It may well be urged that mine is a very small series of cases, and that they have not been given nearly enough time in which to relapse, nevertheless any small success in the treatment of this disfiguring condition is acceptable to most of us, and if others are encouraged by this note to use the drug and to record their results its object will not have been missed.

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THE DICK TEST IN SCARLET FEVER.

BY

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It has long been recognized that streptococci have some relationship to scarlet fever, but until the work of the Dicks no convincing evidence that the streptococcus was the primary etiological factor had been adduced. Their discovery, too, of a soluble exotoxin, by which clinical scarlet fever can be produced, and which can be used as a test of susceptibility to that disease, marks an epoch in the history of our knowledge of the disease.

The present investigation is concerned with the use of the Dick test in scarlet fever patients (a) on admission to hospital (273 cases), (b) at weekly intervals during residence in hospital (239 cases), (c) in a series of cases dismissed from hospital some time previously (159 cases). The material used was the "Wellcome" brand diluted scarlet fever toxin (test) and heated scarlet fever toxin (control). The test consists of an intradermal injection of 0.2 c.cm. of a 1 in 1,000 dilution of filtrate obtained from a broth culture of the *Streptococcus scarlatinae*. In the interpretation of the tests pseudo and positive reactions were counted as positive, and pseudo and negative reactions as negative. This is in accordance with the custom observed by other investigators.

In group (b) 152 cases were treated with anti-scarlatinal serum, and in group (c) 76 cases had been so treated. The serum used was Burroughs Wellcome and Company's anti-scarlatinal serum unconcentrated. In over 85 per cent. of these cases this did not exceed 10 c.cm. in amount.

DICK TESTS ON ADMISSION.

TABLE I.—The Dick Test in 273 Cases of Scarlet Fever on Admission to Hospital.

Day of Disease.	Total Cases.	Percentage Positive.
First	15	60.0
Second	69	73.5
Third	64	72.3
Fourth	53	68.0
Fifth	36	58.4
Sixth	11	72.7
Seventh to fourteenth ...	16	58.0
Fourteenth onwards ...	9	45.5

This table shows that, with the exception of the first day, there is a large percentage positive early in the disease, and that this percentage declines steadily until the sixth day, after which the numbers are too small to allow of trustworthy conclusions.

These figures compare favourably with those of Ker and his co-workers, who found 73.9 per cent. of positives during the first three days, and 68.6 per cent. in the period three to six days. Zingher obtained 98 per cent. positive during the first five days. In his paper on the subject Ker noted the disparity between his results and those of Zingher; he attributed this disparity to various causes, but especially to the greater dilution of toxin which he himself used. Lees, in an outbreak of scarlet fever in a school in Minnesota, found that fifteen out of forty-eight boys who developed scarlet fever gave a negative Dick test at the onset of symptoms. He used ten times the strength of toxin to re-test contacts, and did not obtain more positive reactions; he came to the conclusion that in this particular outbreak he was dealing with more than one strain of toxin. Various authors have reported cases of a patient being Dick-negative before developing scarlet fever. Robertson reports a case occurring in an epidemic. Nobel and Orel report one case seen by themselves and publish records of

another case. I have observed the case of a nurse in hospital who was twice found to be Dick-negative and yet developed a typical attack of scarlet fever. Lees suggests that in any epidemic it would be advisable to isolate the particular strain of organism causing the disease before testing the contacts.

From the foregoing it will be seen that more accurate standardization of the toxin is necessary before complete reliability can be placed on results obtained from its use.

WEEKLY DICK TESTS.

This series of 239 cases is divided into two groups—namely, (a) 87 cases not treated with anti-scarlatinal serum; (b) 152 cases treated with anti-scarlatinal serum immediately after their first Dick test.

TABLE II.—Weekly Dick Tests in Patients Not Treated by Serum.

Week of Illness.	Total Number.	Percentage Positive.
First	79	69.6
Second	82	39.02
Third	84	28.57
Fourth	87	24.13
Fifth	85	27.06
Sixth	66	21.21
Seventh	42	19.05

This table shows that there is a decline in the number of positive reactions from the first week onwards, and that this decline is most marked between the first and second weeks. There is a slight and temporary increase in the number of positives during the fifth week.

These figures indicate a steady increase in immunity. A detailed analysis does not prove this for the individual. There are wide variations. Some patients rapidly become negative and remain so. Others are positive or negative on admission and remain so during their residence in hospital. Lastly, there is a group of patients, 13 in number, who are positive on admission, become negative, and subsequently become positive again. Zingher has stated that immunity to scarlet fever is mainly antitoxic in character. Little is known of the nature of antitoxin formation, but these facts would seem to indicate that individuals vary greatly in this capacity. This has been demonstrated by Lindsay and his co-workers, while Henry and Lewis have shown that the amount of antitoxin present in the blood of convalescent scarlet fever patients is considerably greater than in normal "resistant" controls.

TABLE III.—Weekly Dick Tests in Patients Treated by Serum.

Week of Disease.	Total Number.	Percentage Positive.
First	144	69.4
Second	151	11.92
Third	152	15.78
Fourth	152	16.44
Fifth	140	28.57
Sixth	106	32.02
Seventh	62	40.32

The two striking features of this table are the large decrease in the number of positive reactions from the first to the second week, and the gradual increase in the number of positives from the second week onwards. Both of these are attributable to the administration of anti-scarlatinal serum. The serum confers, in the majority of cases, an immediate passive immunity, which passes off to be replaced by the acquired immunity. Trask has shown that the amount of circulating toxin early in scarlet fever varies greatly in similar cases. It is probable that in some cases the amount of antitoxin given in the serum was completely neutralized by the circulating toxin. Since the percentage of positive reactions in the later weeks is greater in the cases treated by serum than in those not treated by serum, it may safely be assumed that the administration of serum at least delays the process of natural antitoxin formation.

