and Sobat, describes a graceful sweep. The Atbara, which is the last, is in all respects like the Blue Nile, only smaller. With one more remark I will conclude. In the height of the dry season in the White River, the Blue is freely navigated, owing to the great accessions of the Giraffe and Sobat Rivers, but below the Blue and Atbara Rivers to the sea, the sandbanks obstruct further passage."

UNGER'S SCIENTIFIC RESULTS OF A TOUR IN GREECE AND THE IONIAN ISLANDS.—From the recent work of Prof. Fr. Unger, we derive the following epitome of his observations. His brief tour (March 25–June 10, 1860) was confined chiefly to Eubœa and the Ionian Islands, and the results are contributions to their Botany and Geology. He gives a catalogue of 594 species of living plants collected by him, four of which being new are described in full, *Biatora Ungerii*, *Neckera cephalonica*, *Neckera turgida*, and *Silene Ungerii*, and with them a new variety of *Evernia divaricata*. Some fossil plants were found, especially at Kumi on the east coast of Eubœa, from which place he gives descriptions and engravings of 56 species of a remarkably wide botanical range, belonging to no less than 41 genera and 29 natural orders. The fresh-water deposit which is seen here and in the northern Sporades appears also near the gulf of Smyrna, and even as far to the southeast as the Cilician Mt. Taurus. Specimens from this last locality were examined by our author and described ten years ago.

A geological and topographical chart of Corfu accompanies the work, showing the prevailing Cretaceous limestone (*kreide-kalk*) with Tertiary basins in the centre and in the south. The highest elevation is in the north, St. Salvator, 2900 feet.

Several curious natural phenomena are discussed by Unger, as for instance, that at Argostoli on the west coast of Cephallenia, where the gulf waters flow inland through narrow channels disappearing under the rocks. The force of the water in one of them is sufficient to turn the wheel of a mill which has been in operation now thirty years. Where does the water go to? He supposes it to pass by subterranean channels to the salt and

brackish springs on the eastern side of the island, which are only one to one and a half feet above the sea level. The surface of the narrow gulf of Argostoli may be so much higher in consequence of the copious springs flowing into it at its head, as well as from other causes not yet observed. Similar salt springs have been observed in other parts of Greece, as the ancient Rheiti near Eleusis, and may perhaps hereafter be traced to marine sources.

To the question whether, so far as natural characteristics are concerned, the East is susceptible of a revival of its ancient prosperity, he gives an affirmative answer, having shown by comparing ancient testimonies with his own observations that there has been no natural change there of any account.

F. P. B.

GUYOT'S PHYSICAL WALL-MAPS OF THE CONTINENTS.—A series of accurate Wall-Maps illustrative of the physical structure of the several continents, and of lesser portions of the earth's surface, has long been much desired by English and American teachers. The excellent maps which are published in Germany have never been widely introduced in this country, from the fact that the nomenclature, explanations and accompanying text are in the German language and are consequently obscure to many who would otherwise make use of the charts. At length, we have been furnished with an American series, which is not merely adapted in this respect to those who are only acquainted with the English language, but which is an original and important contribution to scientific cartography, and will be found in many particulars, as we believe, superior to other similar works.

The author of the maps is Professor Arnold Guyot, of Princeton, N. J., who has been for several years engaged in collecting his materials and in studying the best modes of presenting the generalizations of our knowledge of the surface of the earth. Two or three maps prepared by him were published in Boston several years ago, but although they were highly valued, their cost was too great to admit of their general introduction. Good as those were, the maps now published are much better fitted, in our opinion, for the illustration of geographical science. In their construction, Prof. Guyot has had the skillful aid of his nephew, Mr. Ernest Sandoz, whose ability as a draughtsman has been cultivated in the best European schools, and is all that could be desired in an undertaking of this kind. The result of their combined experience and study is satisfactory in a high degree. Each of these maps indicates by color the chief physical characteristics of the country it represents; the low lands having a green tint, the table lands brown, the mountain ranges black, and the highest peaks white. One or more cross sections are also delineated at the bottom of the map to exhibit in a still more

striking manner the predominant slopes and elevations. Besides this, the marine currents, the lines of equal temperature, the zones of vegetation and other physical phenomena are indicated.

