

engaged in devouring and destroying tissues which, while being a source of considerable discomfort to the patient would not be the cause of as grave danger to the host as in the second or "burrowing" stage when the parasite would attack vital parts and thus threaten life. The burrowing is evidently prompted by two motives, (1) to secure a suitable nidus in which to pupate; (2) To get as far away as possible from the light.

The Pupa.—The pupa enclosed in a reddish brown puparium is about 10 m.m. in length.

The pupal stage lasts about 6 days.

End of pupa.

The Fly.—The *Pycnosoma*, or blue bottle fly is about 10 m.m. in length with bright blue or green metallic appearance of thorax, and abdominal segments, and is the fly so frequently seen hovering over decomposing matter.

Note on the fly by Mr. F. M. Howlett.

The fly appears to be *Pycnosoma flaviceps*, though there is at present a slight doubt as to the correctness of the Identification owing to the absence of a really good specimen for comparison. It is probably viviparous, as no traces of eggs or egg-shells have been discovered, and this condition is common among those flies whose larvæ feed on decaying animal matter; for them it is important to take immediate advantage of the presence of a supply of food before it dries up, or becomes otherwise unavailable.

Immediately after deposition the young larvæ begin burrowing away from the light into the food material, and remain thus more or less buried for the 6-8 days of larval life, feeding with great voracity. At the end of this period they cease to feed and become very restless; they lose to a certain extent their aversion to light, and travel rapidly in search of a dry place in which to pupate. If the food material has dried up in parts they may pupate there, but as this drying will not occur in cases of living flesh, they will usually emerge from the body of the victim, unless they have lost themselves in, e.g., the cranium, and fall to the ground, in which they will bury themselves, and turn to a reddish brown pupa, or "Puparium." While the normal course of the attack thus coincides in length with the feeding period of the larvæ (i.e., about a week), re-infection may very possibly occur in neglected cases owing to the attraction of the foul-smelling discharge for flies. Such as the common viviparous flesh-flies of the genus *Sarcophaga*. Since it is important to ascertain the identity of the larvæ concerned (all flesh-fly larvæ are very similar), we give a brief description of the salient features of the present species. It has been found that by preserving the larvæ in hydrogen peroxide solution until they begin

to turn brown, the structural characters are generally well shown up.

The larva's general appearance is that of a typical "maggot" about $1\frac{1}{2}$ c.m. long. The surface of the body has a series of ring, like patches of minute chitinous points. The head has two very minute antennæ and the usual hook-like jaws. The features of most importance are at the posterior extremity, where are seen two bean shape chitinous-plates marking the openings (spiracular openings) of the breathing tubes (tracheæ). These plates are slightly approximated dorsally, and the three spiracular clefts seen inside them have the inclination. Below the plates is a low horizontal ridge separated by a furrow from a more prominent ridge below it, this latter ridge bearing two large tubercles a little wider apart than the plates, is again separated from a lower ridge by a rather broad depressed space. This lowest ridge or projection likewise bears two large tubercles vertically under the pair already mentioned, at such a distance that the four tubercles form the four corners of a square, when the animal is fully expanded. Besides these there are four large tubercles on the edge of the upper flattened area bearing the plates, the upper pair of these being vertically over the outside edge of the plates. The position of the other smaller tubercles can be seen from the figures—unless a larva shows, when full-grown, characters which are unmistakably those just mentioned there is a probability that it belongs to some other species. It is desirable that larvæ from cases similar to those described, and from wounds or sores, should in all cases be preserved for possible identification, and whenever possible should be allowed to pupate in sand, so that the species of the issuing fly may be determined.

In general appearance the fly is a shining metallic "blue bottle," about 10 m.m. long, with red eyes, a slight pattern of very faint stripes on the thorax, and on the hinder edge of the segments of the abdomen narrow blackish rings of darker colour. The common *Sarcophaga* to which reference has been made, has red eyes, a grey striped thorax and a curiously chequered greyish abdomen, and is about twice the size of a house-fly.

DOES BILHARZIA (SCHISTOSOMIASIS) EXIST IN INDIA?

By FRANK MILTON,

The Wynaad Medical Association.

