Letters to the Editor.

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Biology of Lakes in Kenya.

WESENBURG-LUND, Thienemann, and others have for years been emphasising the need for more detailed studies of tropical fresh waters. Having recently

The alkali reserve of Lake Naivasha, expressed in normality, was 0.004 (cf. Cambridge tap water 0.0042 N.), but instead of calcium, as in English hard waters, the base was sodium derived from the surrounding alkaline lavas. This may have had a specific effect, as in increasing concentrations the alkalinity appeared to effect a marked reduction in quantity of both fauna and flora. The other lakes illustrated this, since their alkalinity increased in the order: L. Baringo (0.01 N.), Crater Lake (0.11 N.), L. Elmenteita (0.22 N.), and L. Nakuru (0.27 N.). This increase raised the hydrogen ion concentration from pH 9.0 to about pH 11.2. Lake Baringo contained Crustacea, Rotifera, insect larvæ, and fish, and also *Microcystis* sp., but no higher plants were seen. The three others, 'soda' lakes, contained chiefly Rotifera and insect larvæ, Lake Nakuru having apparently only one species of *Brachionus*. They were further characterised by the presence of a very abundant blue-green alga, *Spirulina* sp., in the plankton and an entire absence of shore vegetation, which was replaced by foul, barren mud, largely admixed with flamingo excreta.

On these 'soda' lakes there are two classes of birds. The first are occasional visitors only, such as pelicans, gulls, and ducks; the second and most important are the flamingoes (Fig. 1), of which vast flocks formed a striking pink border to the green water. Examination in May of some flamingoes' stomach-contents showed them to have been feeding almost entirely on the *Spirulina*.

Whether or not this association persists throughout the year cannot be stated, but these microphagous birds must always be dependent upon some such 'water-bloom' as that observed, and they

FIG. 1.—Lake Nakuru, with flying flamingoes.

been enabled, through the help of the British Association and the Percy Sladen Memorial Trust, to make a short investigation of some lakes in the Rift Valley in Kenya, I may summarise here some of my observations.

Lake Baringo, lying just to the north of the equator at an altitude of 3000 feet, was visited once, while Lakes Nakuru, Elmenteita, and Naivasha, and a small crater lake lying about 2° to the south, at an altitude of more than 6000 feet, were examined more fully.

The temperature conditions found at the higher altitude approached those of temperate regions, but diurnal changes were more marked, complete inversion occurring in the shallower waters, as shown below:

Depth.	7 A.M.	9.30 A.M.	Noon.
0.5 m.	18.2° C.	18.5° C.	21.5° C.
1.5 m.	18.6	18.5	20.0

Lake Naivasha was the least abnormal and perhaps approached most nearly the 'oligotrophic' type. It contained planktonic Entomostraca and Rotifera, of which quantitative hauls taken at a number of depths showed concentration in the lower layers by day. The phytoplankton contained a species of *Microcystis* and various diatoms, while successive zones of aquatic plants, such as *Potamogeton* sp. and *Myriophyllum* sp., extended more than half a mile from the shore and sheltered an abundant fauna. Fish, recently introduced, were numerous, and bird-life was rich and varied.

FIG. 2.—Lake Baringo. The shore is barren, but the Marabou stork, which comes to fish, can be seen.

must play an important part in the bionomics of these lakes. It may be tentatively suggested that diatoms, although comparatively scarce at the time of the investigation, may be sufficiently abundant at other times of the year to form their staple food.

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