While these maps are not deficient in details, one of their chief merits consists in the fact that what is minute and special is made subordinate to what is general and extensive. By a skillful mode of drawing, those features of a country which constitute its chief characteristics are brought prominently before the eye, while the minor features are less boldly presented. At a glance it is easy to recognize what mountain chains, table lands, or water courses distinguish one continent or region from another; while a more careful scrutiny will bring out some of the details of the structure. The object seems never to have been lost sight of, that in such general maps as these, the essential, the predominant, the characteristic, should be given in clear, bold, lines; while that which is secondary and unimportant should either be omitted altogether or delineated in a subordinate style. Consequently the maps are not encumbered with minutiae. They are eminently fitted for instruction in a class. Special topography can be acquired in hand-atlases, where an abundance of names is a merit rather than a superfluity; but in the lecture and the recitation such details are confusing to the eye and embarrassing both to the pupil and the teacher.

In addition to the exhibition of natural phenomena, the chief political divisions and the principal towns are also indicated on these maps, in a manner which does not obscure the physical features. The lettering is also well managed. Names are sufficiently frequent but are so printed as not to crowd the map, and indeed so as not to be read at the distance of a few feet. By devices of this kind, a great deal of detail is introduced without overrunning the map, and destroying the simplicity and clearness which are so important.

We have seen completed of this series only the maps of South America and the United States, but we understand that others are ready for publication. (New York: C. Scribner, 1863.)

PROF. WHITNEY ON THE HIGHEST MOUNTAINS OF THE UNITED STATES AND OF NORTH AMERICA.—Prof. J. D. Whitney, Superintendent of the California Geological Survey, discusses briefly in the California Proceedings, ii, 219, the question “which is the highest mountain in the United States and which in North America?” His conclusion is that *Mt. Shasta*, the height of which according to the barometrical measurements of the California Geological Survey, is 14,440 ft., probably overtops all other peaks within the limits of the United States. *Mt. Hood*, sometimes called the loftiest peak of the Cascade Range, is probably not so high as *Mts. Shasta*, *Rainier*, or *Adams*, and by no

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means entitled to the supremacy of the chain, although one of the highest points in it. Dr. Vansant's trigonometrical measurements in 1860 are reported to have given the height of Mt. Hood as 11,934 feet.

Mt. St. Elias has generally been considered the highest mountain in North America on the authority of Malespina's manuscripts, discovered by Humboldt in the archives of Mexico, which assign to it an elevation of 17,854 feet. The following circumstances, in the view of Prof. Whitney, justify us in believing that Malespina's measurements were grossly incorrect.

"In the first place," he remarks, "La Perouse measured this mountain in 1786-8, and made it only 12,661 feet high; again, on the English Hydrographical Charts, it is given at 14,970 feet. But, secondly, Vancouver, in his description of the mountain, says expressly that the snow line does not descend very far down its sides, which would be an absurdity, if it was really 17,000 feet high in a latitude of sixty degrees. It is probable that the height given by the British Charts, probably from Captain Denham's measurement, is nearer the truth; and, if so, then St. Elias is nearly 3,000 feet lower than Popocatepetl, and also lower than several other points in Mexico, and lower than Mt. Brown and Mt. Hooker, in British Columbia, according to the usually adopted figures, viz: 16,000 and 16,750 feet. But, it may be said with truth, that these figures given by Douglas are of little value, and that they are considerably above the real heights.

In regard to the height of the Mexican volcanoes, there is no uncertainty. They have been carefully measured by Sonntag, whose barometrical observations agree with the trigonometrical ones of Humboldt, made more than fifty years before. According to Sonntag, Popocatepetl is 17,783 feet in height, and must, therefore, be allowed the honor of standing at the head of the mountains of the North American continent."

PROF. J. D. WHITNEY'S SURVEY OF CALIFORNIA—PROPOSED MAPS.—The California Geological Survey is likely soon to give us much more precise information respecting the physical geography of that state than can now be obtained from all other sources. The following extract from a communication to the California Academy by Prof. J. D. Whitney, the State Geologist, exhibits what has already been accomplished.

