

THE GOVERNMENT SCIENTIFIC EXPEDITION.

THE voyage of the Challenger over and round the world, and her deep-sea exploration, are concluded. The learned Professor who so ably conducted the scientific portion of the Expedition has received the honour of knighthood, and whatever may be said in depreciation of that distinction, there are but few who have so worthily earned it as Prof. Sir Wyville Thomson. But, although the voyage is ended, and the members that composed the able staff, both official, as connected with the navy, and scientific, are scattered, the interest taken in the voyage has by no means diminished, and the issue of another Report by the Lords Commissioners of the Admiralty, opportunely enough, almost coincided with the return of the vessel, and since our last notice (No. 2503) the voyage has been completed from Japan; but, previous to leaving that country, a dredging cruise was made in the Inland Sea, the result of which was not very satisfactory, animal life not being very prolific.

On the 16th of June last year, the Expedition left Yokohama, and commenced sounding across the Pacific. As the United States Expedition, the Tuscarora, found, the depth is very great (nearly 4,000 fathoms) within a comparatively short distance of Japan, and then it varied between two and three thousand fathoms, until a position was reached nearly in a straight line from Japan, in lat. 38° 9' N., long. 156° 25' W. A serious loss in trawl-rope and trawls occurred on this part of the voyage; on three different occasions the line broke, and 2,000, 1,400, and 3,700 fathoms were lost, and what was also of consequence, a thermometer that had withstood the enormous pressure at a depth of 4,500 fathoms was accidentally broken.

The Challenger now proceeded south to the Sandwich Islands, finding a depth of nearly 3,000 fathoms until nearing the island, the sea-bottom consisting of the usual deep-water red clay. On the 27th of July, the Expedition arrived at Honolulu, and remained a fortnight, and then went to Hawaii, where an interesting excursion was made to the Volcano Kilinea. The vessel then proceeded to the Society Islands, carrying a line of soundings, varying from 2,350 fathoms to 3,000 fathoms, on the way, the bottom temperature varying but little the whole distance, it being about 33½°. On the 18th of September, the Challenger reached Tahiti. A visit was paid to Point Venus, and the tamarind tree said to have been planted by Capt. Cook.

After a pleasant stay of a fortnight, the Expedition proceeded on its voyage, making a southeasterly course from Tahiti to 40° S. On this section there was much the same irregularity in the depth as to the northward of the group, the depths varying from 2,000 to 2,600 fathoms, the deepest water being in the most southerly position, viz., in lat. 40° 3' S., long. 132° 58' W.: from this position a course was made for Juan Fernandez, the depth of water becoming less as the ship proceeded to the eastward.

On the 13th of November, the Challenger anchored in Cumberland Bay, Juan Fernandez. The visit was made to this island to enable the scientific staff to collect all the information they could, and many specimens, ornithological and botanical, were obtained. The island is wooded almost to the summit, and the myrtle grows luxuriantly in all parts; a great number of goats were seen, but they were very wild. Since the time of the old buccaneers, the island has been a penal settlement for the Republic of Chili; but it having been abandoned as such, about fifty people find a living on this lonely and out-of-the-way spot. From Juan Fernandez the Challenger went to Valparaiso, where she arrived on the 19th of November. Some valuable statistics on the temperatures of the Ocean are appended to the Report by Staff Commander Fizard, from which the following notes are extracted.

Throughout the North Pacific Ocean, and over a portion of the Southern, the temperatures at the bottom do not differ from that at the depth of 1,500

fathoms; thus, in the western part of the North Pacific, the temperatures at the bottom are almost identical with those obtained at 1,500 fathoms. In the fourteen series of temperature soundings taken, the difference was only 0.4°. On seven of these occasions, the thermometers gave the same results at 1,300 or 1,400 fathoms. It is, therefore, evident that the minimum temperature of that portion of the Pacific between the Admiralty Islands and Japan is to be found at a depth of 1,300 to 1,500 fathoms, and from this it would appear probable that this portion of that ocean is cut off from the general circulation at about those depths by a submarine ridge connecting the two groups of islands through the chain of small islands, the Bonin, Ladrones, and Carolines, to the equator.

In the section from Japan, east to 155° W., eighteen deep soundings were obtained; in six of these, the temperatures were the same at the bottom and at 1,500 fathoms, and in the other twelve they were higher at that depth than at the bottom, but the extreme difference of the bottom temperature varied only 0.5°, the mean temperature being 35° 1'. At the depth of 1,500 fathoms the range was 1° and the mean results nearly 35° 4', so that it may be concluded that the minimum temperature is at the bottom.

A third section in the North Pacific, or that between the parallel of 35° N. and the equator, shows the extreme difference of the bottom temperatures as 0.4°, and the mean reading 35°, and, at 1,500 fathoms, the mean reading is 0.3° higher, enabling us to assume that the minimum temperature is at the bottom.

In the South Pacific, from the equator to 40° S., the minimum temperature was found at the bottom, and, in the eastern part of the same ocean, or from 132° W. long. to Valparaiso, the minimum temperature was also found at the bottom, and, therefore, not cut off by any submarine ridge from the polar waters to the depth ascertained.

