

ing demands on its finances will find it difficult to increase its medical staff. It can however give grants-in-aid to the missionary hospital and village dispensary, and so help to put medical help within the reach of the villager.

There is another way in which the medical missionary does great service. The work of the public health officers of the Government is looked upon as a tyranny by the people until the need for it is realized. Mr. Will Crooks has said that the most sacred thing is to be able to shut your own door, and no one believes this more than the Indian. But if malaria and the other scourges of India are to be overcome the door must be opened more and more to the inspector, and we can see great opposition to this unless the necessary education precedes or goes with it. The missionary who has won his way into the household by his medical attention and who is always anxious to get into close touch with the people is best able to do this, and in doing it his aid to the Government will be invaluable.

The annual Conference of the Associations of Nursing Superintendents and Trained Nurses of India will be held in Bombay at the Y. W. C. A. and commence on November 26th. Members who desire to attend will kindly send their names to Miss Mill, St. George's Hospital, Bombay, so that arrangements may be made for their accommodation. As there is much to discuss it is hoped that as many as can possibly get away will attend. For Railway concessions application must be made to the two Secretaries, Miss Hawkins, and Miss Bonser, the sooner this is done the better.

DRACONTIASIS OR GUINEA-WORM DISEASE.

By D. A. TURKHU, M. B., C. M., EDIN.

THIS parasitic disease is widely distributed over India, and where prevalent, is responsible for a great deal of suffering and physical infirmity, among the rural population, especially at certain times of the year, causing sometimes a serious loss of labour in agricultural districts. It does not exist in our large Presidency Towns, and the cases of guinea-worm which are sometimes seen in the hospitals in Bombay, if inquired into always reveal that the infection was acquired in an area where the disease is endemic. It has a distinct seasonal prevalence, the outbreak generally lasting from April to September with the maximum manifestation about June.

DESCRIPTION OF PLATE

Fig. 1. The Guinea-Worm, natural size

(a) Head

(b) Tail

Fig. 2. Embryos of Guinea-worm, magnified
100 times

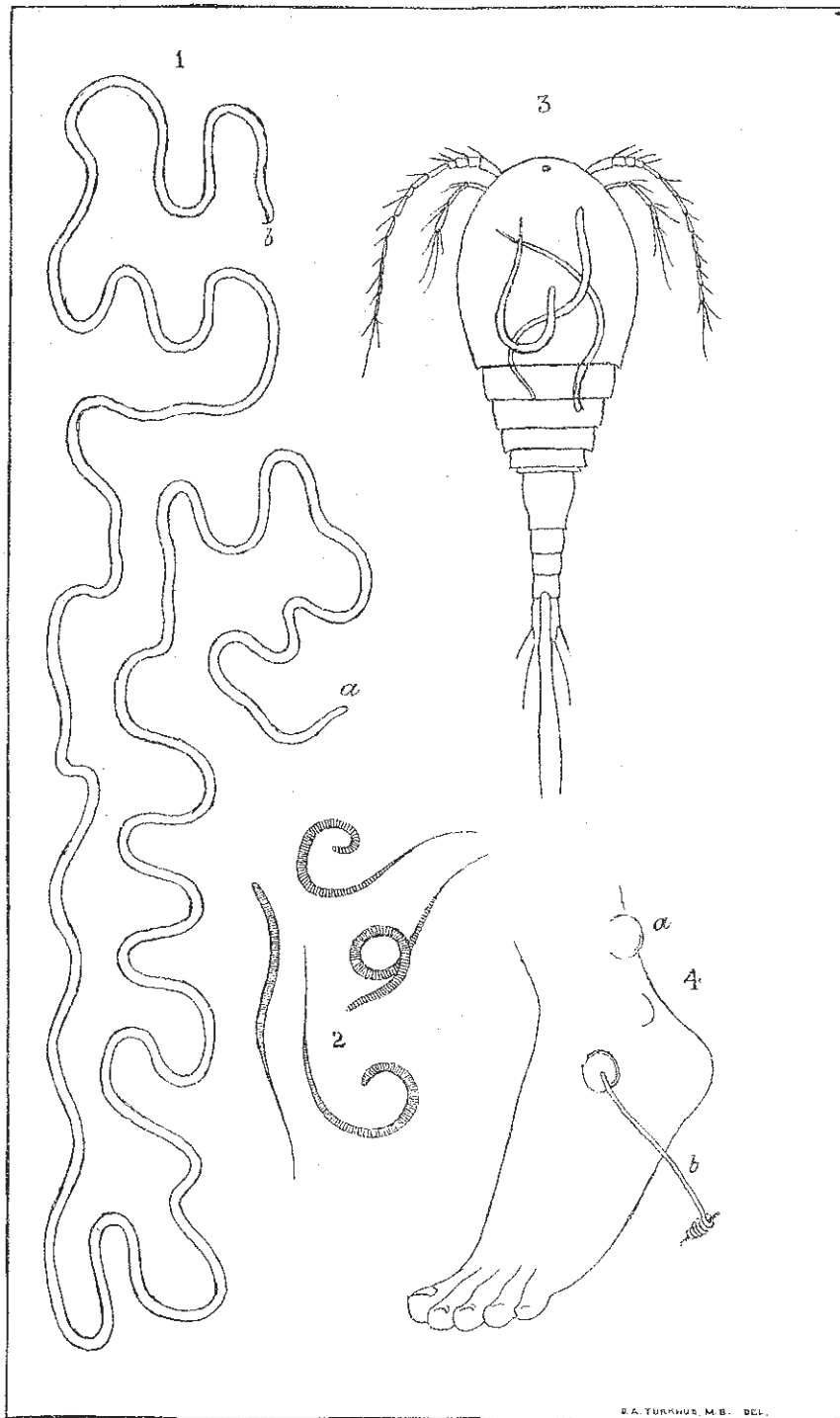
Fig. 3. A Cyclops infected with Guinea-worm
embryos, magnified 100 times.

