Most of them represented well advanced types of disease, so that they presented a most discouraging outlook when treatment was commenced. They were all placed under the best conditions possible as regards surroundings and diet. Even from this small number of cases, it seems fair to conclude that passive congestion shortened the course of treatment of these diseased joints, and that by its means excellent results were obtained where in some the only outlook seemed to be in operative interference.

SOME ETIOLOGICAL SUGGESTIONS.*

- (1) CONCERNING THE SIGNIFICANCE OF AN EMBRYO INTESTINAL WORM FOUND IN THE BLOOD STREAM; (2) REGARDING A SPIROCHAETE FOUND IN YAWS PAPULES; AND (3) A HINT AS TO THE POSSIBLE CONNECTION BETWEEN CHIGGERS AND AINHUM.

BY F. C. WELLMAN, M.D. BENGUELLA, ANGOLA, AFRICA.

I.

THE fact that the following suggestions may possibly have an immediate bearing on the etiology of several tropical affections has led to their publication in this incomplete form.

In my last report on the disease incidence of my district in West Africa I figured and described an unknown entozoal embryo found in the blood stream of a young negress. It was different from the so-called *Anguillula stercoralis* and from the embryo of *Uncinaria duodenalis*. Its presence in the circulation puzzled me, although I referred at the time to Looss's work with larva of *U. duodenalis* as indicating a possible explanation of the presence in the blood of the worm seen by me. My exact words on this point were as follows: "That the embryos of at least some entozoa can pierce the tissues of their host is proven by the experiments of Professor Looss with the embryos of *A. duodenale* in Egypt, some of whose preparations I have seen. Bentley's work on the etiology of Pani-ghao in Assam proves the same thing."¹ Later researches by Looss show that the larvæ, after piercing the skin, leave the subcutaneous tissue in the blood stream, and, passing through the right heart to the lungs, travel up the trachea and down the esophagus to the stomach and intestines. These researches having been fully confirmed by the later work of Schaudinn, Smith, Lambinet, Herman, Boycott and others,² it has occurred to me that my worm may be the larval form of some other intestinal parasite which when observed was in the process of reaching by a similar route its normal habitat in the alimentary canal. If it should prove to be the case that intestinal worms other than *U. duodenalis* may enter their host through the skin, the proneness of bare-footed and scantily clothed races to helminthiasis

would receive additional explanation and a definite means of prophylaxis would be suggested.

II.

Some time ago while examining a scraping from a yaws papule, I was somewhat surprised to see under the 1/12 oil-immersion lens a number of active spirilla-like bodies which in form and movement closely resembled *S. obermeieri*. Thinking it to be a case of the parasite of relapsing fever I thereupon made a prolonged and careful examination of the blood which, however, contained no spirochaetes. I found the parasites in other papules of the same case. The patient, a young girl probably alarmed at my interest in the case, promptly decamped. Having never demonstrated this parasite in cases of yaws examined before or since I concluded that its appearance in this case was accidental, and connected it with similar organisms which have been described in *Pyorrhea alveolaris* and other chronic inflammations of the mouth and different parts of the body. In thinking over the matter since, in the light of Schaudinn's announcement that the *Spirochaeta pallida* is the germ of syphilis (which seems to be confirmed, or at least it seems to be proved that that parasite is found only in the lesions of syphilis — by such high authorities as Metchnikoff, Fränkel and Lehman), I have wondered if the spirochaete seen by me in yaws may not, after all, be significant. The many points of likeness between yaws and syphilis (which has led to theories of their actual identity as held by Hutchinson, Scheube and others) lends weight to such an idea. Of course a single observation is of no great value. However, there may be reasons why the parasites cannot be found at all times during the disease, and we know that such organisms stain badly. I hope to make further observations on the subject and hope others will do the same. If such *spirochaeta* as I have mentioned be related, as Schaudinn maintains, to the trypanosomes a suggestive parallel is seen in dourin, a trypanosome affection of animals which is transmitted by coitus. Wright has pointed out³ that the lesions in dourin and those seen in the mouth associated with the presence of spirochaetes are very similar. I have never been (on clinical grounds alone) a friend to the actual identification of yaws with syphilis. Their histo-pathology has, however, many points in common, and, should the germ of both turn out to be a spirochaete or trypanosome their relation could be regarded as even closer. In such an event the venereal disease of horses and two of the great venereal diseases of man (syphilis and yaws — which latter is undoubtedly often transmitted by sexual contact) would be shown to have a similar etiology.

III.

Some time ago, while engaged in a study of the chigger (*S. penetrans*) and later during the observation of several cases of ainhum, I noticed that the chigger has, even in healthy feet, a predilection for the under surface of the

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¹ Vide report published in the New York and Philadelphia Medical Journal, Aug. and Sept., 1905.

² Cf. Boycott, Journal of Hygiene, v. 3, p. 283.

