

II. DISTOMIASIS.

Several forms of trematodes or flukes are parasitic in man, and when in numbers may cause serious disease.

(1) *Liver Flukes*.—The following varieties of flukes have been found: The *distoma hepaticum*, a very common parasite in ruminants, which has a length of from twenty-eight to thirty-two millimetres. The *distoma lanceolatum*, a much smaller form, from eight to ten millimetres in length, which is also very common in sheep and cattle. The *distoma crassum*, the largest form, measuring from four to eight centimetres in length. One or two other less important forms have occasionally been met with. The studies of the Japanese physicians have brought to light the interesting fact that there is a distoma widely endemic in certain provinces in that country. Two forms have been described, the *distoma endemicum* and the *distoma perniciosum*, about which there is still a doubt whether they are different species or not. The studies of Ijima indicate that they are probably the same. According to Baelz, fully twenty per cent of the inhabitants of certain provinces are affected.

The flukes occupy the bile-passages and the upper portion of the small intestine. When in large numbers they may cause serious and fatal disease of the liver, usually with ascites and jaundice. The liver may be enormously enlarged; in Kichner's case it weighed eleven pounds. The flukes may cause a chronic cholangitis, leading to great thickening or even calcification of the walls of the bile-duct.

The endemic fluke disease of Japan is characterized by enlargement of the liver, emaciation, diarrhoea, and frequently ascites.

(2) *The Blood Fluke; Bilharzia Hæmatobia*.—This trematode is found in Egypt, southern Africa, and Arabia, and is the cause in these countries of the endemic hæmaturia. The female is about two centimetres in length, cylindrical, filiform, and about .07 millimetre in diameter. The parasite lives in the venous system, particularly in the portal vein, and in the veins of the spleen, bladder, kidneys, and mesentery. According to Bilharz, at least fifty per cent of the lower classes in Egypt are infected with it. It is not yet known how the parasite gains entrance to the body. In all probability it is by drinking impure water containing the embryos.

The symptoms are due to changes in the mucous membrane of the urinary organs caused by the presence of the parasites in the blood-vessels of these parts. Hæmaturia is the first and most constant symptom, leading gradually to anæmia. There is generally pain during micturition. The blood is not constant in the urine. The ova of the Bilharzia are readily seen under a microscope with a low power. They are ovoid in shape, translucent, with a small spike at one end. The embryo can be readily seen.

The disease is rarely fatal; a great majority of the cases recover. Chil-

dren are more commonly attacked than grown persons, and the disease often disappears by the time of puberty.

(3) *Bronchial Fluke; Distoma Ringeri; Parasitic Hæmoptysis*.—In parts of China, Japan, and Formosa there is an epidemic disease, described by Ringer and Manson, characterized by attacks of cough and hæmoptysis associated with the presence of a small fluke in the bronchial tubes.

III. DISEASES CAUSED BY NEMATODES.

I. ASCARIASIS.

(a) *Ascaris lumbricoides*, the most common human parasite, is found chiefly in children. The female is from seven to twelve inches in length, the male from four to eight inches. The worm is cylindrical, pointed at both ends, and has a yellowish-brown, sometimes a slightly reddish color. Four longitudinal bands can be seen, and it is striated transversely. The ova, which are sometimes found in large numbers in the feces, are small, brownish-red in color, elliptical, and have a very thick covering. They measure .075 millimetre in length and .058 millimetre in width. They develop outside the body, but the life history is not known. The parasite occupies the upper portion of the small intestine. Usually not more than one or two are present, but occasionally they occur in enormous numbers. The migrations are peculiar. They may pass into the stomach, from which they may be ejected by vomiting, or they may crawl up the œsophagus and enter the pharynx, from which they may be withdrawn. A child, under my care in the small-pox department of the General Hospital, during convalescence, withdrew in this way more than thirty round worms within a few weeks. In other instances the worm passes into the larynx, and has been known to cause fatal asphyxia, or passing into the trachea, to cause gangrene of the lung. They may pass into the Eustachian tube and appear at the external meatus. The most serious migration is into the bile-duct. There is a specimen in the Wistar-Horner Museum of the University of Pennsylvania in which not only the common duct, but also the main branches throughout the liver are enormously distended and packed with numerous round worms. The bowel may be perforated by them and peritonitis result.

The symptoms are not definite. When a few are present they may be passed without causing disturbance. In children there are irritative symptoms usually attributed to worms, such as restlessness, irritability, picking at the nose, grinding of the teeth, twitchings, or convulsions. These symptoms may be marked in very nervous children.

Treatment.—Santonin can be given, mixed with sugar, in doses of from one to three grains for a child and three to five grains for an adult, followed by a calomel or a saline purge. The dose may be given for