"California is covered by a vast net-work of mountain ranges, separated by comparatively narrow valleys, with the exception of those of the Sacramento and San Joaquin, which do not, together, cover more than one-fifteenth of the area of the State. The remaining fourteen-fifteenths may be called mountainous, as the valleys include but a small portion of its surface. Into this mountainous region no accurate surveys have ever been carried; even the General Land Office work stops at the base of the mountains. A few ranch lines have been run among the moderately elevated portions of the Coast Ranges; but, as a general thing, the genuine Mexican grants were limited to the plains.

Without considerable topographical work in connection with the geological survey we should, then, be entirely unable to carry on our geological work with any pretense to accuracy, as we could neither locate our observations nor make our descriptions of the country intelligible. The authority for doing something for the increase of the geographical knowledge of the State is found in the clause of the act authorizing the survey, which requires "proper maps" to accompany the reports.

What has been done, up to the present time, in this department may be briefly recapitulated as follows:

A series of maps, forty-nine in number, has been compiled by Mr. Hoffman from the original documents at the United States Surveyor-General's Office; the scale of these is half an inch to the mile. They contain a compilation of nearly all that is known at that office in regard to the geography of the State. The maps, as thus blocked out, have been used by us in the field, by filling in the topography wherever our route has laid.

The maps which have been or are now being prepared for publication are:

1st. A map of the vicinity of the Bay of San Francisco, on a scale of half an inch to the mile, four feet by three; it extends from near Santa Cruz on the south to Napa on the north, and from the Pacific to Corral Hollow, east and west. The area of land which it covers is 4,248 square miles, which is just twice that of the State of Delaware, and only lacks two hundred square miles of equalling that of Connecticut. As near as can be ascertained, it contains one third of the population of the State, and has about thirty inhabitants to the square mile—the average density of the population of California being but little over two to the square mile. This map, on which all the details of the topography are given, as minutely as the scale allows, is nearly completed, and will be soon ready for the engraver.

2d. A detailed map, on a scale of two inches to the mile, of the vicinity of Mount Diablo; this is about two and one-half by three feet in dimensions, and includes the most important coal mining district yet known to exist in the State. The map can be made ready for the engraver in a few days.

3d. A map of the Coast Ranges, from the Bay of Monterey south to Santa Barbara. It is about three feet by two and one-half in dimensions, is on a scale of six miles to the inch and embraces about 16,000 square miles of territory. To complete it will require about another year's work in the field with two sub-parties.

4th. Map of the Washoe silver-mining region—three and one-half by two and one-half feet in dimensions, on a scale of two inches to the mile—and extending over all the important mining ground of the district. This map is from an accurate trigonometrical survey by V. Wackenreuder; it is nearly completed.

5th. Map of the Comstock Lode, on a scale of four hundred feet to the inch, completed.

6th. Map of the central portion of the Sierra Nevada; scale not yet determined on. Extensive surveys have been made by Mr. Wackenreuder for this part of the work, and these will be continued during the present season.

Of the above mentioned maps, Nos. 1 and 2 will accompany the first volume of the Report. Nos. 4, 5, and probably 6, the second volume.

It is intended, if the survey is carried to completion, to construct a final map of the State on a scale of six miles to the inch, in nine sheets, each about three feet square.

In addition to the regular topographical work, an extensive series of barometrical observation has been made, for the determination of altitudes, some two hundred and fifty important points having been ascended and measured. The most interesting operation in this department was the determination of the height of Mount Shasta, which, by an elaborate series of observations, we found to be 14,440 feet above the sea level. This is the first of the lofty volcanic peaks of the Sierra Nevada which has been accurately measured.

In the department of geology proper, our explorations have extended over portions of forty of the forty-six counties into which the State is divided; and when it is remembered that the average size of a county is equal to half that of the State of Massachusetts, (California having just twenty-four times the area of that State,) some idea of the magnitude of our work may be obtained. The chain of the Sierra Nevada may be parallelized with that of the Alps for extent and average elevation; while the Coast Ranges are nearly as extensive as the Appalachian chain of mountains.

