clinical findings, before finally coming to a definite decision. If the cyst in the lung has ruptured, and the neighbouring tissue has been infected, it may be impossible to distinguish the condition from other inflammatory lesions. In some cases where this has occurred the radiographic appearances may give no suspicion of hydatid cyst. Cysts in the abdomen may not show any shadow on the radiogram unless there has been a deposition of lime salts in its wall or contents. If this has taken place, the outline of the cyst may be distinctly shown, and where cysts have been discovered in the lungs it is advisable to try to get this additional evidence. Some workers have shown hydatid cysts in the liver and spleen by radiograms after pneumoperitoneum has been performed. Radiograms of the skull in suspicious cases of hydatid disease with cerebral symptoms may show erosion of the bone and displacement of the shadow of the pineal gland. Owing to the grave danger of rupture of hydatid cysts of the brain into the ventricle, it is most unwise to perform ventriculography where this condition is suspected. Hydatid disease of the bone simulates giant-celled myeloma in its radiographic appearance. The characteristic radiographic features are well illustrated in the articles by Bauer and Gold. The latter has a radiogram showing cystic destruction of one side of the pelvis and upper third of the femur.

CONCLUSIONS

1. Hydatid disease is not rare in this country.
2. It has a high mortality rate.
3. It could be eradicated by the burning of all hydatid cysts and the isolation of infested dogs until all adult parasites had been expelled and destroyed. This could be accomplished by (a) education of the public, particularly butchers and farmers, by suitably illustrated leaflets and posters for slaughterhouse premises. (b) Strict enforcement of the by-laws prohibiting dogs in slaughterhouse premises. (c) Compulsory notification of all cases of hydatid cysts and the destruction of the cysts by the sanitary authorities. (d) The inspection of farms on which the infested animals were reared, and isolation treatment of all suspicious dogs.

I wish to express my thanks to Dr. G. B. Dixon and Mr. W. Smith of the tuberculosis department for permission to include the radiograms 5 and 6.

THE MEINICKE CLARIFICATION REACTION

BY

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The second laboratory conference on the serodiagnosis of syphilis was held in Copenhagen, under the auspices of the Health Organization Section of the League of Nations, from May 21st to June 4th, 1928. An examination was made of 944 specimens of serum from various cases by means of seven modifications of the Bordet-Wassermann test, and also by various flocculation procedures, including the tests of Kahn, Meinicke (turbidity), Muller (clotting), Murata, Sachs-Georgi, and the modified sigma, and the Vernes syphilimetric tests.

One of the conclusions reached at the first conference, which was held in 1923, was that "flocculation tests cannot replace the Bordet-Wassermann test." Since then the flocculation tests have been improved in technique, and now the recent conference "is of opinion that the best of them may be regarded as equal in value to the best of those which depend on fixation of complement (Bordet-Wassermann)." It also "recommends that, in order to secure the most reliable information to the

clinician, at least two different serodiagnostic methods should be used." A majority of the eminent serologists who performed the tests would prefer for the present that one of the methods should be a Bordet-Wassermann test.

The conference stated that the Kahn and Muller tests were superior in sensitiveness to all other methods. The Kahn reaction is difficult to read, and involves the measuring of small quantities of serum by means of capillary pipettes. The performance of the Muller test is rather difficult, and in both procedures the serum has to be inactivated.

In consequence of this report Meinicke has modified his turbidity reaction (M.T.R.), and has produced the Meinicke clarification reaction (M.K.R.), in an endeavour to increase the sensitivity of his test. Since June, 1926, the Meinicke micro-reaction, a modification of the M.T.R., has been performed in all cases at the Whittingham Mental Hospital, and our preliminary results have been published.^{1,2} Meinicke has now prepared a modification of the M.K.R., enabling it to be used as a micro-test, and reported this method in a letter dated April 11th, 1929, to the medical superintendent of this hospital, Dr. Clark.

We have tested both the M.K.R. and its micro-modification on a number of patients, and can now give an opinion on its sensitivity, reliability, and ease of performance.

THE MEINICKE MACROSCOPIC REACTION

Principle

An other extract of ox heart is diluted with alcohol, and balsam of tolu is added. When this is mixed with a 3.5 per cent. solution of sodium chloride containing various quantities of sodium carbonate, extract dilutions are formed which are densely milky, turbid, and opaque. To this extract dilution active serums are added. With a positive serum a clarifying of the fluid takes place within twenty hours (clarification reaction). In a negative case there is no clarification; the fluid remains turbid.

