daughter of Mrs. A. G. Sare, of Montreal. She graduated in 1913 from the Montreal General Hospital, and joining the C.A.M.C., arrived in England in April, 1916. After seven months service at Moore Barracks Hospital, she was posted in February, 1917, to No. 6 C.G.H. at Troyes, France. Later she was posted to the Duchess of Connaught Hospital at Taplow, Moore Barracks Hospital, Shorncliffe, and in January, 1918, to the Granville Canadian Special Hospital at Buxton, where she became instructress in massage. She was posted to the *Llandovery Castle* in June, 1918.

N/S. JEAN TEMPLEMAN, daughter of Mr. and Mrs. J. Templeman, of Ottawa, where she was born. She graduated in 1912 at St. Luke's Hospital, St. Paul, Minn., joined the C.A.M.C. in 1915, was posted in succession to the Canadian Military Hospital, Shorncliffe, July 2, 1915, No. 1 Canadian General Hospital, February 19, 1916, No. 21 British C.C.S., July 4, 1916, Ontario Military Hospital, Orpington, May 28, 1917, on transport duty s.s. *Scandinavian*, June to August, 1917; returning to Ontario Military Hospital, Orpington, she was posted to *Llandovery Castle* in June, 1918.

N/S. IRENE STAMERS, daughter of Mrs. L. L. Stamers, of St. John, New Brunswick, was born in that city, and graduated at the St. John General Public Hospital in January, 1913. Joining the C.A.M.C. in June, 1915, she was posted in succession to Moore Barracks Hospital, No. 1 Canadian General Hospital, overseas, where she spent ten months, returning to the Ontario Military Hospital, Orpington. In March, 1918, she was posted to the *Llandovery Castle*.

DIAGNOSIS OF CHRONIC INFECTIONS WITH THE GONOCOCCUS BY THE COMPLEMENT FIXATION TEST.

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DURING the last six months of 1917 gonococcus complement fixation tests were carried out in a routine manner at No. 1 Canadian General Laboratory, Folkestone. The results obtained would seem to be worthy of publication, in view of the facts that the venereal question is receiving so much attention at the present time, and that the diagnosis of chronic or latent gonorrhœa and its complications and sequelæ present so many difficulties.

It is a recognized fact that in chronic gonorrhœa, either of man or woman, the uncertainty of obtaining positive results by the examination of stained films of the discharge is very great, and, in regard to cultural methods, here again a negative result may be wholly misleading.

In men, when a thin discharge is expressed from the meatus, in practically all cases very few gonococci are present, either intra- or extra-cellular, and usually there are many other bacteria which may be Gram-negative, or may have become Gram-negative by degenerative processes. A positive culture is, of course, definitely diagnostic, but the difficulties encountered in this procedure can only be appreciated by those who have attempted it in numerous cases.

In women, still more difficulties are presented. In subacute and chronic gonorrhœa, the gonococci, if present, are usually very few in number, and are found only in the cervix and urethra, and then the number and variety of other organisms make a diagnosis impossible, either by freshly stained smears or culture. The organisms present may include the *Micrococcus catarrhalis*, degenerated Gram-positive cocci, *Bacillus coli*, and many others.

HISTORY.

The first publication on the subject of complement fixation in gonococcal infections was made by Müller and Oppenheim [1] in 1906, who studied a case of gonorrhœal arthritis. They used as an antigen simply a suspension of gonococci in salt solution. Bruck [2] reported favourably on the reaction in the same year. The findings of the earlier workers were somewhat contradictory, Vannod [3] reporting that there was no cross fixation between gonococcus antigen and anti-meningococcus serum and vice versa, while Wollstein [4], in 1907, reported findings opposed to the above. Meakins [5] reported the first work on the subject in America in 1907 on cases of arthritis. Teague and Torrey [6] pointed out in 1907 the importance of using several strains of the gonococcus in preparing an antigen. Schwartz and McNeil [7] also emphasized the facts brought out by Torrey and Teague, and stated that the reaction never occurred in cases of anterior urethritis. They found that positive tests were given with Flexner's anti-meningococcus serum, but not from serum from cases of cerebrospinal fever.

Many other workers since those quoted above have reported on the value of the test as an aid to diagnosis of latent infections with the gonococcus, as well as to determine whether or not the case is cured.

TECHNIQUE.

That outlined by Kolmer [8] has been followed, with the exception that we use one-quarter the quantities of the reagents used by him in the Wassermann test.

Although these amounts would seem to be rather small for practical use, much material is saved, particularly complement, and, with care in the handling of small pipettes, the results are as reliable as when the full system is used.*

Hæmolytic System.—We have always used the anti-sheep hæmolytic system. Fresh guinea-pig serum is used as complement in a constant dose diluted 1 : 20. Anti-sheep amboceptor is titrated against this in different dilutions, and one and a half times the hæmolytic dose is used in the actual test.

Antigen.—One of us having had difficulty in preparing a satisfactory antigen, even from several strains of gonococci, one prepared in the laboratories of Parke, Davis and Co.† was tested and found to have excellent antigenic qualities. This is made from apparently numerous strains, differing somewhat in their immunity reactions. Twenty-four to forty-eight-hour cultures of the gonococcus are used. These are washed off carefully with distilled water, heated for two hours at 56° C., centrifugalized, and passed through a Berkefeld filter, and a small amount of preservative added (0·1 c.c. of a 1 : 100 dilution of phenol to each cubic centimetre). The antigen is made isotonic by adding one part of 10 per cent. saline to nine parts of the antigen. This is then diluted again 1 : 10 with normal saline, and titrated for anti-complementary properties (see Chart 1). When this is determined one-half to one-quarter of this amount is used in making the test. This titration should *always* be done before the actual fixation test.

Kolmer states that he has obtained slightly better results by using simply suspensions of gonococci in saline, with a small amount of preservative added.

An antigenic titration may be done with the serum from a positive case, but usually is unnecessary.

While engaged in this work, one of us was experimenting with antigens prepared from the tubercle bacillus, in complement fixation in tuberculosis. Known cases of tuberculosis, not only of the lungs, but of the testes, kidneys, &c., were tested, not only with tubercle antigen, but also with gonococcus antigen, and there was no evidence of cross fixation, although certain of the cases of orchitis and epididymitis were negative with the gonococcus antigen and positive with the tubercle antigen.

This will not be discussed further, as the work on tuberculosis is still being continued, and will be published, it is hoped, at a later date.

The Test.—This will be explained very briefly, as reference to many of the articles cited in this report will give a full description of the procedure.

The patient's serum should be used as soon as possible after taking the specimen. It should be free from cells and clear.

It is heated for half an hour at 56° C. Six tubes were used by us for each test, with increasing amounts of serum in the first three, and the last three as controls with no antigen, to rule out any anti-complementary effect of the serum.

A positive and a negative serum are introduced as controls, also a tube containing only cells and antigen, and a tube containing hæmolysin complement and cells (see Chart II).

Although it was requested that a short history of all cases be sent with the specimen to the laboratory, in many instances only a bare diagnosis was given. When a positive result was obtained on these we attempted to trace them to obtain more accurate data, and found that very often the cases had

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* In the second edition of his work, just published, Kolmer reports good results with one-tenth the quantities.

† It deserves note that later supplies of this preparation have varied in their powers.