We have obtained a pretty clear idea of the general structure of the Coast Ranges from Los Angeles to Clear Lake; the vicinity of the Bay of San Francisco has been worked out in considerable detail, including all of San Francisco, San Mateo, Santa Clara, Alameda, Contra Costa, and Marin Counties, with portions of Santa Cruz, Solano, Napa, and Sonoma. Considerable field-work has been done in the Sierra Nevada, chiefly in the lower portion of the range between Mariposa and Shasta Counties. Our observations have also been extended to the Washoe Region, and we have received considerable collections of fossils from the Humboldt Mining District, (known by this name on the Pacific Coast, but designated on Warren's Map as the "West Humboldt River Range," and in longitude 118°) by which we have been able to fix the age of the formations in that region."

RECENT AUSTRALIAN EXPLORATIONS.—Some months have passed since we have made reference in these pages to the important researches which have been making to discover the physical structure and natural characteristics of the interior of Australia. From the Lond. Geog. Soc. Proceedings (iii, 82), to which we are indebted for so much information that illustrates the progress of British enterprise, we draw the following extracts.

"1. *Explorations from Adelaide across the Continent of Australia*; by J. McDOWALL STUART.—This expedition proceeded along the previous route until they reached the point attained by Mr. Stuart in 1861, from which he was obliged to retire in consequence of the inability of his small party to penetrate further.

The dense scrub that had in 1861 formed an insurmountable barrier was penetrated after six weeks' incessant labor, and the other side was reached in safety and without loss.

On getting into clear country again and taking observations, they found themselves in lat. $16^{\circ} 40'$. Ten miles further on, or lat. $16^{\circ} 30'$, they struck on a large river, apparently a branch of the Roper River, which they followed down until its confluence with the main stream, known as the Roper River. They found that it took its source in some rocky and hilly land, through which they crossed several creeks running in a northeast direction, until they reached the table-land in lat. $13^{\circ} 50'$ and in long. $132^{\circ} 30'$. They crossed this table-land and came upon a large river with a strong current, running through well-grassed country, admirably adapted for grazing and agricultural purposes. The river ran in a northwest direction, and the party followed its course for a considerable distance, until in lat. $12^{\circ} 50'$ and long. $131^{\circ} 40'$ it changed to due north. On this course they travelled for about 30 miles, and then struck due east for about 10 to 15 miles; after which due north to the seaport in Van Diemen Gulf, which was reached on the 24th of July, 1862; and on the following day they planted their flag on the beach amid great cheering from the party.

The point on the coast reached was a promontory marked on the Admiralty Charts as being 30 miles east of Cape Hotham.

The river, which they followed, ran about 40 miles parallel with a river marked on the map as the Adelaide, the difference in the longitude being only from 6 to 12 miles. Stuart passed through much good country, well fitted for agricultural and pastoral purposes. Leichhardt had previously seen this tract, and noticed it in terms not less favorable. Even in the scrub water seems to have been found in sufficient quantities to satisfy the wants of all the party, including the horses, obviating any necessity for carrying a supply from camp to camp beyond Newcastle Water.

They were not nearly so fortunate on the return route, being more than two whole days before they obtained a necessary supply—the only occasion on which they were inconvenienced by its want.

Their provisions held out till the latter part of their journey, when they were compelled to sacrifice three of their horses for food.

Mr. Stuart met M'Kinlay at the Kapanda Station; and at the Adelaide Station Mr. Howitt's party were among the first to welcome him home after his laborious but successful mission.

