REMARKS ON INJURIOUS PARASITES OF EGYPT IN RELATION TO WATER-DRINKING.*

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PREVIOUSLY to the date at which the *Times* correspondent stationed at Alexandria called the attention of the British public to this subject (August 12th), I had already prepared notes on the parasitic dangers to which our troops in Egypt might become exposed.

As certain parasites possess a more or less restricted geographical area, it necessarily follows that invaders or temporary residents in foreign lands are themselves apt to be invaded by noxious parasites, more or less peculiar to the country which either duty or pleasure requires them to visit.

Egypt is a grand field for the helminthologist. Not only is that country the head-quarters, so to say, of one of the most dangerous of human parasites, but it swarms with others possessing scarcely less practical importance, whilst it likewise enjoys the distinction of having made us acquainted with parasitic rarities not known to occur in any other part of the world.

Without question, the most dangerous parasite is *Bilharzia hamatobia*. This parasite was so named by me in honour of Dr. Bilharz of Cairo, who first discovered it in 1851. A few years later, I detected the same species in a monkey; and since the year 1856, confirmatory discoveries and observations, made both at home and abroad, have very greatly extended, though they have by no means completed, our necessary knowledge of the natural history of the parasite. In this connection, we must signalise the labours of Dr. Prospero Sonsino, whose residence in Egypt enabled him to contribute important facts. It is to Dr. Sonsino that we owe our knowledge of the fact that cattle and sheep are also liable to be infested by *Bilharzia*; but the species is not the same as that which invades man and monkey. Amongst recent contributions, we also stand especially indebted to the writings of M. Chatin and to those of Drs. Guillemard, Mackie, and Allen.

The *Bilharzia* is a fluke of the digenetic kind, and therefore requiring a change of hosts. It differs from the sheep-fluke and its allies in being unisexual, the male parasite being the stouter of the sexes. This is an unusual circumstance. Again, the *Bilharziæ* differ in respect of habitat; for, instead of occupying the liver-ducts and intestinal tract, as most flukes do, they take up their abode within the blood-vessels of the victim. Moreover, their residence within the human host is restricted to the veins, and here chiefly to the vessels belonging to the portal system.

Although the parasites are individually small—the slender females being less than an inch long—the presence of any considerable number of them gives rise to a very formidable malady, which in the worst cases proves fatal. The disorder has received various names; but it is sufficient to speak of it as the endemic hæmaturia of warm climates. Dismissing the clinical aspects of the subject, and viewing it solely as a question of public health affecting European residents and visitors, I may state that I have recently seen six of the officers of the Eastern Telegraphic Company who contracted the disorder in the neighbourhood of Suez. Seven in all (not “about a dozen”, as reported in the *Times*) were thus invalided. I have likewise recently seen another case from Natal. In all of these gentlemen, the immediate cause of the parasitic invasion was the careless drinking of unfiltered water. In the Egyptian cases, infection occurred during shooting expeditions along the banks of the Cairo-Suez Canal. The Mahmoudieh or Sweet Water Canal, in the neighbourhood of Alexandria, is equally with this and other canals a source of parasitic danger.

Thus, all the evidence that we have obtained of a practical sort as to the cause of the endemic, is in perfect harmony with that which has been derived from scientific inquiry. So far as our investigations have been pushed—my own efforts in this direction having been frequent and continuous—it is clear that the natural history phenomena of *Bilharzia* do not differ in any essential particular from those that occur in ordinary flukes. In short, we have a similar mode of origination, the same rapid growth and development, attended with metamorphosis and likewise a change of hosts. As with other digenetic flukes, the *Bilharzia* must have its own special cercaria-form; and, arguing from

analogy, there can be but little doubt that the cercaria in question is furnished with a style or boring-tooth.

