

working the change-over switch the navigating officer is able to detect, from the strength of the signals in the coils, which side of the cable his ship is on, as the signals will manifestly be loudest in the coil nearest to the cable.

The greatest length of leader cable in use is forty miles. For a longer distance than this it would be necessary to pay special attention to decreasing the continuity resistance of the cable and the capacity between the core and earth in order to reduce the current attenuation. This would probably lead to a very expensive cable being required. So far experiments have not been

carried out in a greater depth than 30 fathoms, but there is evidence that as the depth of water increases, the strength of signals to one side (say 300 yards) from the cable does not decrease so rapidly as is the case directly over the cable, but the motion of a ship does not materially affect the reception of cable signals by her. It is also possible for a ship to receive visual signals, instead of audible ones, from a leader cable. In that case electric lamps are lighted by the current from the cable. But the visual system has not been developed to such a practically useful stage as the system described above.

Lake Victoria and the Sleeping Sickness.¹

ONE need not yet have reached extreme old age to remember something of the extraordinary interest excited by the discovery of the great Victoria Lake and the unveiling of the

important work, which was carried on under the auspices of the Tropical Diseases Committee of the Royal Society, involved a residence of about four years on one or other of the numerous islands which stud the northern part of the lake, preceded by a stay of some months at Jinja, on the mainland. The outbreak of war in August, 1914, caused an unfortunate interruption in Dr. Carpenter's labours; for the exigencies of active service kept him employed in various parts of German and Portuguese East Africa until November, 1918, when he was released from duty and returned to Uganda.

In spite of this and other intermissions, the author has been able to put upon record, as Prof. Poulton remarks in his preface, a really wonderful body of observations. The earlier chapters of his work contain a useful *résumé* of our present knowledge of the natural history of *G. palpalis* in its relation to other factors which contribute to the spread of the disease, such as the presence of game. It is needless to say

that for the greater part of this now intimate knowledge we are indebted to the admirably devised and painstaking observations and experiments of Dr. Carpenter himself, as may be seen at greater length in the official reports of the Sleeping Sickness Commission. It is satisfactory to know that the author, as a result of his careful study of the habits of the pest, sees some hope, if not of exterminating the fly in certain regions, yet of diminishing its numbers to a point at which it may cease to be dangerous. This, it appears, can be done by constructing artificial shelters which are highly attractive to the fly, and systematically destroying the pupæ that are formed therein. An alternative plan, viz. the extermination of the Situtunga antelope (*Tragelaphus Spekei*), the



FIG. 1.—Fly beach on Damba Isle; a favourite breeding ground is under the bushes at the gap on the right. From "A Naturalist on Lake Victoria."

sources of the Nile by Speke and Grant. A wide field for the imagination was opened up by the news of a vast expanse of water, second only to Lake Superior among fresh-water lakes, in the interior of the African continent. Dr. Carpenter's narrative enables us to substitute reality for romance, and to make the acquaintance of a country of great beauty and charm, marred, unfortunately, by the terrible plague of sleeping sickness.

The main object of the author in his visit to the great lake was the investigation of the bionomics of *Glossina palpalis*, the tse-tse fly which carries the trypanosome of sleeping sickness. This

¹ "A Naturalist on Lake Victoria: with an Account of Sleeping Sickness and the Tse-Tse Fly." By Dr. G. D. H. Carpenter. Pp. xxiv+333+2 plates. (London: T. Fisher Unwin, Ltd., 1920.) Price 28s. net.

natural reservoir of the trypanosome, is pronounced by Dr. Carpenter to be impracticable.

His descriptions of the sights and sounds of the lake and its islands give a lively idea of the interest of the naturalist's surroundings. "The colouration," he says, "in the bright sunlight during one of the clear days characteristic of the heavy rains is really wonderful in its brilliancy. From high ground one looks over the top of vividly green forest towards distant purple islands set in a sparkling deep blue lake, which is stirred into white-capped waves by the prevailing south-east breeze. So clear is the atmosphere at this time, especially in the evenings, that from Bugalla Island some of the individual houses at Entebbe, on the mainland, twenty-five miles away, could be distinguished with the naked eye."

Some of the voices of the night are thus described: "The thunderous snortings of hippos, the muffled bark of the *Situtunga*, break in upon the continuous shrill tinkling sound, curiously suggesting sleigh bells, produced by thousands of small frogs along the shore. Crickets chirp all round and in the house, and during the rains one enormous species, sitting just inside the mouth of its burrow, makes the earth resound with a continuous high-pitched buzzing."

The last seven chapters of the book contain a

mass of valuable observations on the fauna, especially of the group of islands south of Entebbe, and of the Sesse archipelago in the north-west portion of the lake. The chapters on the insect life are of especial interest, more particularly the minute account of the wonderful mimic, *Pseud-*



FIG. 2.—The raised beach of Ngamba cleared of vegetation up to the edge of the forest behind. From "A Naturalist on Lake Victoria."

acraea eurytus, in relation to which Dr. Carpenter's criticism of the mutation theory will be read with interest. The book is well illustrated by photographic views and other plates, which are excellently reproduced. F. A. D.

Industrial Research Associations.

IX.—BRITISH BOOT, SHOE, AND ALLIED TRADES RESEARCH ASSOCIATION.

By JOHN BLAKEMAN.

DURING the year 1918 a few prominent Northampton business men felt that it would be advantageous to encourage scientific research in connection with the boot, shoe, and leather industries. The Northampton Boot Manufacturers' Association was approached and promised support, as also did the more prominent leather manufacturers; but at first it was intended that only a local research scheme should be set on foot, conducted jointly by the Northampton boot, shoe, and leather manufacturers. The Research Department was asked for advice, and the secretary, Sir Frank Heath, having attended a conference at Northampton on September 24, 1918, urged strongly that a British Research Association for the boot and shoe industry should be established which should be national in its scope, and should work in co-operation with the Government Department. It was also decided that a separate association should be formed for leather manufacture, but that the Boot

and Shoe Research Association should invite leather manufacturers to membership, as they would have many problems in common.

The Northampton Boot Manufacturers' Association promised an annual subscription of 375*l.* for five years, which has been raised by a levy of 7*d.* each on the average number of employees, while the minimum subscription for any firm is three guineas per annum. The council of the Research Association has undertaken that the total contributions from members shall be not less than 500*l.* per annum for five years, and the Research Department will then contribute a sum equal to that contributed by members up to a limit of 1500*l.* per annum.

The association began in Northampton as a local effort, and its organisation has consequently centred round the Northampton Technical School. The work that has been accomplished so far has been made possible only by having the equipment and staff of the technical school available. The