

A Probable Method of Transmission of *Schistosoma Mansoni*

BY

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A puzzling aspect of the transmission of *Schistosoma mansoni* (intestinal bilharziasis) is the means by which the eggs, present in human faeces, reach natural waterbodies. Many workers have favoured the hypothesis that infected stools are washed into rivers and dams by heavy rains or by floods scouring areas which are normally above water level. This undoubtedly occurs; however, it can account for infection of snails only during a few months of the year. It was suggested by Clarke (personal communication) and also by members of the Sociology Department, University College of Rhodesia and Nyasaland, that *S. mansoni* eggs might be present in faecal matter adhering to the peri-anal surface after defaecation. The peri-anal area is moist and warm and might provide a suitable temporary environment for eggs. Adherent material would be removed by bathing, thus providing a direct route into streams and dams. Since a large portion of the African population bathes and swims in natural waters, this would constitute an important type of contamination during all but the coldest months of the year.

With Professor Gelfand's permission, peri-anal swabs were obtained from patients in Harare Central Hospital, Salisbury, who were known to be passing substantial numbers of *S. mansoni* eggs in the faeces. Cotton swabs were used to cleanse the peri-anal area and these were rinsed in a small container of formal-saline solution. The presence of schistosome eggs, and also hookworm eggs, was demonstrated.

It seemed likely that the patients in the hospital were more fastidious than the rural African population. It also seemed likely that the fibres of the swabs used were retaining many of the eggs, thus biasing the results.

A further test was undertaken at Chipoli Farm, Shamva, in conjunction with research being conducted by the Bilharziasis Research Laboratory. A group of 26 African boys ranging in age from five to 15 years old was selected. Stool specimens had been examined from the members of this group and the results categorised as follows:

Negative: No eggs seen in a drop of centrifuged deposit.

- 1+: 1-5 eggs of *S. mansoni* per drop.
- 2+: 6 to numerous eggs per drop.
- 3+: Eggs seen in every traverse of the drop.
- 4+: Eggs seen in every field of the drop.
- 5+: Many eggs seen in every field.

Each slide preparation was scanned with a microscope fitted with a x 4 objective.

The entire group of boys had already produced a stool specimen, sampled into a container for the purposes of the main survey. This procedure was familiar to the group and had been performed by them on a number of occasions in previous weeks. Thirty minutes after the last specimen was handed in, the group was examined directly. A blunt rounded steel spatula three-eighths of an inch wide was used to scrape the peri-anal area. Any material on the spatula was smeared directly on to a glass slide. A drop of normal saline solution and a cover slip were added. The spatula was cleaned and sterilised after each examination. The slides were examined with a high-powered dissecting microscope until an egg was found or the slide proved negative. The boys were not told that this examination was proposed, and it seemed reasonable to expect that they took neither more nor less care than usual in cleansing themselves after defaecation.

One boy was found not to have *S. mansoni* eggs in the faeces when his collected specimen was examined at the laboratory, and no eggs were found in the peri-anal skin scraping. All the other 25 boys had *S. mansoni* eggs in the faecal specimens. Of eight graded 1+, four had eggs adhering peri-anally; of five graded 2+, only one had eggs in the peri-anal smear; of seven graded 3+, four were positive; and of five graded 4+, three had *S. mansoni* eggs in their peri-anal preparations. Thus, of 25 African boys known to have eggs of *S. mansoni* in the faeces, 12 showed eggs to be present on the peri-anal skin over 30 minutes or more after they had defaecated and undertaken such peri-anal toilet as was their custom. There were indications that the presence of eggs was related to the personal hygiene of the individuals examined. Nevertheless, in most of the subjects the cleanliness of the peri-anal skin was surprisingly good on naked-eye examination considering the complete absence of any toilet tissues or of the paper substitutes thereof normally used in an emergency situation. None of the boys had the

time or opportunity to wash himself after defaecation.

Preliminary work done in the Bilharziasis Research Laboratory suggests that the distribution of eggs on and within a formed stool is not random and that eggs are to be found most frequently on or near the surface. Further work is required on this aspect and on egg viability.

The presence of *S. mansoni* eggs in adherent faecal matter on the peri-anal skin seems most significant. Such eggs are less subject to unfavourable conditions than eggs within a stool passed on the ground. Transmission by this means requires only that infected individuals bathe in snail-vector infested water, and this occurs commonly in many areas. Furthermore, transmission of this type is not seasonally limited and does not depend on a series of fortuitous events.

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