The blood is allowed to flow until the donor feels faint. The artery is then clipped, pulled out, and ligatured. The whole procedure is carried out under local analgesia.

It may be objected that making use of the radial artery as a canula involves a serious and avoidable mutilation upon the donor; this is not the case—ligature of the radial artery must be performed in any case, and the excision of an inch or so of the vessel makes no difference. The elasticity of the artery renders its use as a canula easy, and a considerable length of vessel becomes available through a comparatively small wound.

THE PROBLEM OF BILHARZIASIS IN SOUTH AFRICA.

By F. G. CAWSTON, M.D., CANTAB.
(First Streetfield Research Scholar.)

The report of some experiments by Mizaira and Suzuki to determine the life-history of the parasite which causes the Asiatic form of Bilharzia disease was reviewed in the Tropical Diseases Bulletin for March 30, 1914, and referred to redia-produced cercariae in the hepatic ducts of infested snails.

In 1916 Dr. Juan Iturbe published for the National Academy of Medicine in Venezuela an illustrated paper on the Intermediate Host of Schistosoma mansoni, in which he describes undoubted redia-formation. It is a little difficult to understand that the same species of trematode worm should be sporocyst-produced in one part of the world and redia-produced in another; but observations of the development of closely allied species would seem to show that such a thing is not altogether improbable.

The report by Lieutenant-Colonel Leiper of the Bilharzia Mission to Egypt which appeared in the Journal of the Royal Army Medical Corps for 1915 includes a description of Bilharzia-infested snails producing the Egyptian forms of the disease. These cercariae are said to develop in sporocyst and daughter sporocysts, and no mention is made of redia-formation in the life cycle of the Bilharzia parasites in Egypt.

Schistosoma hematobium, which is responsible for Bilharzia disease in South Africa, develops in sporocysts in the liver-substance or nephritic ducts of Physopsis africana. In some instances a few isolated cercariae may be found in the liver-substance and the liver entirely free from sporocyst-formation. In such cases one has to look in the nephritic and genital region of the snail before one comes across the sporocyst that produces them. The cercariae develop to their full size in the sporocyst and, at whichever stage of infection one examines the snail, there is no trace of redia-formation, except in mixed infections. Dr. J. G. Becker, who reported adult Bilharzia worms in a guinea-pig to which he had given these cercariae from P. africana, describes the cercariae in the Medical Journal for South Africa, April 1916, but makes no mention of redia-formation in the infested snails.

P. africana is one of the commonest fresh-water snails of semi-stagnant water in infested areas. I have never found any redia-formation in infested specimens from Magaliesburg, Rustenburg, Mulder’s Drift, Umbilo, Toll Gate and the Umsindusi river at Maritzburg.
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There are several closely allied Schistosomes in the infected areas of Transvaal and Natal, suggesting that more than one species may affect man and animals; although the presence of Schistosome infection has not yet been recorded in animals in South Africa. Through the assistance of the Streathfield Research Fund of the Royal College of Physicians, I am carrying out experiments at Durban to determine the life-cycles of the whole Schistosome group of parasites, which are present in various species of fresh-water snails.

Cercaria Secobii.

In 1916 I found a narrower Schistosome with long prongs to its divided tail in ninety-nine Physopsis from Maritzburg. Dr. E. E. Warren suspects this is an avian trematode. Sporocysts in various stages of development were present in the livers, but no trace of redia-formation.

Cercaria Crispa.

During the first nine months of 1919 I found eighty Physopsis in the district around Durban infested with a Schistosome resembling the Bilharzia but having rather longer prongs. These prongs have a distinct tendency to curl over towards the tail. None of the infested snails showed redia-formation.

Cercaria Gladii.

In 1917, I found a Schistosome at Potchefstroom which was redia-produced. It had prongs resembling drawn swords and infested Isidora schackoi. In one infested specimen the rediae were found in the liver-substance having a distinct movement of their own. They possessed pharynx and gut, and fully developed cercariae were seen inside the rediae. In another infested Isidora, although the cercariae were mature, no rediae were seen.

Cercaria Parygculata.

P. africana in the Durban suburbs is infested with an eye-spotted furcocercaria, developing in bottle-shaped rediae showing pharynx and gut. These rediae are uniformly about the same length. One infested liver contained a mass of them. They are 1-30 millimetres in length. The pair of round eye-spots which are situated near the middle of the head of the cercaria are faintly visible through the semi-transparent walls of the pigmented rediae. This cercaria, which is 0.77 millimetres in total length, is the only furcocercous form developing in rediae that I have isolated from P. africana.

Cercaria Pigmentosa.

Redia-formation is not at all uncommon with the leptocercaria of Natal and the Transvaal or with the amphistomes. C. pigmentosa, which develops into liver-flukes when given to animals on lettuce, develops in large rediae in the liver-substance and nephritic ducts of Limnaea natalensis, our commonest fresh-water snail. These rediae are often as much as \( \frac{3}{4} \) of an inch in length.

In April last the Officer Commanding the Military Convalescent Camps in Durban, Captain Birkett, South African Medical Corps, requested me to treat a lieutenant who was a Bilharzia carrier and suffering from renal stone. I commenced a series of tartar emetic injections on April 2, when his urine contained the characteristic spine-pointed ova. By April 10, all ova had disappeared from his
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urine and they have not reappeared. On October 11, this patient told me he had had no return of his hematuria, though he was still being treated for renal calculus. Microscopic examination of his centrifugalized urine showed absence of ova.

The other cases that I have had under treatment by tartar emetic injections have all shown improvement or cure; but many that have recovered from the direct effects of the parasite are still suffering, as the above case is suffering, from complications arising from the disease.

In one case, where the ova have disappeared from the urine for several years, the patient is still subject to recurrent hemorrhage from a papillomatous growth of the neck of the bladder which has recurred after successful removal a year ago.

Another is suffering from a severe cystitis of several years' duration, apparently caused by the presence in the urine of staphylococci, which do not respond to autogenous vaccines.

In another case, although the ova have disappeared for several years, an intractable Bacillus coli infection remains.

A NOTE ON DERMATOPHILUS PENETRANS.

By Captain Malcolm E. MacGregor.
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The Chigger Flea (Dermatophilus penetrans), during the recent campaign in East Africa has been a positive scourge in certain localities. As there is an obvious scarcity of practical knowledge in the available literature on this flea a few notes may be useful.

The distribution of the parasite in Africa is very extensive. It occurs on the Western and Eastern sides of the continent, around the Great Lakes, and here and there right across the continent. It has also spread across to Madagascar, and, by the movements of the troops no doubt, will have been found to have been carried into many parts of Africa hitherto free from the pests; particularly towards the South.

As is well known, Chiggers flourish best in warm, dry sandy places, so that the coastal line of Africa is admirably suited to them.

I first made personal acquaintance with these parasites soon after landing on the East coast, and have ever since looked upon them as an enemy not to be regarded with contempt.

When the British forces landed at Lumbo on the mainland coast opposite the island of Mozambique, in Portuguese East Africa, the Base Hospital encamped at the edge of the low cliffs on the sea-shore, and hospital tents and officers' quarters consisted of E.P. tents and marquees. The ground was of a sandy nature, but contained enough humus to support a scanty vegetation and the ubiquitous cocoanut palms.

Lumbo was free from Chiggers, as far as I can ascertain, until a few weeks after the landing of the troops. Anyhow, we lived comfortably free from attack for some weeks after we got established.

In the meantime large numbers of Ascaris, native porters and white troops had been landed and had encamped over a wide area. Among these troops there