THE interesting case ("A Surgical Curiosity") described by Captain Bodley Scott in the October number of the *Indian Medical Gazette*, suggests the possibility of the urinary fistula and the

vesical calculus both owing their origin to infection by *Bilharzia hæmatobia*.

On considering the probabilities of this case one cannot help being struck by the fact that allusions to this disease, *Bilharzia*, are almost entirely absent from Indian Medical literature.

R. E. Montgomery (1) in 1906 stated that "*Bilharziosis* amongst animals is very common, at least in certain districts of India," and he was enabled to describe and name no less than three entirely new species of the parasite, *Schistosomum Indicum*, *Sch. Bomfordi*, and *Sch. Spindale*, found by him during the examination of a comparatively small number of horses and cattle, and he formulates the following conclusions:—

1. *Bilharziosis* is an established disease amongst the domestic animals of Northern India.
2. Parasites have been obtained from the horse, donkey, cattle and sheep.
3. The human parasite can live in India.
4. India is suited for the propagation of the parasite, and
5. The genus *Schistosomum* contains six species (he omit *crassum* and *mansoni*), of which 5 have been discovered in the indigenous mammals of India.

As far back as 1882 Cobbold (2) at a meeting of the Medical Chirurgical Society, in London, referred to the parasite as having been found in India among oxen and sheep, and in 1886 (3) and again in 1887 (4) Bomford described *Bilharzia* eggs which he had found in the intestine on transport cattle in Calcutta.

These references are by no means numerous, but they point to bovine and equine *Bilharziosis* as being well known and probably widely spread throughout the country.

Among men the disease has been but very seldom recorded, and of those cases which I have been able to trace probably the largenumber were imported, infection having taken place elsewhere than in this country.

The total number of references that I have been able to find are but six in all covering a period of twenty-one years from 1887 to 1907.

These are as follows:—

1. In 1887 W. R. Hatch (5) referred to 12 cases seen by him in Bombay "where the disease appears to be more common than formerly, especially among Mussalmans who have made a pilgrimage to Mecca."

2. In 1903 Powell, (6) reported a case, also a native of Bombay, who had painful hæmaturia and who was passing terminal spined on in his urine. Referring to the same case later (7) he notes that this patient had never left the Bombay Presidency.

3. In 1904 Major E. P. Sewell, (8) R.A.M.C., refers to a case occurring in a British soldier at

Mien Mir, Punjab, who "had never been in Egypt or South Africa."

4. In 1905 Christophers and Stevens (9) noted "a peculiar *Schistosomum* egg found in the urine of a Madras native suffering from hæmaturia." The case was noted at Liverpool and no indication is given as to where the disease may have been contracted.

5. In 1906 Lt.-Colonel D. Wardrop, (10) R.A.M.C., described three cases in British soldiers who developed the disease in India after having served in South Africa. None of these cases had had any symptoms of the disease whilst still in Africa.

In the same article he describes two other cases, also British soldiers, who had developed the disease in this country, but who had never before been out of England. Both these men developed the disease about six months after their arrival in India. It may, however, be noted that cases have been described as occurring in persons in England who had never been out of that country (11) and 12.

6. In 1907 Major W. S. Crosthwaite, (13) R.A.M.C., reported a case occurring in Bangalore in a British soldier who, although he had served in South Africa, had had no symptoms of the disease whilst there.

These are all the cases which, on a confessedly incomplete survey, I have been able to discover. The case mentioned by Hatch of the native of Bombay who developed the disease a month after returning from Suez where he had stayed for 14 days, was so obviously a case of infection arising outside this country that it does not interest us. Of those cases, apart from the earliest group mentioned by Hatch, only two refer to natives of India, and of these only one man had never been out of the country, and the other case was noted and recorded abroad.

Of the British soldiers attacked, seven in all, four had recently served in a country where *Bilharzia* is rampant, and where many of the British troops are known to have acquired the disease, and may well have brought the parasite with them from thence.