³ Lancet, July 9, 1904, p. 74.

little toe, and especially so if, as is so often the case, the skin is cut or torn. It is well known to those who have studied the habits of the chigger that the insect invades abraded or irritated surfaces oftener than sound skin. The fold of skin under the proximal joint of the little toe corresponding to the edge of the web between the toes is the point where wounds are oftenest made by the sharp grasses, etc., through which the barefooted native walks and runs. The principal reason for this in the African is that the little toe of barefooted negroes lies separate from the others at an angle due to anatomical reasons connected with flatfootedness. As I have said, chiggers are oftenest found on the under surface of this toe even when all the toes are intact. When wounds are once made here, however, the chiggers persistently invade them and must be removed constantly. While I do not wish to be read as advocating *S. penetrans* as the sole cause of ainhum, it seems to me that these insects must play a part (in some instances, at least) in the continued irritation which, especially in blacks (who have a fibrogenetic tendency), may lead to the contracting fibroses occasionally resulting in the spontaneous amputation known as ainhum. Such a theory goes far to account for the geographical distribution of the disease which is particularly common in the two great homes of the chigger, viz., tropical America and Africa.

The above conjectures which are, I admit, founded on slight evidence are not put forth in a dogmatic spirit but merely in the hope that they may prove suggestive to those working on the etiology of tropical diseases.

SUPPLEMENTARY NOTE ON A SPIROCHAETE FOUND IN YAWS PAPULES. *

BY F. C. WELLMAN, M.D., BENGUELLA, ANGOLA, AFRICA.

SEVERAL weeks ago I sent to Professor McFarland a paper in the course of which I mentioned the fact that I had found *spirochaetae* in the papules of a case of yaws.

Only yesterday there reached me the report of the meeting of the British Medical Association at Leicester. At that meeting Dr. Aldo Castellani announced¹ the discovery of *spirochaetae* in two cases of yaws in Ceylon. One of his observations dates back as far as February, 1904. My independent discovery of this organism in yaws papules (which may now be regarded as a confirmation of Castellani's previous observation) only dates from July 14, 1905. So I have thought it worth while to publish this additional note which will serve to obviate any misunderstanding that might arise from the tenor of my previous paper which was on its way to America before Castellani's announcement reached me.

It is significant that this observation (which has been spoken of as "one of the most important discoveries of recent times, considering the fact

that the *Spirochaeta pallida* has been found by Schaudinn in syphilis, and considering the relation said to exist between yaws and syphilis"² should have been made almost simultaneously in two such widely separated countries as Ceylon and West Africa. It is to be hoped that observers in all parts of the tropics will avail themselves of every opportunity to thoroughly investigate the matter.

I have sent a statement similar to the above to the *Journal of Tropical Medicine*, London.

THE INFLUENCE OF DAMPNES OF SOIL AND CLIMATE ON THE DISEASES OF RESPIRATION.*

BY HENRY J. BARNES, M.D., BOSTON.

FORTY-THREE years ago the late Dr. Henry I. Bowditch of this city, in an address before the Massachusetts Medical Society, after a very laborious inquiry throughout the state, concluded "a residence on or near a damp soil, whether that dampness be inherent in the soil itself, or caused by the percolation from adjacent ponds, rivers, meadows, marshes, or springy soil, is one of the primal causes of consumption in Massachusetts, probably in New England and possibly in other portions of the globe." To this address and the report of Dr. Buchanan of England, in 1867, on the distribution of phthisis as affected by dampness of soil, reference is often made by writers of textbooks now in use, as authority for the opinion, dampness is not only a cause of this disease but others of respiration. Since the recognition of the bacillus of tuberculosis by Koch in 1882, dampness can only be considered a predisposing or contributing cause by authors quoting from the works of Drs. Bowditch and Buchanan. Little if any effort is made to show why this condition of soil should cause disease, although Dr. Billings writes, "It would be easy to construct a plausible theory in connection with the supposed cause of phthisis by a bacillus."

If the bacillus of tuberculosis, or any of the known pathogenic organisms causing disease of the respiratory tract, can preserve their virility in a damp soil, of which there is much doubt, chiefly because of the bactericidal influence of sunlight, the condition of dampness must be unfavorable for their transportation to the respiratory tract. Their presence in indoor air has been abundantly demonstrated, they may be rafted on particles of dust, but how they would be detached from damp surfaces is difficult to understand, unless released, and transported by an intermediary host of which we have little evidence. So long, then, as they remain in or on a damp soil they can have no influence on the organs of respiration.

If damp soil, then, is a factor in promoting diseases of respiration, it must be through the changes it produces in the air in the vicinity of

* This paper by Dr. F. C. Wellman as received by us Dec. 7, 1905. Owing to a misunderstanding its publication has been delayed.

¹ "On the Presence of *Spirochaetae* in two Cases of Ulcerated Parangi" (Yaws). Abstract in *Journal of Tropical Medicine*, Aug. 15, 1905, p. 253.

² Brit. Med. Jour., Aug., 5, 1905, p. 282.

* Read at the meeting of the American Social Science Association, 1905.