

## STATE WASSERMANN LABORATORY.

In 1909 Dr. Gay began the examination of bloods and spinal fluids by the Wassermann method in the Harvard Medical School. This work was chiefly done for private physicians and for a few of the State insane institutions. Later on Dr. Mooers, curator of the Neuropathological Department of the Harvard Medical School undertook the work, which ended by her death in 1912. For a period thereafter Dr. Lucas assumed charge of the laboratory but very shortly gave up his active duties and transferred them to me. Simultaneous with this transfer there was a rapid growth in Wassermann examinations. During the year 1912 approximately 4000 specimens were examined, and in the year 1914-15 over 8000 tests were made. This short historical sketch of the Wassermann work of the Harvard Medical School will indicate its growth and the experience derived from the clinical and serologic examination of a large number of cases.

In addition to the work carried on by the Harvard Laboratory a most helpful cooperation was established at the Massachusetts General Hospital, which gave both clinical and serological access to a large number of cases. These patients were studied exhaustively to establish the presence or absence of syphilis.

With this background of careful study and large experience the Wassermann Laboratory of the Harvard Medical School was transferred to the State Department of Health on June 1st, 1915. Simultaneous with this transfer a circular letter was sent to each of the district health officers and to each of the institutions under the control of the State Board of Charity, the State Board of Insanity and the State Board of Prison Commissioners, together with the secretaries of these boards, announcing the fact that the State Department of Health was offering them free Wassermann service.

Within a month after this first announcement the Laboratory extended its free services to private hospitals and institutions. In the July issue of the Public Health Bulletin a further extension was announced covering private physicians throughout the State.

The following will give some idea of the rapid growth of the Laboratory since its establishment. In June there were 631 examinations made while during the month of January 2800 were made. This increase was due both to greater interest on the part of institutions as well as private physicians.

Because of the interest which you no doubt have in the proper method of obtaining this service I shall give a somewhat detailed account of it. (1) Specimens may be submitted by direction of the district health officer. (2) Specimens will be received when properly submitted by direction of any local board of health which has made arrangements with the Laboratory for submitting specimens. (3) If the physician does not choose to select either of the above methods, because it will be more convenient for the patients to apply directly to the Laboratory, he may send his patients to Building D, Room 103, of the Harvard Medical School, where patients will be bled on Tuesdays and Thursdays from 2 to 5, unless a special appointment is made at some other time. In the past there has been some difficulty in communicating with the Laboratory by telephone. This may be most easily done by calling the Harvard Medical School and asking for the Wassermann Laboratory.

Because of the present organization of the Laboratory it is impossible to place Wassermann outfits into the hands of every physician of the State. The Laboratory is therefore making every effort to encourage the local boards of health to undertake the bleeding of patients. In this way, physicians in all parts of the State might have use of the Laboratory and there would be secured a uniform method of submitting



specimens. From our experience the only possible way of maintaining a high state of efficiency and accuracy is by a uniform method of submitting specimens.

#### WASSERMANN REACTION.

The Wassermann reaction is a serologic test to detect the presence of antibodies, in blood or spinal fluid, formed as the result of an infection with *spirochaeta pallida*. It is not to detect the presence of these organisms, which, however, may be done by other biologic processes.

In the beginning, I gave a short historic sketch of the Wassermann Laboratory of the Harvard Medical School, indicating that the present standards were based on years of experience, careful study and the examination of thousands of cases, both clinically and serologically. One might well ask why is it necessary to undertake such an exhaustive study, in this way, for a laboratory test, which should have the infallibility derived from purely objective investigation. This to my notion is the most fundamental part of the test. The most important reagent, the so-called antigen, may be prepared according to approved Wassermann methods and used in like fashion, and yet, when put to the actual test fail to pick out absolutely characteristic cases of secondary syphilis. On the other hand, the antigen prepared as I have above described may yield a percentage of fifty, in all specimens submitted for examination. This is out of the question. I estimate that the normal incidence of the disease in the State of Mass. is between three and five percent. It is evident therefore that the accuracy of the reaction in any particular laboratory will depend upon care with which the cases are studied, both serologically and clinically, in order to make it trustworthy in those cases where a clinical history is in doubt, and where other exhaustive means of diagnosing the disease are not available.