As Hatch's cases may be suspected to have occurred among "Mussalmans who had made a pilgrimage to Mecca," we have so far only one native who must have contracted the disease in this country, and three immigrants who may be presumed to have done so. In the case of these three latter it would be interesting to know if there were men in their regiments who were suffering from the disease at the time they were, presumably, infected, for in the case described by Major Freeman (11) of Private Jeremiah, who developed the disease in England, it is noted that there were other men in camp at Borden, where Private Jeremiah reported sick, who had served in South Africa, and although it is not stated that any of

these were actually suffering from Bilharzia, it is still, I take it, intended to suggest the possibility of the infection being derived from the man's companions whilst in camp.

Granting that Bilharziosis in cattle is not necessarily accompanied by the disease in man in the same locality, as is shewn by the fact that whereas 75% of the cattle slaughtered at Catania, in Italy, and coming from Piana di Catania, are infected with *Sch. crassa* the disease is unknown among the human inhabitants, it would still seem very remarkable if this scanty record comprised the whole of the incidence of human Bilharzia in India.

It is impossible to believe that this is the case for the disease is known to be almost everywhere prevalent over the whole world between say the parallels of 35 degrees N. and 35 deg. S. of the equator. Throughout this belt it would be difficult to name any country, other than India, in which medical conditions are observed and reported in which cases have not been recorded, and over very large tracts of this belt it is estimated to attack from one-third to the whole of the native population. In Egypt it is probably true that every individual (native) born and surviving for say 10 years, suffers at some time or another from Bilharzia. In parts of Natal and Cape Colony it is probable that the incidence is almost as high. In Zanzibar (14) one-third of all male natives are said to be victims to the disease. In Mauritius (15) "in certain districts endemic hæmaturia (bilharzia disease) is very common." "The disease is widely spread throughout. Mesopotamia (16) occurring in those living in towns and villages situated on the banks of the rivers Tigris and Euphrates." It has been described by J. Scott (17) as occurring in Persia. In Japan (18) it is very common "in a certain village...of 117 persons working in one particular piece of land almost all were suffering from *Schistosomum* infection." In China (19) where it is widely spread, there are said to be foci where one-third of all boatmen and farmers are infected.

When, in face of this Montgomery says "the human parasite can live in India" and "India is suited for the propagation of the parasite," can it be doubted that even if not originally infected, India, after harbouring, as she must have done many infected cases having so many routes open through which infected persons must be continually passing, as is indicated even in our scanty records, pilgrims from Mecca, troops from South Africa, travellers from all parts, must be by now infected and widely infected.

I may not now beg the space in which to show how easy the infection of a locality is, nor how one single person, harbouring the parasite, may infect an indefinite extent of country, but I do make the statement that it is so.

That India is infected most, I think, take for granted, and it only remains to determine which is the infecting species, and why the disease is not more frequently diagnosed and described.

Apart from the disputed *Sch. mansoni*, the two main species pathogenic to man are *Sch. hæmatobium* and *Sch. japonicum*. These though differing so little in their own anatomy and the form of their eggs, give rise to diseases which, whilst constantly overlapping, as it were in their symptoms and in the lesions they cause, are yet constantly uniform for each species and are widely differentiated in their leading characteristics.

Sch. hæmatobium, the true "Bilharzia" causes typically, lesions of the urinary apparatus especially, and its leading and most striking manifestation is in a peculiar, persistent, and painful form of hæmaturia.

In many parts of the tropics "Endemic Hæmaturia" has been noticed and diagnosed, from the times of their earliest medical history. In practically all those districts the disease so named is now known to be due to *Schistosomum* and to be "Bilharzia."

The parasite also gives rise to a pseudo dysentery in those cases in which the large intestine is primarily attacked, and this symptom might possibly escape notice in a country where the various forms of dysentery are so common, and which in many cases possibly escape sufficient study, but I doubt if the peculiar chronicity and the frequent association of this form of "dysentery" with hæmaturia and other manifestations of Bilharzia would allow it to pass for long unchallenged.

These two symptoms, hæmaturia and mucosanguinolent diarrhæa, and the occurrence of urinary fistulæ are the main characteristics of Bilharzia as seen in Egypt.