OLD CASES.

It is well known that in the majority of cases one attack of scarlet fever protects the individual against a subsequent attack. It was determined to investigate the Dick reaction in patients who had been in hospital at some previous date.

1. Eighty-three patients who had had scarlet fever five years previously were Dick-tested. These cases had not been treated with anti-scarlatinal serum.

2. Seventy-six patients who had had scarlet fever nine months previously were Dick-tested. These cases had all been treated with anti-scarlatinal serum. This latter group automatically selected itself, as anti-scarlatinal serum had only been used for the first time on these cases.

Great care was taken in all these cases to ascertain by reference to hospital records that the attack of scarlet fever was genuine. Rosen and Korobicina call attention to this in one of their papers. Other workers on the results of the Dick test in patients with a history of scarlet fever have not stated that they took similar precautions.

1. In all of these 83 patients the Dick test was negative, thus indicating that they are no longer susceptible to scarlet fever. Rosen and Korobicina, in a series of 111 cases with a history of scarlet fever, obtained 23.4 per cent. of positives. However, in another series of 14 persons in whom the history was verified, they found that 2 only were positive and that these 2 had suffered from scarlet fever twenty and thirty-five years previously. It would seem, therefore, that where a history of scarlet fever is verified the Dick reaction is negative in practically every case, thus indicating immunity to scarlet fever.

2. Of the 76 cases treated by serum nine months previously, 8, or 10.52 per cent., gave a positive Dick reaction. These 8 patients had not developed their anti-toxic immunity. In the present state of our knowledge of immunity to scarlet fever it is impossible to state that the positive Dick test does indicate a lack of immunity to scarlet fever. Davies of Yale, from his investigations on a similar group of cases, considers that there may be some disadvantage in the use of anti-scarlatinal serum from the point of view of subsequent immunity to the disease. It may be that second attacks of scarlet fever will become more frequent. In this connexion it is interesting to note that the only case of a second attack of scarlet fever observed by myself during the course of this investigation occurred in a girl, 6 years of age, who had been treated with serum for a mild attack four months previously. Both attacks were undoubted, and the second more severe than the first. It is too early yet to look for confirmation of this aspect of the effect of serum administration.

This investigation was carried out in the County Fever Hospital, Motherwell, during the winter 1926-27, and I am much indebted to Dr. John Reid, the medical superintendent, for facilities provided and for much helpful criticism.

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LACERATION OF THE ANTERIOR WALL OF THE FEMALE URETHRA AND ITS REPAIR.

BY

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EXAMPLES of laceration of the posterior wall of the female urethra are relatively, though decreasingly, common in midwifery, and although tears of the anterior wall are not unknown yet the peculiarities of this case may make it worth recording.

A 5-para, aged 31, was admitted to hospital four weeks after delivery of her last child. Forceps were used and the child was stillborn. She had persistent incontinence of urine throughout her convalescence, and came into hospital with a provisional diagnosis of vesico-vaginal fistula. Albumin and pus were present in the urine.

Whilst under an anaesthetic the patient was placed in the lithotomy position. On examination the posterior wall

of the urethra was found to be intact. The external urethral orifice was torn and ragged, and appeared to be dilated to about half an inch diameter. The little finger could easily be passed into the urethra, and the anterior wall was found to be torn for nearly an inch in length. This communicated with a large infected cavity behind the pubic arch, and the bare bone of the posterior aspect of the symphysis pubis could be palpated. It appeared as though the whole pelvic structures had been torn away from the pubes.

FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

Diagrams of First Operation.

FIG. 5.

FIG. 6.

FIG. 7.

Diagrams of Second Operation.

An attempt was made to free the torn edges of the urethra, and this was repaired with interrupted catgut sutures. Three or four sutures were inserted anterior to the urethral wall in order to pull the lateral tissues somewhat together. A eusol gauze pack was placed in the cavity, the pack emerging at the vulva above the repaired urethral orifice. A self-retaining catheter was inserted into the bladder.

An evening rise in temperature occurred for four days, but was never more than 100.4°. The gauze pack was gradually decreased and the cavity closed completely, whilst the catheter was retained until the fifteenth day. For the following five days there was frequency and urgency of micturition, but no actual incontinence. Incontinence, however, did recur, and the patient was allowed to return home after two months in hospital.

She was readmitted two months later when her general condition was improved. The anterior wall of the urethra was found to be torn for about half an inch in length, and a great deal of contracted fibrous tissue was present round it. The urethra was pulled out taut and a small incision made along either side of the gaping urethra. The urethral walls were trimmed and brought together by means of interrupted catgut sutures. Two catgut sutures were put into the side wounds and a self-retaining catheter placed with some difficulty into the bladder. The catheter was retained for three days and then had to be removed. After a few days the patient had complete control over micturition; only occasional frequency occurred, and the anterior wall of the urethra healed perfectly.

I am indebted to the surgeon in charge, Dr. E. O. Croft, senior honorary surgeon to the Leeds Hospital for Women and Children, for permission to publish this case.