2. *Exploration of the Interior of Australia*; by Mr. LANDSBOROUGH. —Mr. Landsborough, who had previously (*Proceedings*, vol. vii, p. 5) explored southwesterly for 300 miles, started from the Gulf of Carpentaria on the 10th February, 1862, following the Leichhardt for some distance, and turning off near the falls in a direction E.S.E. over a grassy country. This terminated in some picturesque hills, among which it was thought that a sheep establishment would be well placed. Beyond the hills there was more wood and less pasture. The Flinders was crossed on the 19th, followed for some time, and finally left on the 1st March in lat. $20^{\circ} 3'$. Near Mounts Little and Brown the river is deep, and seems perennial. The country is probably thinly inhabited, as the

first native was seen on 1st March. The rains in this month were heavy, and rendered the ground soft and difficult. The pasture continued good, with sufficient wood for fuel; but the country would not bear a great amount of live stock, and both water-tanks and annual grass sowing would be necessary. While still on the Flinders a blue range of mountains was visible, and named Branston Range; another mountain was named after Frederick Walker. On the 22nd March the party encamped on the Jardine Creek, an affluent of the river which they had followed so long. On the 26th, while tracing out the neighboring creeks, draytracks were seen, probably those of persons who have occupied Bowen Down, a district discovered two years previously by Mr. R. Buchanan. On the 29th the party reached Landsborough Creek, leading to Thomson River, where Landsborough came upon an old camp of his own. About lat. $22^{\circ} 58'$ they also fell in with some fine looking natives, who said that they had seen an exploring party, but no camels. Further on the natives possessed some iron tomahawks, which they said they got from another tribe on the river to the southward. Continuing their course in a S.S.W. direction, and partly under the guidance of natives, some of whom, however, seemed disposed to be hostile, the party on the 15th April reached a creek which they named Dunsmore, and which led them on the 17th to Cooper River. The country passed through and explored during the next four weeks in the neighborhood of the same river was generally of an indifferent character, and towards the east the horses on more than one occasion suffered from want of water. Marks on many of the trees showed that it had been visited. On the 21st of May they reached the station of a settler on the Warigo River; and thence passed by Bumaranah on the Darling on the 2nd of June, to Menindie and Melbourne by the usual route.

3. *Explorations in the Interior of Australia by the Burke Relief Expedition, under Mr. J. M'KINLAY.*—The South Australian Burke Relief Expedition was originally organized with the view of ascertaining the fate of, and affording relief to, that portion of the Burke expedition which perished upon Cooper Creek, after achieving the task so unsuccessfully undertaken by previous explorers. It left the South Australian capital on the 14th of August, 1861, and reached the confines of the settled districts on the 26th of the following month. On the 27th of September the party, consisting of nine whites and two natives, with twenty-four horses, four camels, twelve bullocks, one hundred sheep, and dog, crossed Lake Torrens, and fairly commenced their arduous task. Though not at that period occupied, the country to the north of Lake Torrens had been visited by many of the settlers upon the southern margin; and one of them undertook to guide the party to the first of a series of fresh water lakes, about fifty miles in advance. It took several days to reach Lake Hope, as the heat of the weather completely knocked up the bullocks; but by the aid of the camels the expedition was extricated. During the stay of the party at the lake district, an excursion was undertaken with the view of ascertaining the truth of a report that some whites were living upon a raft in one of the creeks in the vicinity. On the banks of the creek were marks of a

European encampment; the dung of camels proving that it must have been one of Burke's, while *en route* to or from the Gulf to Cooper Creek. The remains of one of the party, since ascertained to be Gray, and showing traces of a violent death, were found slightly covered with earth and boughs; and at a little distance two holes very like graves. A subsequent visit to Cooper Creek left but little doubt about the fate of Burke.

In the course of December the main camp moved to a double lake, called Appocaldradille. From this point a scout was undertaken to both north and east without finding water for 50 miles. The party consequently moved on to a deep creek, called Appanbara, where, however, they endured much suffering from heat and bad water. After the first rains in February, it was thought practicable to traverse the stony desert. For some days the route lay along a creek called 'Cariduro' (probably Eyre Creek of Captain Sturt), where several traces of Burke's party were found. At this period of the journey the main difficulties were due to the floods, which rise very rapidly, and render the whole country a sea either of water or of treacherous mud. Forced by the flood to continue a northeast direction, over an undulating stony country, the expedition came at length to vast grassy plains, bounded by volcanic hills, among which were obtained some of the most striking views on the journey. On the 7th of May the party reached the gorge through which the Leichhardt flowed towards the Gulf. On the 20th the camp nearest the sea was made, at a point where the tide rose 8 or 9 feet, and where sea anemones floated past in large numbers. On the 21st the expedition commenced its return *viâ* Port Dennison; and on the 2nd of August, after great fatigues and the loss of most of the cattle, the first station in the settled districts was reached."

