should be immunized with toxin-antitoxin. They should have three doses of 1 c.cm. one week apart. Young children show no reaction.

In 1916 Park and Zingher⁸ presented a paper based on a series of over 1,000 cases that had been actively immunized with diphtheria toxin-antitoxin. These susceptible individuals were selected by means of the Schick test out of a total of about 10,000 children and adults in ten different institutions. The mixtures of toxin-antitoxin that were used for immunization were either neutral (66 to 70 per cent. L. + to each unit of antitoxin), or slightly toxic (80 to 90 per cent. L. + to each dose of antitoxin) to the guinea-pig. The dose was varied from 0.5 c.cm. to 1 c.cm. and the number of injections from one to three. The injections were made subcutaneously at intervals of seven days.

The retests with the Schick reaction showed that only 30 to 40 per cent. became immune three weeks after the first injection, about 50 per cent. at the end of four weeks, 70 to 80 per cent. at the end of six weeks, and 90 to 95 per cent. at the end of eight to twelve weeks.

The best results were obtained with the full immunization consisting of three injections of 1 c.cm. each, given at weekly intervals. The duration of the active immunity was studied in a group of children that was followed up for over one and a half years; these cases showed that the active immunity persisted for at least that length of time. It is possible that the immunity induced by the injections of toxin-antitoxin started a combined cellular production of antitoxin, which would have otherwise appeared much later in life. The L. + dose of toxin is the amount which, when mixed with 1 unit of antitoxin and injected into a 250-gram guinea-pig, will cause its death at the end of four days.

Conclusions.

1. The Schick test has given us very definite data as to which years are the most dangerous with regard to diphtheria infection in a child's life. These are between 6 months and 6 years, while the periods of lowest susceptibility appear to be under 6 months and over 15 years. These results are endorsed by clinical experience.

2. It is of great value in deciding the difficult question of whether a patient is a carrier or is really suffering from diphtheria. For example, a case of streptococcal tonsillitis in a diphtheria carrier would by culture alone be thought to be one of diphtheria. If a Schick test were done on such a case no doubt would be left—in the case of the test being negative it would be treated as a carrier, and if the reaction were positive, as a case of diphtheria. Similarly in a case with a nasal purulent or sanious discharge the same difficulty would arise and a Schick reaction here too would indicate the line of treatment to be followed.

3. It has, perhaps, its greatest value in showing us to whom, among persons exposed to infection (for example, contacts, doctors and nurses), we may safely omit to give antitoxin—thus greatly minimizing the risk of anaphylaxis and also saving pain and expense. When possible, only those nurses who give a negative Schick reaction should be employed in diphtheria wards.

4. We are able by means of the Schick test to ascertain, in cases which have previously had the disease or have had antitoxin, to what extent their immunity persists, and whether they have sufficient antibodies to overcome a fresh infection.

5. Lastly, it has supplied us with a basis on which to build new immunizing methods, which have given such encouraging results in America that we feel justified in looking forward with confidence to the day when diphtheria will be a disease well under our control, and the infant and child life of this country robbed of one of its chief horrors.

I wish to express my thanks to Dr. Claude B. Ker for his guidance in doing this work, and for permission to publish the results. I also wish to thank Dr. Stewart Fowler, Dr. Lamond Lackie, and Dr. H. Gibson for giving me opportunities of carrying out the tests in their respective wards.

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A MONUMENT was recently erected in one of the public parks of Madrid to Dr. C. M. Cortezo, the Spanish physician and politician, who is editor of the *Siglo Médico*, in recognition of his long philanthropic and public activities. At the inauguration ceremonies, in response to many speeches, Dr. Cortezo said that he accepted the tribute only as homage to the medical profession.

THE TREATMENT OF SYPHILIS IN MACEDONIA ON ACTIVE SERVICE.

BY

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THE experience of four and a half years in the army, the greater part of which time was spent in the diagnosis and treatment of venereal diseases, may justify a few remarks upon the methods employed in dealing with syphilis in Macedonia during the late war. I soon became impressed, first, with the importance of making a definite diagnosis as early as possible, and secondly, with the danger of the policy of applying local treatment to a venereal sore and awaiting results.

