

charge of the laboratory work, stated at an international congress of a year ago, that of men slightly infected, forty per cent. could be detected by the microscope, fifty-five by the washing process and ninety-five by methods of culture.

Dr. Boycott considers next a technical method of diagnosis of early cases through a considerable increase in eosinophile leucocytes in the circulating blood, the most marked reaction here coming with young people who have been only recently infected and who have not become anæmic at all. In these cases there is a leucocytosis comparable to that which occurs in trichinosis. With this in mind the lecturer has some difficulty in conforming the results of Dock and Bass, of the United States, with those established in Cornwall and Westphalia, unless, indeed, there may be a difference between the American worm and that of Europe.

The passing of the ankylostoma from host to host is one of the curiosities of biology. There are so many ways in which the transmission of pathogenic parasites is effected directly that there is something unusual in this creature, where the infection in man is dependent upon the environment of the parasite outside his body. Some parasites have no life outside the bodies of their hosts, being given directly from one to another; others oscillate between an animal host and man; others still, like the diphtheria bacilli, have a comparatively brief term of saprophytic life, while still different germs, like those of tetanus, are in the latter condition most of the time. In the hookworm the eggs cannot develop within the body and the young worms cannot become sexual and multiply outside of it. Both conditions are essential to the continuance of the ankylostoma race. There are, moreover, a number of limiting conditions. The eggs cannot hatch without a free supply of oxygen, and therefore cannot mature in the intestine. They will rarely hatch under water, nor if protected from the air to the interior of a manure pile. In a considerable mass of water the eggs will not develop, so that a well-sewered city is reasonably free from infection, although ten days of deprivation of oxygen may be needed to kill the eggs. The larvæ require oxygen, but they thrive well in water. In these stages oxygen is necessary, but when the creatures become adult

they develop most remarkable anærobic capacities.

Moisture is another essential element to the propagation of the hookworm. The eggs or larvæ live a very short time in dry air at ordinary temperatures. The disease never prevails in dry climates, and even in places where it has been abundant, there has been a choice of localities. Its travel from man to man depends upon two factors, the deposit of dejecta upon the ground or in insecure outhouses, and the prevalence of a bare-footed population. In Porto Rico the sugar fields show the difference of locality, since they were not nearly so heavily infected as the banana plantations or those devoted to coffee.

The former are exposed to the sun and are ploughed every year, while the coffee bush is always shaded and the banana grows in groves. In Westphalia there was a serious outbreak in the coal mines following the introduction of a systematic watering of the roadways to prevent dust explosions. The number of cases reported in the years following the beginning of the watering jumped from four per 10,000 miners working to twelve, forty-one and fifty-three. In these German mines the increase in disease led to a systematic examination of all the men and nearly 10 per cent. were then found to be infected. In the South African gold mines, which are dry, about half the natives who come to work are already infected, but the disease does not spread and few if any of the white miners have been affected. In Cornwall the mines vary in wetness with the less number of ankylostomites in the drier ones. Sprinkling is considered necessary as a precaution against explosions, but a system of dry zones has been instituted which has many advantages from the sanitary standpoint.

The only localities in northwestern Europe where the hookworm can gain any hold and make headway are the underground workings. Most mines are warm, and many, hot, and in them there is a suitable environment for the development of the parasite, varied, of course, by many factors into which Dr. Boycott goes quite in detail. Local circumstances influence the conditions. The Levant mine in Cornwall is under the sea, hot and rather badly ventilated, but the seepage of the salt water kills the eggs. In the salt mines of