The following is a brief description of the routine examination in the State Laboratory. All specimens for a given day are tested and the positives and doubtfuls from the first test are withdrawn and retested on the same day. This renders technical error practically impossible and admits of a concentration of time on the most significant reactions tested on that day. I may say that the most prolific source of poor Wassermann work is dependent on uncontrolled tests and a failure to properly identify each specimen as it passes through the complicated machinery required for Wassermann examination.

I had hoped to talk of the incidence of the disease in the various groups examined by the State Laboratory. But this in itself would constitute a discussion covering a much longer period than we can afford to spend at this time. I can say, however, that during the first five months of its existence 2443 patients were examined, serologically, 15% of these patients had been infected with syphilis. 475 were positive by the Wassermann test and 55% of these 475 were not suspected of having the disease, until a Wassermann examination had been made. This has the largest significance, when one considers that the majority of these patients were in good hospitals where excellent facilities for clinical examination were present. The conclusion is therefore easily reached, that even in the hands of an expert clinical syphilis, although present, is difficult of detection.

#### DIAGNOSTIC SIGNIFICANCE OF THE TEST.

Positive indicates that the patient has been, or is, infected with the causative agent of syphilis. In this community very rarely an acute febrile condition such as pneumonia and malaria may give a positive reaction. From our investigations this seems to be independent of the temperature of the patient but due to certain serologic changes incident to his infection.



Negative in the majority of instances indicates that the patient has not been infected with syphilis nor is he the harbinger of spirochaeta in his body at the time of the test. An exception to this statement is found in very early cases of primary syphilis. In obscure cases, three or more negative results should be obtained before reaching any conclusion as to the absence of syphilis.

My chief interest is in doubtful reactions and yet it is the most difficult problem to stimulate a similar amount of interest in the physicians and institutions who avail themselves of the services of the Laboratory. The usual reaction to a doubtful report is either that it means nothing or that possibly it would be wise to submit another specimen. When this is done and the second report is given as negative both patient and physician are delighted and feel no necessity for further examination. I cannot too strongly insist that doubtful means that there is a grave suspicion of a syphilitic infection, and in my experience persistently or predominatingly reactions always mean syphilis.

#### THERAPUDIC SIGNIFICANCE.

In this field our experience is not so mature. I can only offer you an outline of my personal experience which has been founded on many hundred cases of treated syphilis. But before doing this it will be best to consider the pathology of the disease. As the result of an infection with spirochaeta pallida there is effected in the blood and serous fluids of the individual a chemical or physico-chemical change. We speak of this as antibody formation which symbolically explains certain serologic reactions. Proper treatment of the disease is directed toward ridding the body of the infectious agent. It has nothing whatsoever to do directly with the so-called antibody content of the patient's blood. On the other hand when the body has been freed of the infecting agent there is, in many instances, a gradual disappearance of specific antibodies and a return to the serologic metabolism of the uninfected individual. When the in-

fection has had months or years of duration before treatment and the Wassermann reaction has been consequently firmly established as positive the disappearance of this reaction cannot be expected to follow a few injections of salvarsan or a few months of mercury by any of the methods now used.

One case will illustrate what I have just said. A patient after having received several months of anti-specific treatment consisting of salvarsan and intramuscular mercury had a persistently positive reaction during the course of her treatment and a month following it. One year later this patient was re-examined and a negative result obtained. She had had no anti-specific treatment during the interine. The conclusion is obvious. Her treatment had killed the spirochaetes. It was ample in character and in amount. Time only was necessary to make the positive reaction fade into a negative one.

When I am asked what the significance of a positive reaction is in a treated case my answer is a question. What has been the character of the treatment, its amount and duration? Is the patient clinically free from symptoms? If these questions are satisfactorily answered and the character, time and amount of treatment been adequate in my experience, I suggest that the clinicians desist from further treatment for a while at least, and simply watch the patient clinically and to submit specimens at intervals of three to six months each.

A persistent negative in a treated case is rarely accompanied by clinical symptoms and would indicate a cure, but only under the proviso that a previous Wassermann test had been positive.

Doubtful therapeutically means that the reaction is beginning to shift toward the negative phase.

In conclusion let me say the prompt recognition and intelligent treatment of this disease is a public health problem of the first importance, and the State Department of Health wishes every physician and every



institution, public and private, to cooperate in the control and eradication of the disease and the precaution of those later manifestations of it which are so destructive of health and life itself.