The hospital for venereal diseases contained some 300 beds, of which roughly a third were set apart for patients suffering from syphilis. Cases admitted to hospital with no other signs beyond a venereal sore were treated as follows: The sore was scraped and the exudate transferred to a microscope slide, a film made, stained by the Giemsa method, no other being at our disposal, and examined. If deemed advisable, the blood serum was tested by the Wassermann reaction, which was regarded as a help to diagnosis, but not relied upon alone, nor was it allowed to outweigh clinical evidence. Cases which left no room for doubt clinically were not necessarily subjected to the microscopic search for the *Spirochaeta pallida*, or to the Wassermann test. It is well perhaps to mention this fact, because in an article which appeared in the *Practitioner* for December, 1920, upon the Wassermann reaction, by Dr. C. Lundie, it was stated that in the army "a diagnosis of syphilis is not allowed, except when the *Spirochaeta pallida* is found or the Wassermann reaction is positive, and *per contra*, a cure is not admitted until both have become negative, a result in the case of the Wassermann sometimes impossible to attain."

The diagnosis having been made the patient was at once put under treatment, the usual course consisting of:

- (1) A weekly injection (intramuscular) of mercury.
- (2) Daily mercurial inunctions.
- (3) A weekly injection (intravenous) of "606" (salvarsan, kharsivan, diarsenol, galy), 0.3 gram, or a fortnightly injection 0.6 gram.
- (4) The urine was tested weekly, and treatment regulated thereby.
- (5) The patient was weighed at the commencement of treatment and at stated intervals throughout the course.

A rigid régime was insisted upon before and after the "606" injections; the reaction was usually slight, sometimes there was none. No cases of arsenical dermatitis occurred, and no suppurations ever followed the mercurial injections. Iodides were frequently given, but they did not form a part of the routine treatment. They were never used except in conjunction with mercury, not being regarded in themselves as a cure for syphilis.

Patients who had had repeated attacks of malaria, or who had suffered from dysentery or severe diarrhoea, and who had become debilitated thereby, did not make good subjects for this intensive treatment. As a rule mercury was withheld in these cases, at first altogether, and "606" administered in doses of 0.3 gram. If, as was usual, improvement took place, mercury was injected cautiously, a careful watch being kept for albuminuria or diarrhoea. A great many cases showed a mixed infection, due either to superimposed sepsis, or to the original sore containing pyogenic organisms. Suppurating inguinal glands were treated by simple surgical methods and were incised when "ripe"; at one time the plan of excising the glands before the skin had become involved was adopted; we found it tedious and without any appreciable advantages. The average stay of a patient in hospital was five to six weeks.

Each patient on leaving hospital was given a slip of paper which he was told to hand to his medical officer; whether this was always done is open to doubt. The advice given was to take one pill of hyd. c. cret. gr. ij each night for three months, to leave off for one month, and at the end of that month to have the blood tested by the

Wassermann reaction; he was told that if this was negative he should go on again exactly in the same way—that is, to take the pills for a further three months, to leave off for a month, and at the end of that month to have his blood tested again, and so on for at least twelve months. He was told that if the Wassermann reaction was at any time positive he should act according to further medical advice; the fact that the reaction was positive not being taken, in the absence of any signs of activity, as proof that a further course of intensive treatment was necessary or advisable.

Although we did not claim to "cure" after so short a course of treatment, we could claim that after a few weeks our patients were fit to carry on their duties in the trenches or elsewhere, which after all was an important matter in such a crisis.

RETROGRADE CATHETERIZATION FOR IMPERMEABLE STRICTURE OF THE URETHRA.

BY

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THE operation here described is proposed as a substitute, in suitable cases, for Wheelhouse's operation, because it is easier to perform and gives better results from the patient's point of view.

Severe stricture of the urethra with retention of urine in the male is not as common in Reading as in London, but a few cases are admitted to the Royal Berkshire Hospital every year. Most of them can be treated by rapid dilatation under an anaesthetic, and quickly discharged from the wards to out-patients. Frequently before admission attempts have been made to pass a catheter, and the patient arrives with false passages and bleeding from the penis. In these cases I have the bladder aspirated above the pubes two or three times and try what rest, hot baths, and a free purge will do. Sometimes it is possible in a few days to pass a catheter and dilate the stricture. If this fails the patient is anaesthetized and a variety of catheters and sounds are tried. If I fail to get in even a filiform bougie the usual proceeding has been to do Wheelhouse's operation; but when there are false passages and a bleeding urethra this is often very difficult and tedious. Moreover, it leaves the patient with a urethra further damaged, the wound is in a bad place, and there is a chance of trouble with a urinary fistula and sometimes delay in healing. I have known several cases to do very well, and even with neglect after treatment on the patient's part to go very many years before they returned with acute retention of urine. Probably with reasonable care in passing a bougie the patient might have avoided further trouble. In many cases with false passages the difficulty of finding the tiny aperture of the stricture, together with the dirty position of the wound, and the sensitive area in which it is situated, condemns Wheelhouse's operation at the present day, although it was undoubtedly a good operation at the period when it was first performed. With modern experience in the treatment of suprapubic wounds, retrograde catheterization and dilatation of the stricture is preferable.

