

THE TREATMENT OF YAWS (FRAMBOESIA) WITH  
ARSENOBENZOL (SALVARSAN).\*

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PLATES LIII AND LIV.

Yaws is a highly contagious and disfiguring disease very prevalent in the tropics and believed now to be caused by a specific spirochæte—the *Treponema pertenuis* of Castellani. Although some writers have held that yaws and syphilis are merely two manifestations of the same disease, it can now be stated that the weight of opinion is against that view and in favor of the view that they are distinct diseases. With this latter conclusion the experimental work of the last few years is in harmony.<sup>1</sup> Monkeys can be inoculated with yaws as with syphilis; and monkeys which have recovered from syphilitic lesions are still susceptible to inoculation with yaws, although they are not reinoculable with syphilis. Moreover, *Treponema pertenuis* is distinguishable morphologically from *Treponema pallidum*; and thus while it can be affirmed that both syphilis and yaws are caused by spirochætal organisms, it can also be stated that the spirochætæ belong to different species. All the evidence is, therefore, to the effect that the diseases are distinct entities.

Hitherto, the treatment of yaws has been highly unsatisfactory. In the first place, the usual treatment employed must be continued over long periods of time to attain any permanent result. While this is possible in some cases among the better class of patients, it is nearly impracticable with the class of dispensary and hospital patients, and among the lower classes of natives it is wholly impracticable. There would appear to be no specific treatment for

\* The substance of this paper was read at the meeting of the Manila Medical Society, September 5, 1910, at which one of the cured patients was exhibited. Received for publication, December 29, 1910.

<sup>1</sup> This is the inevitable conclusion from the experiments of Charlouis, Neisser, Baermann, Halbertstädter, Ashburn and Craig, Levaditi, and others.

yaws. Such eminent authorities as Manson, Scheube, Castellani, Plehn, Firth, and Jeanselme are unanimous in designating the present methods as very unsatisfactory. Probably, indeed, none of the older drugs—mercury, arsenic—actually influences the duration of the disease. Potassium iodid, which seems to accomplish more, is notably uncertain in its action. The eruption will sometimes disappear rapidly when iodids are administered; but even in such cases, during the employment of the drug, fresh eruptions appear.

#### ARSENOBENZOL A SPECIFIC REMEDY FOR YAWS.

A few months ago Professor Ehrlich kindly sent me a supply of dioxydiamidoarsenobenzol, or "606," or, as it is now designated, arsenobenzol or, preferably, salvarsan, the last being the name under which the drug has been introduced into commerce, to be employed in the treatment of syphilis. So many publications based on the employment of the drug in syphilis have already appeared that I shall not deal with that subject at the present time. In view, however, of the favorable results obtained with the drug in the treatment of syphilis, I determined to test its effects in yaws. This decision seemed warranted by the close morphological and biological relationship existing between the spirochætæ causing the two diseases and by the fact, established by Ehrlich and Hata,<sup>2</sup> that fowl spirochætosis is favorably affected by the drug. Moreover, Iversen<sup>3</sup> had already applied the drug successfully to the treatment of relapsing fever in man, in which condition the spirochætæ are rapidly destroyed and the disease is cured.

Up to this time twenty-five cases of yaws have been treated with arsenobenzol. The full reports on the cases is being reserved for the present in order to ascertain whether any relapse will occur. So far there have been no evidences of a relapse and the cases have remained cured, although many of them were treated four months ago or longer.

The form of preparation employed was that of the alkaline solu-

<sup>2</sup> Ehrlich and Hata, *Die experimentelle Chemotherapie der Spirillose*, Berlin, 1910.

<sup>3</sup> Iversen, *München. med. Wchnschr.*, 1909, lvi, 1785.

tion, which was injected deeply into the gluteal muscles. On the day following the injection, some reddening, swelling, and induration of the skin and deeper tissues were usually present; but in no instance did suppuration develop, and pain, when complained of, was stated not to be severe. Among those treated were several children who did not seem to suffer pain either during or after the injection, although they were noted to be less lively than usual for about twenty-four hours after the treatment.

A single injection, has, up to the present, proven sufficient to bring about a cure of the lesions of yaws, and this notwithstanding the fact that in a number of instances tertiary lesions with ulceration existed. No other form of treatment, either local or general, was employed along with the arsenobenzol. The effects of the drug are exercised quickly. Three or four days after its administration the granulomatous lesions begin to change and grow smaller, and in from ten to twenty days they have usually disappeared and left behind a smooth pigmented surface of skin. The effects have, indeed, been both striking and surprising, and in some cases, in contrast with the other modes of treatment, almost magical. In from twenty-four to forty-eight hours after the injection, the margins of the granulomatous lesions are reddened and the centers rendered of a bluish hue, both the results of congestion. The spirochætæ soon disappear and absorption of the lesions progresses quickly. The skin finally resumes its normal color.

Although in none of the series of cases reported was a second dose of the drug given, I believe that in severe cases of long standing in which the ulcerations are extensive, a second injection could be administered with advantage about three weeks after the first. I have employed from 0.25 to 0.3 gram of the drug in children, and from 0.4 to 0.5 gram in adults. I should add that I have never observed any unfavorable constitutional symptoms follow the administration of the drug; and, on the other hand, that I have seen the general health improve rapidly after the disappearance of the eruption.

The accompanying photographs (figures 1, 2, 3, and 4) illustrate the conditions before and after the administration of the drug. They represent a very few of the results obtained.



FIG. 2.



FIG. 1.



FIG. 4.



FIG. 3.

Finally, I should add that while the studies reported were in progress, the papers of Nichols<sup>5</sup> from the Rockefeller Institute for Medical Research came to my notice. In these papers are described for the first time the experimental production of testicular lesions in the rabbit, containing numerous spirochætæ, by means of material from the lesions of yaws obtained from a colored soldier who had returned to the United States, and the rapid cure of those lesions by means of a single injection of arsenobenzol.

EXPLANATION OF PLATES.

PLATE LIII.

FIG. 1. Case I. Before treatment. Granulomatous lesions on face, chest, arms, legs, etc.

FIG. 2. Case I. Twelve days after injection of arsenobenzol. All the lesions have disappeared and their site is indicated by smooth, pigmented skin.

PLATE LIV.

FIG. 3. Case II. Before treatment. Granulomatous lesions on face, trunk, arms, legs, and feet.

FIG. 4. Case II. Nine days after injection of arsenobenzol. All the lesions have disappeared, the skin has become smooth, and only some pigmented areas remain.

<sup>5</sup> Nichols, *Jour. Am. Med. Assn.*, 1910, lv, 216; *Jour. Exper. Med.*, 1910, xii, 616.