Technique

Serum.—This is centrifuged and then placed in a test tube; it must not be heated or inactivated. Haemolytic, icteric, and cloudy serums are all adaptable to the reaction.

Antigen.—This may be obtained from Dr. Meinicke's laboratory (Elberfelder Strasse, 74, Hagen, Westphalen, Germany). It should be kept at room temperature and be protected from light; the bottle should have a cork stopper.

Salt Solution.—Two stock solutions are used—namely, (a) a 3.5 per cent. solution of sodium chloride, and (b) a 1 per cent. solution of sodium carbonate in 3.5 per cent. salt solution. Four dilutions of the soda solution are required for the test:

- 0.01 per cent. made by adding 1 part of (b) to 99 parts of (a).
- 0.015 per cent. made by adding 1.5 parts of (b) to 98.5 parts of (a).
- 0.02 per cent. made by adding 2 parts of (b) to 98 parts of (a).
- 0.04 per cent. made by adding 4 parts of (b) to 96 parts of (a).

Method

Antigen-soda dilution mixture.—Four test tubes, each containing 10 c.cm. of the various soda dilutions, and another four each containing 1 c.cm. of antigen, are placed in a water bath and left there for ten minutes at 45° C. Each tube of soda-salt solution is then rapidly mixed by pouring backwards and forwards with 1 c.cm. of the antigen. The resulting antigen mixture is milky and entirely opaque. It should be allowed to mature for two minutes. Four test tubes, A, B, C, and D, each 8 cm. in length and 1 cm. in diameter, are set up in rows in a rack; 0.2 c.cm. of the serum is pipetted into tubes A, B, and C, while 0.1 c.cm. of the serum is pipetted into tube D, and to this is added 0.1 c.cm. of the 0.04 soda solution.

- To A is added 0.5 c.cm. of 0.01 per cent. extract dilution.
- To B is added 0.5 c.cm. of 0.015 per cent. extract dilution.
- To C is added 0.5 c.cm. of 0.02 per cent. extract dilution.
- To D is added 0.5 c.cm. of 0.04 per cent. extract dilution.

The time taken in pipetting the antigen mixture into the tubes with serums should not be more than ten minutes. Eight different serums can generally be tested in this time. The racks are then well shaken, and are left for twenty hours in a room at a temperature of about 20° C.

Reading of the Results

In a negative reaction the fluid in the test tubes is milky and opaque as before. In a strongly positive reaction a complete clarification has taken place in the test tubes, so that the cross-bar of a window two or three yards away is distinctly visible. In a weaker positive the fluid is more or less opalescent, but the cross-bar can be seen through it.

In most of the tubes a certain amount of sedimentation takes place, but it is the opacity and not the sedimentation which is the guide to the reading of the result. Should only the last tube (D) be clear, and the other three slightly opaque, the reaction must still be considered strongly positive.

Sixty-five specimens were examined and a confirmatory Wassermann test was performed on each at the University of Manchester. There was agreement between the two tests in 92.4 per cent. of these cases. In two of the five cases which disagreed the result of the M.K.R. was doubtful.

In reading the results tubes A, B, and C were found to give unreliable results. In twenty-one cases out of the sixty-five the reading in one or more of them differed from that of tube D. Our results are all based on the reading of tube D, which we consider the only one really necessary for the reliable performance of the test. By using it alone the test could be much simplified.

THE MICROSCOPIC MODIFICATION

The principle of the test is the same as for the M.K.R.

Serum.—The blood collected from a finger-prick is passed along a capillary tube 10 cm. in length by 1 mm. inside diameter. Two-thirds of the tube are filled, and the empty end is sealed by a flame, care being taken that the blood is not heated. Only when the capillary has to be sent away need the other end be sealed with wax. The tube is now left for a few hours in a cool place in a horizontal position and then centrifugalized towards the sealed end. The clear serum collects in the centre and is ready for use when the tube has been filed and broken, and the contents tapped or blown on to a clean numbered slide.