DR. LIVINGSTONE'S RECENT EXPLORATION OF THE NIASA LAKE.—The following synopsis of a recent communication from Dr. Livingstone respecting his explorations of one of the Lakes in Southern Central Africa, is taken from the London Geographical Society. (Proceedings, vii, 18.)

"*Exploration of the Niassa Lake*; by DR. LIVINGSTONE and his Party.—After establishing the members of the University Mission in the neighborhood of Mount Zumbo, Dr. Livingstone proceeded with his party to explore the Lake Niassa. They carried a four-oared boat in three weeks past Murchison's Cataracts, which extend through 35 miles of latitude, and launched her on the upper waters of the Shiré. They entered the lake on September 2, accompanied by a score of natives, and explored its western coast for 200 miles, travelling until they were compelled to return from want of food, due to the recent extermination of the northern coast tribes by savage warfare. Part of the expedition went on foot and part in the boat: the latter were never able to cross the lake or venture far from shore, owing to the suddenness and extraordinary violence of the storms. They ascertained its breadth by rough triangulation, whenever the haziness of the air allowed the opposite shore to be seen, but no certain knowledge was obtained in regard to its northern extremity. The lake has something of the boot shape of Italy: it is narrowest at the

ankle, where it is 20 miles, and broadens gradually to 50 or 60 miles. Its western shore presents a succession of sandy bays, each divided from its neighbor by a bold headland, with detached rocks extending some distance out to sea. Much of the land adjacent to the lake is low and occasionally marshy: it is tenanted by water-fowl and some elephants. Eight or ten miles from the shore are ranges of high and well-wooded granite hills, nearly parallel to its course, and presenting in several places a magnificent succession of distances. The intervening plane narrows towards the north; where Dr. Livingstone turned, it disappears altogether. The depth of the lake is readily to be traced by the changing color of its surface. A belt of bright green water fringes the shore, and varies in breadth from a few yards to several miles: beyond this is the deep blue water of the body of the lake. A sounding-line of 200 fathoms was found insufficient to reach the bottom one mile from shore. The temperature of the water is 72° Fahrenheit; its rise in the rainy season is 3 feet. Five affluents were seen on its western coast, of inconsiderable size: their united volume was far inferior to that of the waters of the Shiré.

Natives, of essentially one tribe and language, throng the southern portion of the lake. Their villages are so close together as frequently to form a continuous line of habitations. They are hard-working fishermen and good cultivators of the land: they were reasonably civil to Dr. Livingstone's party, and exacted no dues for the right of transit. The slave-trade is unfortunately active. An Arab had built a "dhow" (boat) on the lake, in the latitude of Ibo, for the purpose of ferrying slaves across. Dr. Livingstone's present endeavor is to transport a steamer to the Niassa for the purpose of checking this traffic as far as may be practicable, and also with the object of further exploration."

EXPLORATION OF THE RIVER VERMEJO, IN THE ARGENTINE CONFEDERATION—MR. PORTER. C. BLISS.—The Argentine Confederation lately sent an expedition up the Vermejo River, one of the principal branches of the River Parana, to examine its capacity for navigation and the advantages of the districts which it drains, for commercial enterprise. Connected with the party was a young scholar from New England, Mr. Porter C. Bliss, who was especially charged with inquiries relative to the Indians upon the route. For such investigations he was unusually fitted, having long paid particular attention to the characteristics of the aborigines of the Continent. A correspondent of the New York *Daily Times*, writing from Buenos Ayres, Sept. 28, 1863, reports that Mr. Bliss has returned to that city with an abundance of new and important information in respect to the region which he has visited. Among the subjects to which his attention seems to have been directed, is the adaptation of the country to immigrants, for whom it presents many attractions. It is suggested as a favorable home for the freedmen of the South. From our personal acquaintance with Mr. Bliss, we shall look with interest for a full and authentic statement of his observations.