BRITISH JOURNAL OF VENEREAL DISEASES

- TANI, T., and AIKAWA, S. (1936) *Jap. J. exp. Med.*, **14**, 465; (1940) *ibid.* **18**, 39.
- TANI, T., SAITO, K., and FUNADA, H. (1935) *Zbl. Bakt. I. Orig.*, **134**, 232.
- TANI, T., and ÔGIUTI, K. (1936) *Jap. J. exp. Med.*, **14**, 457.
- THOMAS, CL. S., and MORGAN, H. J. (1934) *J. exp. Med.*, **59**, 297.
- TOMASCZEWSKI, E. (1910) *Berl. klin. Wschr.*, **47**, 1447.
- TRUFFI, M. (1909) *Zbl. Bakt. I. Orig.*, **52**, 555; (1910) *ibid.* **54**, 337.
- TURNER, T. B. (1939) *J. exp. Med.*, **69**, 867; (1939) 3rd Intern. Congr. Microbiology, New York, 636.
- UHLENHUTH* P., and GROSSMAN, H. (1926) *Arch. Derm. Syph.*, **152**, 708; (1927) *Zbl. Bakt. I. Orig.*, **104**, 166; (1928) *Z. Immun. Forsch.*, **55**, 380.
- UHLENHUTH, P., and MULZER, P. (1913) *Arb. Reichsgesundh.Amt*, **44**, 307.
- VAN HAELST, J. (1934) *Derm. Z.*, **69**, 212.
- V. VÁSÁRHELYI, J. (1936) *Z. Immun. Forsch.*, **89**, 296.
- WAKERLIN, G. E. (1926) *J. infect. Dis.*, **38**, 323.
- YAJIDA, H. (1929) *Jap. med. World*, **9**, 183.
- ZIMMERMANN, E. (1930) *Arch. Hyg. Berl.*, **103**, 269.
- ZINSSER, H., HOPKINS, J. G., and MCBURNEY, M. (1916) *J. exp. Med.*, **24**, 561.

IV

THE LORENZ FLOCCULATION TEST FOR THE DIAGNOSIS OF SYPHILIS IN BLOOD AND CEREBROSPINAL FLUID

By J. N. CUMINGS, M.D., M.R.C.P.

[From the Central Emergency Pathological Laboratory, Sector IX., and the Biochemical Laboratory, National Hospital, Queen Square, London.]

Lorenz (1940) described a rapid flocculation test for syphilis adapted for cerebrospinal fluid, using a modified Laughlen antigen. He obtained very satisfactory results when compared with a complement fixation procedure, and the test was much quicker to perform. It would therefore be valuable as an easy and rapid method of examination in some laboratories, provided it gave no false positive reaction and yielded a reasonably high proportion of correct positive results, as compared with the Wassermann.

This paper describes the results of Lorenz tests of 510 cerebrospinal fluids, and the application of a modification of the test to blood.

THE LORENZ FLOCCULATION TEST

METHOD

Stock Antigen. 0.1 gm. of scarlet red is added to 10.0 c.c. of standard Kahn antigen in a centrifuge tube, which is corked, and after mixture of the contents placed in the water bath at 55° C. for 4 minutes; after this, whilst still corked, it is centrifuged for 10 minutes. The supernatant fluid is removed and to it is added one-tenth of its volume of tinct. benzoin. co. (B.P.). This antigen keeps well at room temperature for some months.

Test Antigen.—To 0.2 cc. of stock antigen are added 2.0 cc. of 2 per cent. saline, and the mixture is shaken. This should not be used before the lapse of half an hour, but will retain its activity in the ice chest for about a week.

Test.—For each fluid to be examined 0.02 cc. of test antigen is placed in each of three Wassermann tubes, and 0.5 cc., 0.2 cc., and 0.1 cc. of fluid added. Control positive and negative fluids are put up in a similar manner. The rack containing the tubes is placed in the water bath at 55° C. for 4 minutes, shaken on a Kahn shaker for 4 minutes, and centrifuged. The supernatant fluid, except for two drops, is removed, and after gentle shaking the deposit mixed with the remaining fluid is placed on a slide and examined microscopically under a lower power objective. Clumping of red particles is seen in a positive test, the size of the clumps indicating the degree of positivity.

The scarlet red used in the antigen mixture was Baird and Tatlock's Scharlach R, but B.D.H. Sudan IV is equally good, although it gives a slightly different colour. Very good results can be obtained also with Sudan Black B (Gurr) or Nile Blue in suitable concentration; with Sudan Black B the black colour of the floccules shows up very well. Wassermann antigen was tested experimentally to see if it could replace the Kahn antigen, but it was found to be unsuitable as it precipitated the dye prior to use.

EXAMINATION OF CEREBROSPINAL FLUID

During the past year 510 cerebrospinal fluids have been completely examined and the tests have included both the Wassermann and the flocculation test as described above. The amount of fluid used in the

BRITISH JOURNAL OF VENEREAL DISEASES

Wassermann test was four times that of serum normally used for that test.

Table I gives the results obtained.

TABLE I

Number of Cerebro-spinal Fluids examined	Wassermann Test Result	Flocculation Test Result
470	Negative.	Negative.
36	Positive.	Positive.
1	Doubtful.	Doubtful.
3	Negative.	Positive.