From the Admiralty Islands, for the distance of a thousand miles to the northward, a mass of water, with a temperature exceeding 80°, extends from the surface to a depth of from fifty to ninety fathoms; below this warm surface stratum, the temperature decreases very rapidly (at one place it changed 15° in eleven fathoms), until, at 300 fathoms, it was nearly constant at 45°. This isotherm was found at that depth from the Admiralty Islands to 15° N. long.; northward of this the surface water gradually cooled, and the isotherm of 45° sank to 400 fathoms, whilst that of 40° was constant at 500 fathoms between the parallels of 15° and 26° N. In lat. 31°, this isotherm of 45° rose to 300 fathoms, lowering all the temperatures above it, but, adjacent the coast of Japan, it resumed its position at 500 fathoms.

In the section running nearly east from Japan, the isotherms were found nearly parallel, excepting over a narrow belt of cold water.

In the north and south section to the Sandwich Islands, the surface temperature gradually increased as the Sandwich Islands were approached, and the temperature of the water was affected to a depth of 200 fathoms; beneath this, the increased temperature appeared to have a very slight effect.

From the Sandwich Islands to lat. 9° N. the isotherms rise slightly, and, at that latitude, are considerably raised, due probably to the excess of rainfall; but, from that position to Tahiti, they steadily descend.

In the section from Tahiti to lat. 40° S., the temperature changes from 78° at Tahiti to 54½° at 40° S.; but, notwithstanding this change, the isotherm of 40° retains the same depth—500 fathoms; above that depth the isotherms gradually rise as the surface temperature cools. The isotherm of 35° follows very nearly the contour of the bottom.

From lat. 40° 3' S., long. 132° 58' W., to Mocha Island, on the coast of South America, the isotherms are as nearly as possible parallel.

Tables are appended to facilitate a comparison of the temperatures in the western part of the North Pacific with those obtained in the central part, and also of the maximum and minimum tem-

peratures observed in both oceans with the relative depth.

THE ALBERT NYANZA.

Trieste, July 14, 1876.

WILL you allow me to draw the attention of geographers to the last details concerning the Mwtan, or Albert Nyanza, supplied by the energetic Col. Gordon? You are aware that Gessi, one of his people, has circumnavigated, in nine days, with two lifeboats, the great western reservoir of the Nile; and that the result has been to verify Capt. Speke's position and dimensions, about 140 by 50 miles. You also know that the Nile, after issuing from the lake, forms a remarkable fork, of which one branch flows to Kerri. Here Col. Gordon was stationed in May, 1876, expecting the thirty-eight ton steamer to take him to Magunzo. The other half trends to the north-west, and its line still awaits exploration. But this may be new to you. The north-western fork either rejoins the Nile in N. lat. 7°, and E. long. 30° 20' (Greenwich), where a strong stream, navigable for some distance, enters the river of Egypt, and thus Kerri would become an island. On the other hand, both its direction and its levels allow it to form the Welle river, which joins Barth's Kubanda, and, should such be the case, it establishes the theory of my eminent friend Dr. Schweinfurth, that the Albert Nyanza is drained by the Welle. If this be fact, it will forward the civilization of the country, while adding much to the inconvenience of the actual explorers, whose labours must be greatly protracted; and geographers will note another African novelty, a lake with a single issue feeding two distinct river-systems.

But the most important, and to me the most interesting, result of the circumnavigation is the following. No river which is not dry in the dry season enters the Albert Nyanza. The south end is shoal, and growing a forest of the ambatch plant, which flourishes only in eighteen inches to two feet of water. On the other hand,—and note this,—the distinguished explorer says, "There may certainly be a chain of lakes and marshes leading from Lake Albert to Tanganyika, for Gessi distinctly says the ridge of mountains on the west coast does not join those on the east coast of the lake. Thus there is a gap."

Some months ago I published my suspicion that the Tanganyika is a lake with two outlets—remember that it lies in Africa, "which ever beareth some new thing." Sir Samuel Baker, when we last met, after detailing the native accounts of its connexion with the Albert Nyanza, suggested that the passage might be blocked up by papyrus and other water-plants, a familiar phenomenon on the upper Nile. Lieut. Cameron's admirable journey has established the watershed to the west. It would be one of Africa's primest marvels if two of her great lakes be proved each to feed two completely different watersheds. Meanwhile we impatiently expect "more light."

RICHARD F. BURTON.

GEOGRAPHICAL NOTES.

In the forthcoming number of the *Geographical Magazine* will be published a sketch-map of the seat of war, containing only those names of places which have become prominent through recent proceedings. It will also contain the continuation of Mr. Ravenstein's elaborate paper on Migration within the British Isles, illustrated by six statistical maps.

Dr. Yakshich, of Belgrade, a great authority on the subject, estimates the population of European Turkey, exclusive of the Principalities, at 8,000,000, of whom 3,000,000 are Slavs. Add to these latter 1,500,000 Servians and Montenegrins, and we have 4,500,000 Slavs amongst a total population of 9,500,000. The number of Mohammedans is estimated by the same authority at 3,350,000; and although these are inferior in numbers to the Christians, they possess all the advantages to be derived from holding the reins of power.

The alleged massacres of Bulgarians have led