Investigations with the view of determining the ultimate changes undergone by the larvæ of *Bilharzia* are indeed still wanting. Probably they can only be successfully conducted in infested districts. The negative character of my own experiments with the lower forms or ciliated larvæ is sufficiently explained by the circumstance that the appropriate intermediate bearers were inaccessible to me. I succeeded in hatching out myriads of embryos, and I demonstrated the fact that they were possessed of a highly developed water-vascular system. The subject was fully illustrated in the *BRITISH MEDICAL JOURNAL*, July 1872. Thus far, M. Chatin and others have verified my observations, but beyond this none of us could advance.

Practically, it is of small moment what species of water-snail or other aquatic organism holds the cercaria of *Bilharzia*. Infection may follow as well from the ingestion of the free swimming cercariæ as from swallowing the intermediary bearers. Whichever mode of infection occurs, it comes to the same thing in the end. The fresh water canals hold the molluscan bearers and cercariæ; and the latter, when swallowed, arrive at maturity within the ultimate host—man or monkey, as the case may be. The disorder follows. This being so, it is obvious that simple filtration will, under ordinary circumstances, prove a sufficient protection. The drying or damming up of the Mahmoudieh Canal is not an unmixed evil to the present occupants of Alexandria. It ensures greater freedom from parasitic invasion, and it induces efforts to remedy the evil consequent upon the failure of the ordinary supply of fresh water.

Unfortunately, the *Bilharzia* is not the only obnoxious parasite that gains access to the human body by means of foul drinking-water in Egypt. The next parasite of importance is the *Ankylostoma duodenale*. It belongs to the Strongyle family, and, like most of its congeners, undergoes growth transformations within water or within moist earth. Most probably its development is also accompanied with a change of hosts. If this be so, we must expect to find some species of aquatic insect or some small entomostracan play the rôle of intermediate bearer. These crustacea abound in all the fresh-water canals. Transferred to the human body, the young ankylostomes, or *Dochmii*, arrive at maturity and become veritable blood-suckers. When in small numbers, their presence may not be so much as suspected; but when several hundreds of them occupy the intestinal canal, they produce what Griesinger has called a progressive pernicious anæmia. How fatal this parasite may prove in other countries than Egypt, was recently shown in the endemic which carried off some of the labourers working at the St. Gothard tunnel. At the time of the outbreak, many disputes and misunderstandings prevailed concerning the rôle of this parasite. Under the popular title of “tunnel trichinosis,” the affection was sadly mixed up with other endemic disorders. Similarly, the blood-letting habits of *Ankylostoma* and *Bilharzia* being liable to produce like symptoms, the two affections were occasionally rolled into one. The matter cannot be further discussed in this place, but I may observe that our knowledge of the geographical distribution of this treacherous entozoon has been greatly extended by the recent observations of Professor McConnell, who finds that the parasite abounds in India. Wherever found, its power for mischief is the same, and its entrance into the human body is through the medium of water.

Another notorious parasite is the so-called *Filaria sanguinis hominis*, but I cannot now enter fully into the question of its importance. I allude to it here for the purpose of introducing Dr. Sonsino's opinion respecting the collective rôle of the three specially obnoxious endemic worms of Egypt. These three species, namely, *Bilharzia*, *Ankylostoma*, and *Filaria*, “concur”, he says, “in the production of a large mortality of the natives”, and the mischief they thus occasion “is not sufficiently appreciated.”

When recently I was invited by the Managing Director of the Eastern Telegraph Company to draw up a memorandum on this subject, I laid down the following rules for the guidance of their employés.

1. Select for drinking purposes, whenever procurable, either deep well-water or water from a spring collected at or near its source.
2. Avoid the use of stagnant water of any kind, especially that procured from tanks or shallow pools.
3. If the only water available for drinking purposes have been obtained from a doubtful source, it must either be thoroughly filtered or boiled; merely straining through muslin or other of the coarser kinds of filter is useless. On excursions or shooting expeditions, a pocket-filter must be carried.
4. Avoid partaking of all salads made with vegetables grown either in market-gardens, or in open situations frequented by natives of uncleanly habits. Lettuces, water-cresses, and other uncooked vegetables, even when they are known to have been cultivated in favourable situa-

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tions, require to be carefully washed with clean water before use. Only spring-water, well-water, filtered water, boiled water, and distilled water, can be pronounced as absolutely safe. Springs near human habitations are liable to become contaminated.

