no evidence of recurrence *in situ*. Rectal examination reveals no sign of anterior extension of the growth towards the bowel. The patient is now undergoing x-ray treatment, so far with no relief of his pain.

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THE PROPHYLACTIC VALUE OF SCARLET FEVER ANTITOXIN.

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AN opportunity recently occurred of testing the degree and duration of passive immunity conferred by prophylactic doses of scarlet fever antitoxin. As the procedure adopted involved several of the new methods in scarlet fever, we think that some account of our observations will be of interest.

In a diphtheria ward a girl, aged 12, convalescent from the disease, and therefore up and about, developed scarlet fever. The diagnosis of this case was confirmed by a very marked Schultz-Charlton reaction, produced by the intradermal injection into the rash of 0.2 c.cm. of horse scarlet fever antitoxin, and also by a positive Dick test. As the child had received diphtheria antitoxin many days before, she was first desensitized with 1 c.cm. of horse serum in the ordinary way, and then received 25 c.cm. of an unconcentrated scarlet fever antitoxin intramuscularly. The temperature, which overnight had risen to 103.8°, dropped by crisis to normal by the morning. The rash, which had become very intense before serum was given, completely disappeared in less than thirty-six hours; the temperature remained normal, and the child to all intents and purposes was quite well, and has remained so. This child had no previous history of scarlet fever. On the same morning another girl, aged 10, vomited and complained of slight sore throat. The tonsils were observed to be congested, and she presented an extremely faint pink flush over the trunk; her temperature was found to be 101°. Although this child was stated to have had scarlet fever "at home" a year previously, the Dick test was positive. The flush on the trunk was so fleeting that no Schultz-Charlton test was feasible. We have no doubt that this patient had an abortive attack of scarlet fever, but she was nevertheless dealt with in the same way as will be described in the case of other contacts in the ward.

On the occurrence of these two cases a search was made for the source of infection. A girl, aged 12, who had been admitted six days previously with severe faucial diphtheria, was found to be desquamating on the hands. Careful inquiry elicited the fact that nearly three weeks prior to admission to hospital she had complained of a sore throat, and that a rash had been noted on her back and legs. The Dick test in this case was negative to a dilution of toxin which we are satisfied after some hundreds of trials in various dilutions constitutes in 1 in 1,000 dilution a reasonable skin test dose. This toxin (X48) was supplied to us by Dr. R. A. O'Brien, and is the toxin used with corresponding controls of heated toxin throughout the Dick tests described in this paper. This negative response to a skin test dose of Dick toxin was consistent with our previous experience of the Dick test performed on cases of scarlet fever in the third week or later. We have no doubt that this girl, herself immune to a skin test dose as a result of a recent attack of scarlet fever, was the source of infection.

Although we and others of our colleagues in the Birmingham City Hospitals are satisfied, as the result of a long series of trials, that 0.2 c.cm. of 1 in 1,000 dilution of toxin X48 constitutes a skin test dose, we have in this series of cases, and as part of a larger piece of work, used not only 1 in 1,000 dilution, but also 1 in 500. The use of these two dilutions, one twice as strong as a normal skin test dose, gives us a measure of the immunity possessed by the patient in excess of that denoted by a negative skin test dose. All the contacts, therefore, were tested with both these dilutions, as were also the two infected cases and the infecting case. The latter, as already stated, gave a negative response to 1 in 1,000, but was positive to 1 in 500.

