MECHANICAL SAFEGUARD AGAINST BILHARZIA.¹
DESTROYING THE PARASITES.

BY.

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Bilharzia is prevalent in many parts of Southern Africa, and many attempts have been made to eradicate the disease. The author suggests that the parasites can be eliminated by mechanical means when there is need to make use of bilharzia-infected water.

There is at present no adequate means of determining the amount of bilharzia disease prevalent in South Africa, though the proposal to spend £50,000 on a five-year campaign against the infection in Southern Rhodesia indicates its economic importance so far as Native labour is concerned. The difficulties involved may be judged by the report that, at the end of that period, the infection was on the increase.

In this campaign reliance was placed largely on an attempted destruction of the snails which conveyed the parasites to human beings, but due consideration of the problem as it affected Egypt and other countries since the cause of the disease was determined in the Far East about 1910 indicates that attention must be directed rather to curing infected persons and avoiding the infected water.

Sufficient attention has not been paid to the part the engineer could play in solving the problem, or to the fact that in farm life and in military camps infection never occurs from domestic supplies of water which have been pumped up from an open river and passed through a suitable reservoir or tank, but, in every instance, through exposing one's skin to water in the river itself.

WATER TREATMENT.

This experience points to the fact that the infection may well be avoided by rendering the free-swimming parasite inactive by mechanical means. Investigations in Natal at the end of the prolonged drought of 1945 have clearly shown that the forced disturbance of water and avoidance of all surface layers of water is sufficient to render water harmless.

As long ago as 1915 the Bilharzia Mission to Egypt fully recognized that the waterorganisms might survive for a day or two, but that the vast majority succumbed within twenty-four hours unless able to find their way into the skin of a human being or other animal. Some five years later the Chinese form of the parasite was found to survive for even seventy-two hours.

One has only to shake water containing the parasites to see how readily these cercariae lose their tails and are destroyed, for they are fragile, short-lived and surface beings which have no power to encyst like some allied forms. This should be sufficient to convince anyone of the importance of mechanical means for rendering water wholesome.

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ENGINEERING PROBLEM.

When I was asked to report on the water supply of Umtali, Southern Rhodesia, I explained that the problem was one for the engineer rather than the medical man. The health authorities at Klerksdorp, in the Transvaal, also raised the question whether the river water might not be passed through the power station and boiled.

There is no occasion to belittle the advantages of boiling infected water in a tank, adding paraffin to the surface layer to destroy other larvæ or adding copper sulphate to a swimming bath to produce one in a quarter of a million solution for destroying the bilharzia parasites. My contention, however, is that mechanical means may of themselves suffice.

Two alternative schemes for avoiding bilharzia parasites in water. A is the river, B the purifying tank, and C the reservoir or swimming bath supplied by syphon. In the lower diagram the raw water is elevated to B by pump.

A quarter-inch mesh cover for the intake pipe would prevent the entry of any infected snails. A coiled wire and other devices are sufficient to justify the use of a half-inch mesh, provided the pipe is led down into the river bed to avoid surface organisms produced by the snails, which, however, would be destroyed as the water was disturbed by pumping.

Should an infected snail find entry through the pipe supplying the reservoir, the parasites would rise to the surface as soon as they escaped from it. These would be avoided when water was led into a second tank through an escape pipe fed from the lower portion of the contained water. It is wisely suggested to me by Mr. W. H. Benvick, of Durban, that this is better syphoned off.

Provided two such tanks are safeguarded against snails, any infection from the bilharzia parasites may be regarded as impossible, for allowance must be made for the fact that most of the water will have remained away from the
river for two or three days to prevent the survival of the parasites; and one is not concerned just now with other water diseases.

This system might well be applied to native villages where a swimming bath or similar collection of water should discourage bathing and paddling in infected streams, and it deserves the serious consideration of all interested in the control of water-borne infection in tropical countries and wherever bilharzia is known to occur.

From the zoological point of view, one hesitates to attempt the eradication of any mollusc or other natural purifier of water or the employment of chemicals which are liable to interfere with its natural enemies in open rivers, and it has been found in Natal that the snails are free from human parasitic infection for most of the winter months.