Antigen.—The same extract is used as for the M.K.R. The soda-salt dilution required is made by adding 3 c.cm. of a 1 per cent. solution of sodium carbonate in 3.5 per cent. salt solution to 97 c.cm. of a 3.5 salt solution—that is, by adding 3 parts of stock solution (a) to 97 parts of stock solution (b). This gives a 0.03 per cent. soda-salt dilution. Then 1 c.cm. of the extract and 10 c.cm. of the soda-salt dilution are placed in test tubes and incubated in a water bath at 45° C. for ten minutes. They are then mixed by pouring rapidly several times from one to the other. The resulting extract dilution is then poured into a warmed porcelain crucible, and covered with a watch glass; there it must "ripen" for two minutes before the test is performed. It is milky and entirely opaque, and should not be kept longer than ten to fifteen minutes, in which time fifteen serums can be mixed with it.

Mixing.—Two platinum eyelets are used for the admixture. The larger, 4 mm. in diameter, is attached horizontally to a small porcelain stand, and a loopful of the extract dilution is taken on it. On the smaller, which is 2 mm. in diameter, serum is taken. They are mixed by passing the smaller eyelet several times rapidly through the lumen of the larger. A drop of the mixture from the smaller is now placed on a clean coverslip, and a hanging drop preparation is made; this is allowed to stand for one hour in a moist atmosphere at room temperature. As each fresh serum is examined the platinum eyelets are dipped in water and next in alcohol; they are then flamed. They must be cool before being used again, and it is better, therefore, to have two pairs of eyelets.

Examination.—After an hour the slides can be read, a microscope with weak ocular and dry objective magnifying about sixty times being used. A negative reaction shows an even, finely granular field in which the particles are lively. In a positive reaction agglutination occurs, and large, widely separated dark-brown clumps are seen. Where the reaction

is weakly positive the clumps are smaller and closer together. On one occasion a delayed positive reaction was noted. It is advisable, therefore, to re-examine the slides eight or nine hours after the test has been completed.

RESULTS

Since April, 1929, 384 serums have been examined, and a confirmatory Wassermann test has been performed on ninety-five of these cases. Our routine is that a nurse collects the serum from the new admissions and from other cases as directed by the medical officer, and they are then sent to the laboratory in lots of about ten at a time, and examined. Where the Meinicke reaction is positive, and in all suspicious cases, a specimen is always sent away for a Wassermann test.

There was agreement between the two tests in 92.7 per cent. of the cases. In the seven which differed the Meinicke was positive in six cases and doubtful in the other, while the Wassermann reaction was negative in all.

We are of the opinion that a reliable microscopical test has many advantages to offer over any of the macroscopical methods in which a large quantity of serum is required. Especially is this the case when dealing with children, resistive and troublesome patients, the obese, and those in whom the veins are poorly developed.

CONCLUSIONS

The Meinicke clarification reaction can be simplified by eliminating three of the tubes containing serum (A, B, and C) and using only tube D. Its micro-modification is rapid in operation, gives a high percentage of agreement with the Wassermann reaction, is very sensitive, and is easy both to perform and to read. As a routine test for syphilis in the patients admitted to a mental hospital it offers advantages over any other test. It has proved both serviceable and reliable.

My thanks are due to Dr. R. M. Clark, medical superintendent, under whose general supervision this work has taken place, for permission to publish these results, and also to Mr. A. H. Fann, senior laboratory assistant, for help with the technical part of the work.

REFERENCES

- ¹ Clark: *Journ. of Ment. Sci.*, October, 1926.
- ² Prentice: *Lancet*, 1928, i, 493.

FURTHER OBSERVATIONS ON OVARIAN TRANSPLANTATION

BY

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My work on this subject during 1929^{1 2} indicated the results obtained by (1) transplantation of ovaries, removed from rabbits, into other rabbits (twenty transplantations); (2) transplantation of ovaries, removed from cats, into rabbits (twenty transplantations).

The site chosen in this series was a pocket, framed between the superficial and deep fasciae of the back of the receiving animal. Sections were taken of transplanted ovaries removed at regular intervals, and examination of these revealed no trace of ovarian tissue in transplants older than six weeks. Further, the occurrence of heat, acceptance of the male, and the other signs associated with full ovarian activity steadily declined as the graft degenerated, until complete sexual senility was observed at the time when no ovarian tissue could be found in the transplants.

In 1930³ human ovaries were transplanted into monkeys (*Macacus rhesus*)—five transplantations in all. These were performed in two situations—namely, (1) between the layers of the broad ligament, and (2) subcutaneously.

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