In South Africa where Bilharzia, also due to *Sch. hæmatobium*, is very prevalent, the main, and in many cases only sign is hæmaturia. The disease as seen in this part of the continent is of much less severity than the Egyptian form, and appears to be more transitory and to tend more speedily towards spontaneous cure.

Infection taking place in early life and the disease not being of long duration as a rule, cases are found almost exclusively, but by no means entirely so, among children and young adults, and causes so little pain or distress that the power of passing bloody urine is looked upon as an interesting accomplishment by many of its youthful possessors, and an extra access of hæmorrhage confers a certain distinction upon its fortunate possessor among his envious comrades.

In Schistosomiasis due to *Sch. japonicum* the disease runs an entirely different course, so much so that a differentiation should, I think, be made in the nomenclature. It might be possible to

retain the name "Bilharzia" for the type of disease due to *Sch. hæmatobium* and having the characteristic symptoms originally described by Bilharz in 1852, (20) and Schistosomiasis, or perhaps better still, the original Japanese name of "Katayama disease" confined to the form seen in China and Japan and due to *Sch. japonicum*.

The picture exhibited by a typical case of "Katayama disease" is as follows:—The patient, usually an adult, and belonging either to the wet cultivator, fisherman, or boatman class, is first attacked by an indefinite and irregular form of fever. The fever might be taken for Malaria, but in these countries where Malaria is familiar to the people the patients are constantly noted as saying that they know they are not suffering from this disease, there being, to them, an appreciable difference between the Schistosomiasis fever and that due to malaria. The fever is very irregular, sometimes lasting only a day or two at a time with recurring attacks, and sometimes persisting for several weeks without a break. This fever is generally followed by, or alternates with, attacks of so-called "dysentery." During these attacks the patient suffers a great deal of abdominal pain, often localised over the liver, and passes frequent motions of an offensive, pasty, character and containing blood, mucus, and, notably, undigested food. This primary stage of recurring attacks of fever and dysentery may last for an indefinite period, the patient being able to continue his occupation but constantly ailing and suffering from gastric pain and discomfort.

After a time the liver and spleen enlarge and ascites develops. The accumulation of fluid in the abdomen often takes place very rapidly and to a very large amount, and begins, as a rule, during an attack of fever or dysentery. During this time the patient suffers from a progressive loss of flesh, with increasing weakness. A large number of the patients suffer acutely from sleeplessness, a peculiarity about which is that the time of night at which this occurs is peculiar to the particular patient and is more or less the same for that patient throughout.

In the later stages of the disease the liver, after being enlarged, shrinks and becomes small and cirrhotic.

Death, as a rule, takes place from exhaustion or from some intercurrent disease such as pneumonia.

This represents the more usual and chronic form of the disease and in this form it has been confused with both Malaria and Kala-Azar.

In some cases the disease, after it has become established, takes on an acute cerebral form, the patient developing Jacksonian epilepsy, hemiplegia or other sign of lesion of brain tissue. Or it may be of an acute abdominal type where in

the ordinary course of the disease the patient is suddenly seized with acute "choleraic" symptoms with continuous diarrhoea and cramp and death in a few hours. Catto's classical case (21) from which he originated the name *Sch. cattoi* (since upset by Looss) (22) died in quarantine at Singapore "of cholera after three days' illness," though a most minute and detailed account of the *post-mortem* examination made by Catto shows no evidence of the disease having been cholera but does show an intensely acute enteritis due to *Sch. japonicum*.

I have endeavoured to indicate in the fewest possible words the distinction between the two main types of disease due to *Schistosomum* infection as illustrated in the two countries where they show their greatest differentiation. The disease wherever found is always akin to one or other of these type forms, and it is under the guise of one of them that the malady should be looked for in India.

As far as our scanty records go all the cases described as having been introduced into, or found in this country have been due to *Sch. hæmatobium* and have had hæmaturia as their leading symptom, and one would possibly be induced thereby to expect that Indian schistosomiasis would be "Bilharzia," but it seems to me impossible that this should be the case. The leading symptom of Bilharzia is so gross and so immediately tricking that it could never have remained undetected for long and there must have been recognised centres if only of "Endemic Hæmaturia" but such as far as I am aware, is not the case.