I believe that the observance of these rules is sufficient to ensure protection; but, since others (whose opinions are also entitled to consideration) take a different view of the mode of infection, it is desirable to state the grounds on which an additional precaution has been recommended.

It is supposed by some writers that the young *Bilharzia* gain access to their victims by perforating the skin; consequently, they would forbid bathing in rivers, canals, and open fresh waters of any kind. Sea-bathing, on the other hand, is very properly encouraged.

There is some ground for the objection raised as to bathing in fresh waters, inasmuch as the larvæ of the common fluke have been known to penetrate the skin and to develop in such situations. These instances, however, are rare, and they merely afford examples of parasitic "straying" from the usual path.

The memorandum above quoted was printed and privately issued to the Company's stations on the 29th of last March. With the managing director's approval, these recommendations are now made public.

Lastly, as regards dangers that may arise from external attacks by water-parasites, little need be said. Many still hold, and until lately I myself was of the same opinion, that the Guinea-worm or *Dracunculus* enters the human body from without. We owe it to the lamented Russian traveller, Fedtschenko, to be able to state that *dracunculus* requires a change of hosts, and that a species of cyclops is the intermediary crustacean bearer. There is little danger in Egypt from this source. Troops in foreign lands are now uncommonly well protected by clothing; still there are points worth mentioning, especially as, in the heat of a campaign, distress from thirst often compels the brave soldier to drink the filthiest of waters. One remark will suffice. During the invasion of Egypt by Napoleon, the French soldiers were so distressed that many of them threw themselves flat on the ground to drink at the margin of the canals. In this way, their mouths and nostrils were attacked by leeches; the species specially held responsible for these bloodthirsty assaults being that known as the *Hæmopsis Sanguisorba* of Savigny. These free parasites not only attacked the men, but also their horses, camels, and cattle. It has recently been re-stated that in the expedition of 1799, the French soldiers also suffered from hæmaturia. That such was the fact there can be no doubt, and it is almost equally certain that the disorder was occasioned by the now well known *Bilharzia*. At that time, however, the parasite was entirely unknown. Thus it is both interesting and instructive to observe how modern discoveries and researches throw light upon events that have long become historic, and upon endemic diseases whose essential character was completely misunderstood at the time of their occurrence.

DREAMS.—M. G. Delaunay recently made a communication to the Paris *Société de Biologie* on our new methods of physiological investigation. Physiologists who have studied cerebral thermometry have found a relation between the temperature of the brain and that of the cranium, which is not physical but physiological. M. Delaunay, by making experiments on himself during sleep, discovered that similarly a rise in the cranial temperature induces cerebral action. According to psychologists, dreams are generally illogical and absurd; M. Delaunay, however, by covering his forehead with a layer of cotton-wool, rendered at will his dreams healthy and intelligent. The second method is based on decubitus, which, by favouring the afflux of blood into the dependent part, increases nutrition and induces action in that part. According to M. Delaunay, the dreams which people have when lying on the back are sensuous, agitated, and erotic. Those which occur when the dreamer is lying on the right side are changeable, full of exaggeration, absurd, and relate to old recollections. Those which occur when lying on the left side are intelligent, reasonable, and relate to recent occurrences. Finally, people often talk during the last-mentioned kind of dreams. The writer sums up to the effect that dreams are a legitimate subject for psychological investigation, since dreams, intelligent or otherwise, erotic or sober, can be induced by causing variations in the cerebral circulation and the nutrition of the various regions of the brain, either by the elevation of the cranial temperature or by decubitus.

