

arrangements will be published when we have completed the examination of the long-range particles from the active deposits of actinium and thorium.

L. F. BATES.

J. STANLEY ROGERS.

Cavendish Laboratory, Cambridge,
September 15.

The Intermediary Hosts of the Human Trematodes, *Schistosoma hæmatobium* and *Schistosoma mansoni* in Nyasaland Protectorate.

I HAVE received a letter enclosing two tubes containing specimens of five species of fresh-water molluscs from Capt. W. H. Dye, Medical Officer, Karonga, Nyasaland, British Central Africa. Capt. Dye writes: "I think I can say that the enclosed specimens represent all the fresh-water molluscs to be found in this district, as I have searched most thoroughly."

Capt. Dye was able to infect two of the species experimentally with *Schist. hæmatobium* and *Schist. mansoni* respectively.

The molluscs have kindly been identified as follows by Mr. G. C. Robson, Zoological Department, Natural History Museum, S. Kensington.

- (1) *Lamistes affinis*, Smith (full grown and young).
- (2) *Vivipara robertsoni*, Frauenfeld.
- (3) *Limnæa natalensis*, Krauss.
- (4) *Physopsis sc. globosa*, Morelet.
- (5) *Planorbis sp. near sudanicus*, Martens.

Capt. Dye writes of (4) *Physopsis sc. globosa*, Morelet: "They are very common in the marshy pools, although rather difficult to find owing to their predilection for the muddy undersides of reeds, etc., and their habit of dropping off when the plant is touched. They appear to attract *S. hæmatobium* readily, and large numbers of miracidia disappear out of the tube in which they are put, against the control."

Capt. Dye goes on to describe in detail the experiments he made. He finds that the mollusc dies in two days when heavily infected with the miracidia of *Schist. hæmatobium*; after taking precautions to keep the water as free from decomposition matter as possible. The experiments were repeated several times with the same results. The snails were "not killed by *Schist. mansoni*, but one cannot get such concentration of eggs from fæces as from urine."

As to *Planorbis sp. near sudanicus*, Martens, it is referred to as "the one and only species of planorbis in this part of the world (I have most thoroughly searched). This species is not killed by a heavy infection of *Schist. hæmatobium*," but was "infected from a good heavily infected stool with *Schist. mansoni*."

Capt. Dye sent specimens of infected snails, but they died *en route* and were too decomposed for sectioning on arrival. He appears to have discovered that *Physopsis sc. globosa*, Morelet, is the intermediary host of *Schistosoma hæmatobium* in Nyasaland, and possibly he has also found the intermediary host for *Schistosoma mansoni* in Nyasaland (*Planorbis sp. near sudanicus*, Martens).

The other snails which he sent had, he stated, no attraction for either *Schist. hæmatobium* or *mansoni*.

J. B. CHRISTOPHERSON.

London, W.1.

The One-Host Life-Cycle of *Hymenolepis fraterna*, Stiles, of the Mouse.

IN the recently issued third volume of "The Practice of Medicine in the Tropics," edited by Byam and Archibald, Drs. Clayton Lane and Low call in question

(on pp. 1821-2) the one-host account of the life-cycle of the well-known tapeworm *Hymenolepis fraterna*, Stiles. This account is principally based upon the work of Grassi and Rovelli and Joyeux, and it is of considerable interest and importance to be certain of the facts, not only because the vast majority of tapeworms in the higher animals most certainly require two hosts in order to complete their life-cycle, but also because these facts have a practical bearing upon the problem concerning the mode of transmission of *Hymenolepis nana* in man.

To ascertain the truth of the matter I have during the last three months selected from a large number of tame mice thirty-four individuals which I have had under close observation for periods varying between 33 and 55 days, during which the fæces had contained no *Hymenolepis* eggs, and from which it may be concluded that the mice were free from *Hymenolepis* infection. On July 20 I infected twenty of these mice with large numbers of *Hymenolepis* eggs obtained from naturally-infected mice, leaving the other fourteen mice as controls. Of the twenty mice infected, eighteen were found to contain cestodes in various stages of development when examined from five to twenty-four days after, one (examined only three days after) probably contained cysticeroids, and one only had apparently remained uninfected. The controls remained uninfected. Since these experiments were conducted under conditions which rendered it impossible for fleas, house-flies, or other animals to serve as intermediate hosts, and since all other necessary precautions were taken, it must be concluded that the one-host account of the life-cycle of *Hymenolepis fraterna* is the correct one. The details of these experiments will be published in full at the earliest opportunity.

W. N. F. WOODLAND.

Wellcome Bureau of Scientific Research,
London.

Polar Climate and Vegetation.

DR. STEFANSSON'S proposition, as put forth in his letter to NATURE of August 4, p. 162, that if either pole of the earth were situated in a lowland area the winter snowfall would be insufficient to produce a permanent ice-cap, is fundamentally based upon the fact that the Arctic lowlands of Canada and Siberia, with a mean annual temperature far below the freezing-point, are yet free from a summer snow-cover and permanent glaciation. This proposition is tantamount to saying that the inner north polar area is permanently glaciated because it happens to be sea, and the south polar area because it happens to be a plateau 10,000 feet high.

That this is essentially a sound conclusion will, I think, appear on a little reflection. Around the North Pole sea-ice forms during the six months night in such quantity that barely half of it can be melted during the six months day, with the consequence that even in July the mean air temperature (as given by Mohn) does not rise above +30° F., or 2° below the freezing-point, while the mean January temperature drops to -40° F.—an extreme "continental" range of temperature at a low general level conditioned by the vast expanse of floe-ice amounting to some two-thirds of the area of the polar sea. On the other hand, the mean July temperature of the Arctic lowlands varies with locality between 40° and 60° F., and, as pointed out by Dr. Stefansson, heat spells of 90° in the shade commonly occur.

The great summer cold of the Antarctic Plateau is at first sight more difficult to understand than the less severe summer cold of the Arctic Ocean. The