Fig. 4. A case of Guinea-worm

(a) Blister produced by the worm

(b) A protruding worm being

"wound out."



The disease is caused by a filaria, *Filaria medinensis*, sometimes also called *Dracunculus medinensis*. It is the largest of the human filariæ, and when fully developed is about 3 feet in length and in thickness about the size of a fine whip cord. The worm lies in the connective tissue between the muscles, or just under the skin, and in the latter situation it can easily be felt with the fingers. More worms than one may be present. It has been ascertained that the worm takes about 12 months to attain its full size; yet all this extraordinary development takes place in the human body, without the parasite producing any symptoms. Only the female worm is known. After becoming fully developed, she makes an attempt to escape from the body of the host, for the next stage in the development of the worm has got to be spent outside the human body. She first drills a small hole in the deeper layers of the skin, and raises the cuticle in the form of a blister about half an inch to an inch in diameter, probably with the fluid she secretes. After a day or two the blister bursts, disclosing a circular, superficial, raw surface or ulcer in the centre of which may be seen the hole made by the worm; or the head of the worm itself may be seen protruding from the hole. The appearance of the blister is sometimes preceded by severe urticaria or nettle-rash, a rise of temperature and bilious vomiting.

The worm makes its appearance commonly in the lower extremities of man, generally the feet, but it may be met with in any part of the body. Among "*Bhishtis*" or water-bearers it may appear on the back. Now if the part where the worm has come out be doused with cold water, and the head of the worm carefully watched, it will be seen to extrude a thin, delicate, transparent little bag, which gradually becomes distended, and in a little while bursts, discharging a whitish fluid. This can be repeated at intervals, by the reapplication of the stimulus of cold water. If a drop of this milky fluid be added to a little water and examined under the low power of a microscope, it will be seen to contain innumerable little young worms—the embryos of the guinea-worm—wriggling about and swimming in an extremely active manner.