It is seen that the tests agreed in all but three cases. These three fluids were from patients known to have neurosyphilis and whose sera gave strongly positive Wassermann reactions, so that no false positive was obtained, and in fact the flocculation test afforded three more positive results than did the Wassermann.

EXAMINATION OF BLOOD

As the results appeared to be promising, during the past few months the test has been applied to blood. Serum (free of red cells) is decomplicated and a suitable quantity (usually 0.2 cc.) is diluted 1 in 10 with 2 per cent. saline. The test is then conducted with this diluted serum in the same manner as for cerebrospinal fluid. The bloods received had been sent for Wassermann or Kahn tests for the diagnosis of syphilis or for the control of treatment, and were from patients with neurological diseases, from some with other diseases and from a fair number with suspected chancres, in some cases proved by the finding of spirochætes.

Tables II and III on p. 37 give the results obtained.

It is seen that with 1,160 sera the Wassermann or Kahn or both agreed with this flocculation test in all but 43.

Table III gives the results obtained with the 43 sera in which there was some disagreement between the three methods of examination. It is seen that of the 20 positive flocculation reactions, 10 were obtained on sera from known cases of syphilis. In 4 others the sera gave a positive Kahn reaction, though the Wassermann was doubtful, and the remaining 6 with no evidence of

THE LORENZ FLOCCULATION TEST

TABLE II.—SHOWING RESULTS WITH 1,127 SERA IN WHICH THE FLOCCULATION TEST AGREED WITH THE WASSERMANN AND/OR KAHN (TOTAL SERA TESTED 1,160)

Number of Sera	Wassermann Test Result	Kahn Test Result	Flocculation Test Result
740	Negative.	—	Negative.
93	—	Negative.	Negative.
155	Negative.	Negative.	Negative.
79	Positive.	—	Positive.
21	—	Positive.	Positive.
26	Positive.	Positive.	Positive.
2	Doubtful.	—	Doubtful.
1	Doubtful.	Doubtful.	Doubtful.

TABLE III.—SHOWING RESULTS WITH 43 SERA IN WHICH THE FLOCCULATION TEST DISAGREED WITH THE WASSERMANN AND KAHN

Number of Sera	Wassermann Result	Kahn Result	Flocculation Test Result	Remarks re Clinical Condition
5	Positive.	Negative.	Negative.	1 with a history of syphilis.
6	Doubtful.	—	Negative.	
1	—	Doubtful.	Negative.	Spirochaetes present in chancre.
4	Doubtful.	Negative.	Negative.	1 with spirochaetes present in chancre.
2	Negative.	Positive.	Negative.	1 with spirochaetes present in chancre.
8	Negative.	—	Positive.	6 with tabes and 2 with spirochaetes present.
7	Doubtful.	—	Positive.	1 with past syphilis.
5	Doubtful.	Positive.	Positive.	1 a treated syphilitic.
4	Negative.	—	Doubtful.	4 with tabes.
1	Negative.	Doubtful.	Doubtful.	1 with tabes.

syphilis gave doubtful Wassermann reactions ; it appears therefore that probably all these 20 cases were cases of syphilis and that the flocculation test was correct. The 5 sera with a doubtful Lorenz reaction but negative Wassermann were all from patients who had definite tabes, so that no false positive appears to have been obtained in this series.

The 18 sera which gave a negative flocculation reaction with a different Wassermann or Kahn result were from 4 patients known to have or to have had syphilis, and

BRITISH JOURNAL OF VENEREAL DISEASES

14 who gave no history of syphilis, but in 9 of these 14 cases the Wassermann or Kahn was doubtful. The 4 cases of syphilis consisted of three patients with primary syphilis (*S. pallida* +), and 1 with syphilis of some long standing; it is well known that the Wassermann and Kahn may often be equivocal in such conditions and it seems reasonable to suppose that this might also be so in this case.

Altogether the results suggest that, whereas this flocculation test does not yield false positives, it is rather more sensitive than the Wassermann test as performed in this laboratory.

SUMMARY

The results of the flocculation test of Lorenz for the diagnosis of syphilis on 510 cerebrospinal fluids and, with a modification of the method, on 1,160 samples of blood are described.

The test agrees almost exactly with the Wassermann, and no false positive result was obtained with either blood or fluid.

It is recommended as a parallel test to the Wassermann, or for use in laboratories where facilities do not at present exist for the performance of the Wassermann.

I wish to thank Doctors E. ff. Creed and R. D. Clay for performing a number of the Wassermann tests of the blood.

REFERENCE

LORENZ, W. F. (1940), *Amer. J. Clin. Path.*, **10**, 527.

V

OBSERVATIONS ON THE LIPOID REINFORCEMENT OF ANTIGENS IN THE GONOCOCCAL COMPLEMENT FIXATION TEST

A. I. MESSER, M.A., M.B., Ch.B., D.P.H., Northumberland County Laboratory; and A. E. W. McLACHLAN, M.B., Ch.B., D.P.H., F.R.S.E., Joint Committee's Clinic, Newcastle-upon-Tyne General Hospital.

ALTHOUGH the serological diagnosis of gonococcal infections by means of a complement fixation test has