In such a case as I have described my method of late years has been, in the first place, to pass some sort of a catheter or bougie and perform rapid dilatation of the urethra. If this fails I select a time when the bladder is distended and make a suprapubic opening in the bladder; a No. 10 or 12 catheter (silver) is then taken in the right hand and easily passed into the bladder end of the urethra as far as the stricture. A No. 8 silver catheter is then passed into the penile urethra until it meets with the point of resistance of the stricture, avoiding the false passages if possible. The catheter in the bladder is then advanced with firm pressure, but without violence, until the stricture is stretched and pushed forwards as much as possible. With this catheter held firmly in position the No. 8 catheter is manipulated with the left hand and disentangled from any false passages; it is passed on carefully but firmly until metallic contact is made between the two catheters. Once certain of metallic contact some force and a little rubbing action may be used as long as the surgeon is certain the two catheters are touching at

their points. It is now easy to hold the points of the two catheters in contact, and to allow the penile catheter to push the bladder catheter gradually backwards until the former is in the bladder. A larger penile catheter is now passed in place of the No. 8. If the larger catheter gets trapped in the false passages it is very easy to slip in the bladder catheter again from the suprapubic wound and make contact with a penile catheter.

The urethra can now be rapidly dilated to No. 16 or 18, and a No. 12 silver or a large size hard rubber catheter tied in. The bladder is well washed out through the catheter and suprapubic wound and a drainage tube purse-stringed into the bladder wall. The wound is stitched up, or if too dirty the stitches are inserted and left untied for a few days. It is advisable to put a small drainage tube into the wound below the last stitch, if the wound is sutured at the time, in case of a leak by the side of the large tube. The suprapubic wound is treated as usual after a prostatectomy, and the catheter left in the urethra for a week. The bladder is washed out once or twice daily, according to the condition of the urine.

A case operated on recently by this method left the hospital in four weeks with the suprapubic wound healed, except a superficial granulation and a urethra that a No. 16 would drop through by its own weight. His recovery was delayed by a misunderstanding by which the catheter was removed in four days; the house-surgeon was unable to replace it. Under an anaesthetic a No. 18 sound passed quite easily, and I tied a fresh catheter in for a week. There was no further difficulty. If this had been done at first, as I directed, he would have been fit to go out some days or a week earlier.

I have been unable to find this operation described in any textbook on genito-urinary surgery. Thomson Walker mentions retrograde catheterization. He says: "Suprapubic cystotomy is performed, and retrograde catheterization with a metal sound. The point of this is cut down upon in the perineum. The operation has little to recommend it over the perineal dissection." This is only a method of doing Wheelhouse's operation. I have adopted it with advantage in a case in which I failed to find the aperture in the stricture after starting a Wheelhouse operation in the ordinary way. It certainly solved the difficulty. Should the operation I have described fail, it would be the quickest way of dealing with the difficulty. At present I have never found any necessity, as retrograde catheterization has invariably succeeded.

I think it is highly probable that other surgeons may be using this method of dealing with troublesome strictures, although I have failed to find any record. I am sure those who have not done so will find it a very easy and safe way of dealing with these cases, and the result very satisfactory to the patient. It is needless to say that the whole operation must be performed with strict surgical cleanliness.

In considering what damage is done to the urethra by retrograde catheterization, it is necessary to remember that the actual length of a stricture of the urethra may be considerable, perhaps from half an inch up to 1½ in. or more, but the part of the stricture that is really so small as to prevent the passage of urine or a fine bougie is short; in my opinion it rarely exceeds a quarter of an inch, and is often less. It is this portion that is nipped between the points of the two metal catheters. With a fixed point in the bladder end of the urethra, it is possible to force the penile catheter effectively through the constriction by steady pressure, or with a slight grinding movement. The exact size of the penile catheter may have to be varied, but the No. 6 to 8 is the usual size required to give the necessary rigidity. Once the catheters are in good metallic contact the whole difficulty is overcome.

The damage to the urethra is very slight, and the free drainage of the bladder tends to prevent any inflammatory reaction on the kidneys such as sometimes takes place after passing a catheter. The patient is far more comfortable afterwards, and is not so long in recovery on the average, in severe cases, as after Wheelhouse's operation. I can strongly recommend the operation in selected cases as easy, certain, and better for the patient.

A MONUMENT has been erected at Rome, Georgia, U.S.A., to the memory of Dr. Robert Battey, the originator of Battey's operation, oöphorectomy, first performed at Rome, U.S.A., in 1872. The chief address at the inauguration was made by Dr. Howard Kelly, of Baltimore.