Diagnosis of Ankylostomiasis.

THE publication before us¹ aims at giving a connected account of copious and careful work already published in the *Indian Journal of Medical Research*, and since in certain instances it is only the conclusions originally drawn which are now reproduced, their validity cannot be estimated except by reference to the original record.

Since all scientific work on ankylostomiasis must rest on accurate diagnosis, great attention is paid to the direct methods by which this is obtainable, namely, to detection of ova and collecting of worms. The former was undertaken mainly by microscopic examination of the centrifugal deposit from a strained faecal suspension, but partly by a special modification of the commonly used concentrative principle inherent in the employment of a heavy salt solution in which hookworm ova float and other faecal matter sinks.

For the particular floatation technique described, it is claimed that it loses only 7 per cent. of ova as against a loss of 50 per cent. or more entailed by other methods, the control employed being apparently the first-mentioned technique. Regarding the control, Mhaskar himself finds it inaccurate in that, in the one instance noted, subsequent floating of a counted smear increased the countable ova by 14 per cent. The extraordinary inadequacy of these controlling counts is, however, shown by the reviewer's figures, hitherto undisputed, indicating that the average addition required to this particular form of control is not 14 but more than 30 per cent. He finds, too (the report is now in the press), that in his hands Mhaskar's floatation technique indicates an ovum content from one-tenth to one-sixth of that which another, namely, direct centrifugal floatation, shows to be certainly present.

It is of interest to refer here to a compilation by Dr. Khalil,² who advocates a technique embodying yet another modification of the floatation principle, a saturated solution of common salt being used to float up ova in the inverted cone formed by an Erlenmeyer flask, coarse faecal matter having first been strained off through a fine sieve. Clearly the intention is that the rising hookworm eggs should become concentrated upon a small area, their removal to a small examination area being thus facilitated. The technique is held to ensure detection of mild infections. It is entirely uncontrolled.

Now the only recorded effort hitherto made (by the present reviewer) to control the effects of floatation in an inverted cone showed that the number of ova recovered from the surface was, on the average, one-tenth of those which a control count indicated as present in the faeces employed; and it has since been shown, as noted above, that that particular control underestimated the ovum content by an average of more than 30 per cent. It is not then possible, without evidence offered of the ovum content of the faeces used, to accept as accurate this new gravity floatation method in an inverted cone. Presumption of its inaccuracy lies in the many instances here reported where it detected a solitary ovum, whereas, as the available evidence suggests, there were indeed present some twenty or thirty, detectable by adequate means; and in the fact that while 40,000 examinations by the admittedly inadequate smear or centrifugal precipitation methods showed an infection percentage in different parts of lower Egypt of 48 to 97, that obtained in the one village tested by the new technique was only 16.6.

The particular importance of accurate and controlled examinations in Egypt lies in its being apparently the only country in the world where extensive human hookworm infection is limited to *Ancylostoma duodenale*. It offers, therefore, unique opportunities for determining whether, as, for example, in ovum output and reaction to treatment, ankylostomiasis and necatoriasis differ—whether there be one ankylostomiasis or two.

Regarding diagnosis by collecting the worms passed after the administration of an anthelmintic, Mhaskar failed to find males in a tenth of cases which were passing fertile eggs, and females in 71.6 per cent. of 500 cases, also passing fertile eggs. His conclusion that intensity of infection cannot be gauged by the number of ova found on a slide, though inevitable on his premises, is not necessarily correct.

It is further concluded, without qualification, that betanaphthol thymol and carbon tetrachloride have a fleeting effect on oviposition, their administration rendering diagnosis by search for ova untrustworthy for four days. But the original table, if analysed, shows that in 227 cases treated, 129, or 57 per cent., were not cured; and of the uncured 18, or 14 per cent. only, showed this temporary inability of the diagnostic method employed to detect ova. On the other hand, of the 98 cases reasonably presumed cured (for ova were not found in their stools after the third day) 48, or 51 per cent., showed ova during one or more of the first three days. Clearly all factors have not been considered in drawing these conclusions.

The line of treatment used for tea estate labour illustrates vividly the features of the procedure at present fashionable. In one group of estates there was instituted the popular mass treatment without diagnosis. Betanaphthol was administered by scooping it up in a measured spoon. It was concluded that as regards 50 grain doses for an adult "it is safe, and even a mistake in excess of the maximum dosage advised is not followed by any serious inconvenience; not much care is required in prescribing this drug, nor is any after-supervision necessary." There is no cross reference under this comment to the following incident. On the next set of tea estates, examination of 104 faecal specimens showed 94 infected. Mass treatment was accordingly administered without further diagnostic examinations. Of 1400 persons treated as described with betanaphthol, 2 died and 37 became gravely ill, with the symptoms of poisoning already described in the *Indian Medical Gazette* by Orme and by Corteling, and for Brazil by Smillie. Two men, that is, died of poisoning by a drug administered for an infestation, of their individual possession of which there is no evidence. The betanaphthol was proved to be chemically pure.

In the matter of prevention, which is of course summed up in the word soil-infection, it is shown that larvae identified as those of hookworms persisted in trenched nightsoil for 13 to 14 weeks, and in the surrounding soil for 6 to 9 weeks; but it is concluded that larvae do not migrate from the place of development. Larvae found in the soil after 16 weeks were held in all cases to be non-parasitic, for it is stated that, apparently in some 14 experiments, counted numbers of these larvae were placed in a drop of water left lying on the skin of the forearm for half an hour, and that every one of these larvae was afterwards pipetted off and accounted for.

The valuable work here detailed merits close examination, however much one may feel compelled to dissent from the main conclusions.

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¹ Report of the Ankylostomiasis Inquiry in Madras. By K. H. Mhaskar. Indian Medical Research Memoirs, Volume No. 1. October 1924.

² Ankylostomiasis and Bilharziasis in Egypt. Reports and Notes of the Public Health Laboratories, Cairo, No. 6. 30 P.T.