ABORTION.—A case involving some medico-legal points was recently tried in Chicago. A girl died from metro-peritonitis. A midwife was tried of causing her death by attempt to produce abortion. The necropsy showed that there had been apparently an attempt to produce abortion, but that the girl had never been pregnant.

REMARKS

ON HOLIDAY-MAKING AND HEALTH- RESORTS OF NORWAY.

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WHEN medical men are planning a holiday for themselves, their families, or their patients, Norway is seldom thought of. The attractions of the Norwegian fjords have been known for several years past to the hardier class of yachting men. One or more summer months have been very pleasantly passed in exploring the many branches of the Hardanger and the Sogne fjords, the valleys and fine waterfalls which are near, and the mountainous districts within easy reach of safe anchorage. Further north, the whole coast may be visited through channels almost land-locked, and reindeer and Laplanders seen in the "land of the midnight sun". Latterly, a far more numerous class than the yachtsmen have obtained almost the same advantages by means of the numerous steamers which now run from Hull and London to Christiania and Bergen, and the Norwegian steamers which ply along the coast and up the different fjords. And, with the sole disadvantage to those who suffer from sea-sickness of the forty or fifty hours' passage from Hull, it is impossible to imagine how holiday-making and the search for health could be more pleasantly combined than in a summer visit to Norway.

Those who wish to see the midnight sun would be obliged to leave England early in July. This is earlier than would suit a London practitioner; but all the southern parts of Norway can be visited with equal advantage up to the end of August, or even later. My own tour was limited from leaving London on July 25th till my return on August 28th. During these five weeks, we had only one thoroughly wet day; only two in which excursions were partially interfered with by rain; only one day and night when warm clothing was necessary or comfortable; and, although an umbrella was generally required during the warmer parts of the day as a sunshade, the heat was scarcely ever too great for comfort. Clear air and a pleasant soft refreshing breeze were the rule, not only in boats or steamers, but on the roads. Of course, some seasons are more rainy, and some hotter; but as compared with Switzerland or the Tyrol, my own experience and that of others would seem to bear out the impression that one may expect less interference with plans from weather in a Norwegian summer than elsewhere.

Then, as to accommodation; for healthy travellers who are not fastidious, this is quite sufficient. The hotels in the larger towns are good, and the steamers are comfortable. At the smaller country inns and stations visited by travellers in the carriages of the country, the arrangements are primitive, and for ladies far from convenient; but, of the many ladies whom I met at different places, I did not speak to one who did not think that these minor drawbacks were not far more than counterbalanced by the beauty of the scenery, the novel mode of life, and the many interesting events in each day's journey.

As to expense: in Norway, travelling with a party of four to six persons, about £1 a day for each person is a fair or liberal estimate for those who travel in the ordinary manner. But as all this may be learned from the guide-books of Murray, Baedeker, or Bennett—or from Mr. Cook, who has excellent arrangements for tourists in Norway—I shall content myself with thus simply pointing out a comparatively untrodden path to any who are planning a holiday; and proceed to give some little information as to some of the health-resorts in Norway. Hitherto they have been chiefly used by Norwegians themselves, with a few visitors from Sweden and Denmark or Germany. But, occasionally, an English sportsman or traveller has been glad to combine his plans with a visit to one of the sea-bathing places, hydropathic establishments, or mineral baths which are to be found both near the sea, or rather on one of the fjords, and in more mountainous districts. The most important of all these bathing-places I visited on July 7th and 8th, at Modum, about thirty English miles from Christiania. It is near the shore of the Tyrifjord, surrounded by pinewoods on the slope of mountains which extend northwards and bound a valley or gorge, along which rushes a river after a very fine precipitous fall. The hills and the sides of the stream and falls are rich in sheltered walks, and the air is very pure and invigorating. A spring known as St. Olaf's fountain is a strong chalybeate, with free carbonic acid.