Of the 16 contacts, 14, including the abortive case of scarlet fever already mentioned, gave positive readings to both dilutions; the two exceptions, who had well authenticated (hospital treated) previous attacks of scarlet fever, were completely negative to both dilutions, showing that as a result of a previous attack they possessed an immunity to scarlet fever toxin far in excess of that denoted by the skin test dose. It was determined to produce passive immunity in these 14 cases. Two scarlet fever antitoxins from different sources were employed for this purpose. Scarlet fever antitoxin "C" was a concentrated antitoxin, of which we had a small supply for testing. It was stated that each cubic centimetre would neutralize "at least 50,000 skin test doses of scarlet fever toxin," and that 2.5 c.cm. constituted a dose which would produce passive immunity. Scarlet fever antitoxin "U" was an unconcentrated serum, part of an experimental batch. We had previously ascertained that 0.2 c.cm. of 1 in 1,000 dilution of this batch of serum would produce local blanching when injected intradermally into a recent scarlet fever rash. We also knew that 10 c.cm. of this unconcentrated serum would convert a Dick-positive reactor into a negative reactor in twenty-four hours. We therefore in 4 cases employed 2.5 c.cm. of the concentrated serum, and in 10 cases 10 c.cm. of the unconcentrated serum. In every instance the intramuscular route was employed; thirty-six hours after the serum had been administered the patients were again tested with the same dilutions of the same toxin, and the results of these tests, together with subsequent tests at intervals, are set out in the chart.

One of the disadvantages of the use of unconcentrated scarlet fever antitoxic serums when used in therapeutic doses has already been noted by one of us¹—namely, the occurrence of serum rashes which may be quite severe. Hence a very careful record was kept of the occurrence and severity of any serum phenomena after the use of prophylactic doses of concentrated and unconcentrated serums respectively. It will be seen from the table that none of the 4 cases given concentrated serum in doses of 2.5 c.cm. developed serum rashes; whereas 6 of the 10 who had received 10 c.cm. of the unconcentrated serum developed trifling rashes, in most cases on the arms and legs only. One rash was scarlatiniform in type, and confined to the back.

The following chart sets out the results of all the observations which were made.

A study of the chart shows that as a result of administration of 2.5 c.cm. of a concentrated antitoxin or 10 c.cm. of an unconcentrated antitoxin, immunity was produced in thirty-six hours in all cases to a skin test dose of toxin; and in 9 of the total to a dilution of toxin twice as strong. In a week's time all the 4 cases who had received the concentrated serum were still negative to a skin test dose, whilst 3 gave minimal reactions to the 1 in 500 dilutions; 4 of the 10 cases who had received unconcentrated serum gave minimal positive results to 1 in 1,000 dilutions at the end of a week. In all these cases the 1 in 500 dilution was, of course, also positive. Two children remained negative to both dilutions. A week later still re-tests were performed with the same toxin in the same dilutions. One child who had received concentrated serum still remained negative to both dilutions, whilst 3 gave positive reactions—two of them minimal—to 1 in 500. Four of those immunized with unconcentrated antitoxin still remained negative to the 1 in 1,000 dilution (two of these to both dilutions). Five children reacted positively to both dilutions, and the remaining child had been discharged from

CASE	AGE	PRIMARY DICK TEST		SC. FEVER ANTITOXIN, TYPE	DOSE CCS	1st RE-TEST 36 HOURS.		2nd RE-TEST 1 WEEK.		3rd RE-TEST 2 WEEKS.		4th RE-TEST 3 WEEKS.	
		1000	500			1000	500	1000	500	1000	500	1000	500
1	4	●	●	C	2.5	○	○	○	○	○	○	○	○
2	3 10/12	●	●	C	2.5	○	○	○	○	○	○	○	○
3	7	●	●	C	2.5	○	○	○	○	○	○	○	○
4	10	●	●	C	2.5	○	○	○	○	○	○	○	○
5	6	●	●	U	10	○	○	○	○	○	○	○	○
6	3	●	●	U	10	○	○	○	○	○	○	○	○
7	7	●	●	U	10	○	○	○	○	○	○	○	○
8	13	○	○	NIL		○	○	○	○	○	○	○	○
9	12	●	●	U	10	○	○	○	○	○	○	○	○
10	11	●	●	U	10	○	○	○	○	○	○	○	○
11	10	○	○	U	10	○	○	○	○	○	○	○	○
12	10	●	●	U	10	○	○	○	○	○	○	○	○
13	11	●	●	U	10	○	○	○	○	○	○	○	○
14	10	●	●	U	10	○	○	○	○	○	○	○	○
15	9	●	●	U	10	○	○	○	○	○	○	○	○
16	8	○	○	NIL		○	○	○	○	○	○	○	○

○ NEGATIVE. ● POSITIVE. ◐ POSITIVE OF SMALL AREA OR FAINT POSITIVE.

