

The Biology of the Suez Canal.

THE Cambridge and Royal Society Expedition which set out last September to investigate the biology of the Suez Canal (see NATURE, October 4, p. 520) arrived at Suez at the end of the month, and at once went under canvas on the shores of the Bitter Lakes, being provided with boats, etc., by the generosity of the Canal Company. Here the members remained for four weeks, afterwards proceeding to Suez for a like period. They are now at Ismailia living on a house-boat lent by the Canal Company, this being towed from place to place as desired. Later they propose to move to Port Said for the last four weeks of their stay.

The Bitter Lakes, which are about 36 kilometres long by 12 broad, becoming much narrower to the south, yielded surprising results. There is a central area of about 6 fathoms, that overlies an extensive salt bed. This is covered by black mud, which proved to be absolutely devoid of life, although the density and temperature of the water immediately over it are relatively little higher than elsewhere; it may be presumed, however, that the salinity of the Lakes must have decreased since the Canal was opened. This deeper ground merges into extensive areas of shallower waters (0-3 fm.) by the shores, the surrounding land being almost typical desert. The waters were investigated in 1882 by Keller, who found them almost devoid of life, while Fox now writes enthusiastically as to the richness and variability of the organisms of this shore region. Keller found no anemones or echinoderms, 1 species of crab, 2 sponges, and a very few worms, while Fox records anemones as very common, also a few alcyonaria, echinoderms represented by sea urchins, starfishes, brittle stars, and holothurians, many species of crabs and sponges, with an abundance of worms and representatives of most other groups of organisms, including excellent soles. Bare sand, almost devoid of life, is found in patches, but most of the bottom is covered with a rich growth of algæ and phanerogamic plants. There is a striking average increase in size of some of the individual species of animals as compared with those which Fox previously collected for research purposes at Suez, the most striking being a large black *Synapta* about 45 cm. long as compared with the usual length of 25 cm. There proved to be considerable diversity of fauna and flora off different shores of the Lakes, and contiguous patches of the bottom were often found to carry different plants and animals, so that the mapping out of the bottom regions proved a task of great difficulty.

"The salt pools on the shores," writes Mr. Fox, "although interesting, have been disappointing owing to the poverty of their fauna. All contain one fish and one gastropod, both species in great numbers. There is no plankton and no other animal. The fish and mollusc both feed on algæ. The surprising thing is the high salinity which the fish and mollusc endure. My hydrometer registers 1000 in distilled water, 1204 in saturated salt solution. The Red Sea off Suez is 1031, the Bitter Lakes 1035-1045. These fish and molluscs

live happily in 1175." (These are relative figures that may require adjustment for temperatures, etc.)

At Suez the Expedition has been mainly concerned with collecting the fauna and flora for comparison with those of the Bitter Lakes. Exact data as to temperatures, salinities, acidities, etc., have been obtained. There would seem here to be greater variability in the bottom life as compared with the period antecedent to the opening of the Canal. For this reason the Expedition has confined its work to ten selected stations, mostly with soft bottom, only once having visited the "coral" reefs which lie about 3 miles to the south. The greater part is sand; phanerogamic plants are uncommon, and algæ almost absent. The latter, however, occur abundantly under the piers, and Mr. Fox discusses how far the general absence of algæ in the Gulf of Suez may be due to an inhibition produced by the intensity of light, the possibility of this as the chief factor being largely discounted by the strong growth of plants in the Bitter Lakes. The Expedition has also studied with great care the organisms attached to vessels, to piles, and to buoys, cleaned on known dates, and has put out wooden floats. These latter should give data both as to the factors helping in the distribution of the organisms and as to the rates of growth of many forms.

In his comparison of the two regions he has so far studied, Mr. Fox concludes that the fauna on the piles of piers is equally abundant, "but the shallow bottom and coast fauna is more abundant in the Lakes. It seems to me that the richer Lake fauna may depend on the bottom, which is mostly sand mixed with mud. On this the phanerogamic weed grows in abundance and gives cover to animals. Further, detritus feeders like mud. In the Bay of Suez, on the other hand, the shallow bottom is more often sand. There are small areas of sand in the shallows of the Bitter Lakes, and these are devoid of weed and very poor in animals, as at Suez. The difference in richness then may be due to a difference in bottom. The striking facts about the lakes would be that (1) the higher salinity does not prevent a rich varied fauna, (2) it does not inhibit growth in size, (3) there are peculiar effects, such as the sex of *Neptunus*, almost all males."

The work of the Expedition has clearly been much expedited and made far pleasanter by the kindness, generosity, and personal interest that has been taken in it, not by the directors alone, but by all the officials of the Canal Company. They have lent boats and camping equipment, carried mails and helped in the commissariat. The head of the Coast Guards has lent launches, and the officials of the Government have uniformly been friendly. The Canal Company clearly has an area under its control of great scientific interest, if periodically examined. The present Expedition can only, at most, map out its different faunistic regions, and it will remain for a further expedition to examine these quantitatively, so that science may get the full value of the present enterprise.

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