We have no record if its introduction gives rise to symptoms which, though striking enough when once recognised, do whilst still unfamiliar and unexpected, lend themselves to confusion with other diseases and, as it happens, with diseases with which we are all so familiar that we are perhaps inclined to accept them as diagnosed, as it were on sight, when further thought and consideration might lead us to detect something unfamiliar about the cases, and we may thus up till now have failed to detect an important disease which may be, even widely, disseminated throughout the country.

Whether the different species of *Schistosomum* are mutually exclusive, as far as man is concerned, I do not know. Among animals, as Montgomery has shown different species may exist not only in the same country or district, but in the same animal (22). As far as I know, with the exception again of the disputed *Sch. mansoni*, in no country has more than one species been described, with the exception, of course, of evidently immigrant cases. If this is so, and the speculation is an interesting one, it might account for the curious fact of so many known, and in all certainty, so many unrecorded in

stances of the introduction of the Egyptian or hæmaturic form of the disease failing to propagate the infection, it being presumed that the *Sch. japonicum* already holds the field.

REFERENCES.

- (1) R. E. Montgomery, M.R.C.V.S. "Observations upon Bilharziosis among Animals in India." *Journ. of Trop. Vet. Scien.*, Part I, Vol. I, 1906.
- (2) Transactions of the Medico-Chirurgical Soc., 1882, (Nov. 14).
- (3) Bomford, G. "Notes on Eggs of Distomum (Bilharzia) hæmatobium found in Transport Cattle in Calcutta." *Scien. Mem. Med. Off. India*, 1886. Part II.
- (4) Idem "The Uncinate Ova of Bilharzia found in the large Intestine of two Calcutta Transport Bullocks." *Quart. Journ. of Vet. Scien. in India*, 1887. Vol. V.
- (5) W. K. Hatch. *Lancet*, Ap. 30, 1887.
- (6) A. Powell. "Bilharzia in India." *Brit. Med. Journ.*, Feb. 28, 1903.
- (7) Idem, *Indian Medical Gazette*, Nov. 1903.
- (8) E. P. Sewell. *Journ. Roy. Army Med. Corps*, Nov. 1904.
- (9) S. R. Christophers and J. W. W. Stephens. "Note on a Peculiar Schistosomum Egg." *Brit. Med. Journ.*, Nov. 11, 1905.
- (10) D. Wardrop. *Journ. of Roy. Ar. Med. Cor.*, Vol. VI, 1906.
- (11) E. C. Freeman. "A case of Bilharzia Hæmatobium contracted in England." *Jour. of Roy. Ar. Med. Cor.*, Vol. V, 1905.
- (12) N. Faichnie. "A case of Bilharzia Hæmatobia Contracted in England." *Journ. of R. A. M. C.*, Vol. V., 1905.
- (13) W. S. Crosthwaite. "Notes on two cases of Bilharzia Hæmatobia at Thayetmyo, Burma." *Journ. of R. A. M. C.*, Vol. IX, 1907.
- (14) James Petrie. *Brit. Med. Journ.*, July 18, 1903.
- (15) Janet G. Horwood & A. J. Milne. "Poeypoid Tumour of Cervix "Uteri due to Bilharzia." *Brit. Med. Journ.*, Mar. 10, 1906.
- (16) P. S. Sturrock. "Bilharzia in Mesopotamia." *B. M. J.*, 2, Dec. 1899.
- (17) J. Scott. "Bilharzia in Persia." *B. M. J.*, Mar. 26, 1904.
- (18) Katsurada, T., & Hasegawa, T. *Sei-i-Kwai Med. Journ.*, Oct. 31, 1909.
- (19) Ernest, C. Peake, *China Medical Journ.*, 1908.
- (20) Bilharz Th. "Fernere Beobachtungen über das die Pfortader des menschen bewohnende Distomum hæmatobium, und sein Verhältniss zu gewissen pathologischen Bildungen" *Zeitschrift f. Wissenschaft. zoolog. Leipsig*, Band IV. (1852).
- (21) J. Catto, "Schistosomum Cattoi. A new Blood Fluke of Man." *B. M. J.*, Jan., 1905.
- (22) A. Looss, *Centralblatt f. Bakteriol. Parasitenkun. u. Infects. Krankheit*, Vol. XXXIX, p. 280.