The mother worm, when mature, is just a fully distended sac containing millions of these embryos, and the main object of the parent worm is to get her progeny conveyed to water, in which element alone the young worms can live at this stage of their life. The reason which leads her to travel to the foot or ankle, or in the case of "*Bhishtis*," the back, is obvious: for these are just the parts of the body which are most likely to be brought in constant contact with water. In this country it is a common sight

to see villagers walking into rivers and tanks to take home their daily supply of drinking water, and where "step-wells" are common, the same scene is met with. The instinctive foresight of the mother worm takes advantage of this and she contrives to select her abode where she will be in a favourable position to discharge her young ones into water.

In the water however, the embryos do not live for more than a few days and undergo no further development, unless they enter an intermediate host, viz. the cyclops, which is a small crustacean, belonging to the same order as lobsters, crabs and shrimps. These cyclops are semi-transparent little creatures about the size of a pin's head, and are common inhabitants of wells, tanks and other collections of water. They swallow the little guinea-worm embryos discharged into the water by the mother-worm, and from the cyclops' stomach, the young worms make their way into the general body cavity of the cyclops where they remain for a number of weeks and undergo further development.

Now, if such cyclops, harbouring guinea-worm embryos in their interior, are transferred to the human stomach,—and this happens among people who do not take the precaution of filtering their drinking-water obtained from wells and tanks,—the acid gastric juice kills the cyclops and liberates the embryos from their interior. The young worms are thus set free in the human stomach, and they then pass from the alimentary system into the tissues. What exactly happens is not yet known, but the worms undergo further development in the human body, gradually increase in size without causing any symptoms, and in the course of about 12 months, the mature female worm makes her appearance under the skin ready to come out and discharge her young progeny into water.

Such is the life cycle of the guinea-worm and it will be seen from it that the prevention of dracontiasis should be a very simple matter. Persons with guinea-worms should be prevented from having access to tanks and wells, the water of which is used for drinking purposes. If the water is filtered (even straining it through a piece of muslin will do) the cyclops will be kept back, and there will be no fear of getting the infection. The surest remedy however is always to boil the water used for drinking. The life history of the worm will also make it evident why the disease is absent in towns with a pure and wholesome water supply, unlikely to be contaminated by persons with guinea-worm.

As regards the treatment, where the worm "points" the part should be douched several times daily with cold water, and a thick pad of cotton wool soaked in sterile water should be placed on the

ulcer and kept moist. This should be continued daily until the worm has got rid of all her embryos, when the extraction will prove an easy matter, and the worm will come away with careful winding on a tiny piece of a match. Any attempt made at premature extraction will be resented by the worm with all her might, and rather than come away she will even allow herself to be ruptured; the result will be that her millions of young ones will escape into the tissues and give rise to severe inflammation, abscess and sloughing. If the worm is just under the skin she may be removed whole, through an incision, the extraction being facilitated by massaging the parts. Various injections have been recommended, but they are very painful and not always successful. For inflammation and cellulitis hot boric fermentations should be employed and sinuses and abscesses should be slit up and incised and treated in accordance with general principles. "Hakims" and "Vaidis" in this country have been known to extract the whole worm at a single seance by the application of suction by the mouth, after a preliminary small cut in the skin to expose the worm and massage of the surrounding parts. This operation is performed for a fee of only a few annas, sometimes quite successfully, but often, as no antiseptic precautions are observed, with results which may be imagined.

DISTRICT NURSING IN THE JUNGLE.

THE District Nurse's Headquarters are at a small village called Mandagadde, 17 miles from the town of Shimoga and on the high road.

The area of the district may be said to extend 18 miles towards the taluk town of Tirthhalli on the high road, but on either side the only limit is the degree of accessibility!

The people among whom the District Nurse works are chiefly members of the Namadari caste. We do not of course refuse to go to others but we are there chiefly for the benefit of the Namadari people. These people form a very distinct and separate tribe who are to be found in various parts of three taluks, Tirthhalli, Nagger and Koppa. These taluks cover an area roughly of 1,500 sq. miles, and the Namadaris scattered over that space are about 30,000 in number, and it is because the census returns among them are so low that they are in sore need of and are now asking for medical help. Various schemes have been suggested and may or may not prove feasible, but in the meantime the Wesleyan Mission is doing what it can to help.