A Mirror of Hospital Practice.

THE TREATMENT OF SIMPLE FRACTURES, DISLOCATIONS AND SPRAINS BY MASSAGE AND EARLY MOVEMENT.*

BY A. HOOTON.

MAJOR, I.M.S.

In a standard work on surgery published in 1895 the following passage occurs:—"In the treatment of an uncomplicated simple fracture all that the surgeon has to do is to place the fragments in proper position and retain them there, and to attend to the general health of the patient on ordinary principles. Nature unites the bone. In no way can the surgeon accelerate the process or improve upon it, but by meddling treatment he may retard and disturb it." During the 18 years since this was written, by one of the most distinguished English surgeons, surgical opinion has been slowly changing. It has taken a great deal of writing and demonstration to convert the profession to a different

view, but there can be no doubt that the consensus of opinion is now in favour of a different line of treatment, and that the advisability of early movement combined with massage is generally admitted, though, in working class practice especially, it may not always be practicable to spare the time necessary to carry it out effectively. The two chief advocates of early movement and massage in fractures, dislocations and sprains were a French surgeon, Lucas Championniere, and Wharton Hood, a London surgeon who had studied the practice of Hutton, a famous English bone-setter. The bone-setters are unqualified practitioners, frequently of a very ignorant type who are looked on with suspicion by the regular medical profession in England, and it was perhaps for that reason that little notice was taken of Wharton Hood's earlier writings in connection with the treatment of injuries in general. It was known that he had worked with Hutton, and no doubt he would suffer in professional credit for having done so. Hutton, however, was a very well informed and clever man, far above the ordinary bone-setters in ability, and had the opportunity of observing large numbers of old injuries, brought to him in many cases after distinguished surgeons had failed to cure them. His observations had led him to the belief that ordinary surgical practice in such injuries as old sprains and fractures in the vicinity of joints, followed by stiffness often associated with much pain, was all wrong. Following up this idea, and developing the methods handed down to him by his family, who had also practiced the profession of bone-setting for generations before, he adopted forcible movements in these old injuries, often with great success, succeeding repeatedly in cases where the regular surgeons had failed. No doubt he had his failures, also, but there his position was unusually fortunate. Nothing was heard of the failures, because people who suffered under his treatment were ashamed to confess that they had consulted an irregular practitioner. Thus Hutton acquired a great reputation, and when circumstances placed Wharton Hood in a position to study his methods he seized the opportunity, and for two years regularly attended the bone-setter's consultation room. In this way Wharton Hood became aware of the great service of massage and early movement in old injuries, and it was not long before he carried the system further, to the treatment of recent injuries. At the same time Lucas Championniere, was working on the same lines in his hospital in Paris and the two observers arrived independently at very similar results. The orthodox surgical practice as regards fractures, up to quite recently, has been that the fragments should first be placed as nearly as possible in their normal position, and that then every thing should be sacrificed to keeping them at rest. With this end in view it has been customary to put the limb in splint, so arranged, in the case of most of the fractures of the extremities, as to secure immobility of the joints above and below the seat of injury, and to postpone the treatment of any stiffness that might arise until after firm union had taken place. The occurrence of stiffness, often due to organic adhesions in the joint, was in fact looked upon as a necessary consequence of a fracture, and it was quite usual, in fractures in the neighbourhood of joints, to find the limb useless and painful when the splints were removed after 6 to 8 weeks, and to reckon a further period of two or three months, occupied in passive and active movements and massage as a part of the regular treatment. It was supposed that any movement before firm union had taken place would result in failure of union. But the advocates of the new system of treatment contended that so far from union being delayed the formation of callus was actually stimulated by movements carefully carried out, and they instanced the ready healing of fractures in animals, such as the dog in which it is impossible to keep the part entirely at rest, in proof of this statement. It is now generally admitted that this argument is sound, and that, granted that the part is brought into good position and kept

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