Note.—Only 6 cases showed serum phenomena. These were as follows: Cases 5, 9, 10, and 15 had urticaria on arms and legs; Case 12 on arms only. Case 13 had a scarlatiniform rash confined to the back. Cases 4, 8, and 16 were the only ones with a previous history of scarlet fever.

hospital before this second re-test could be carried out in her case.

A fourth re-test in twenty-one days of 6 children who had remained negative to a dilution of 1 in 1,000 at the third re-test was carried out. All 6 of these children were still negative to 1 in 1,000; 3 of these 6 had received concentrated antitoxin, and one of these 3 still remained negative to 1 in 500 dilution. The remaining 5 gave small reactions to 1 in 500 dilution.

It may be concluded, therefore, that 2.5 c.cm. of a good concentrated scarlet fever antitoxin will protect a child susceptible to scarlet fever (as assessed by a skin test dose of Dick toxin) for at least a fortnight, and that 10 c.cm. of an unconcentrated serum of known high blanching titre will confer similar protection, although with less certainty. Concentrated serum in a dose of 2.5 c.cm. did not produce a serum rash in any of the four cases investigated. There is the additional advantage that such a small bulk of serum is in itself in the neighbourhood of a desensitizing dose of horse serum; hence in the case of a child who has previously received diphtheria antitoxin the process of desensitization may be safely omitted if only such a small bulk of scarlet fever antitoxin is requisite.

It should be added that all the cases related above, including the infecting and the infected cases, were removed, as soon as the results of the first Dick test after serum were read, to an ordinary scarlet fever-diphtheria ward. They were consequently exposed to the infection of scarlet fever throughout the period recorded. No instance of infection occurred amongst any of the transferred children.

We have no doubt that the practitioner in charge of children's institutions now has available in the Dick test and in scarlet fever antitoxin the means of prompt control of an outbreak of scarlet fever. Scarlet fever antitoxin may be used for either of three purposes: (1) intradermally, preferably diluted to 1 in 10 with normal saline, for the diagnostic Schultz-Charlton reaction; (2) intramuscularly or intravenously, in therapeutic doses, for the treatment of the disease; (3) intramuscularly, for the production of temporary passive immunity.

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Memoranda: MEDICAL, SURGICAL, OBSTETRICAL.

PHENOLAINE IN OPHTHALMOLOGY.

My first introduction to phenolaine was through Mr. Nesfield's *Ophthalmic Surgery*. After a fairly extensive use of it during a period of two years I share his enthusiasm and regard the drug in ophthalmology as one of the most important in our armamentarium.

The reason for this communication is that I have inquired from several ophthalmologists if they had had any experience of it, and have received negative replies, and my hope that it will lead to a trial in those cases in which it is especially recommended—nebulae and leucoma of the cornea.

My first experience with phenolaine was in a case which I will briefly describe, and in which the result was miraculous, using the word Mr. Nesfield quotes in relation to the drug.

A boy, aged 6 years, was sent to me by Mr. Claude Avarne in October, 1923. The boy had had a most severe attack of whooping-cough in January of that year. The mother then noticed that the right eye began to turn in. When I saw him he had a decided right convergent strabismus, could not fix with that eye, and had no perception of hand movements. Ophthalmoscopic examination revealed an old mass of vitreous opacity, barring absolutely any view of the fundus. This mass was evidently the result of a haemorrhage into the vitreous due to the whooping-cough.

I had just been introduced to phenolaine, so I began, according to directions, subconjunctival injections. I gave one a month. After the fourth injection the vitreous became absolutely clear, and has remained so. I followed up with one other injection.

A tucking operation then followed to reduce the squint. Owing to the subconjunctival injections there was a most alarming chemosis during the process of healing, so much so that I had to snip the conjunctiva to promote drainage. The result of the tucking operation, in spite of all, is perfect. Owing to the length of time the eye had squinted it is amblyopic + 1.00 Sph. V.=6/36. From a blind eye this is surely a triumph for the injections.

I have since used phenolaine in many cases of old nebulae, and have never met with disappointment. I always urge it with confidence. Cases that could only read Jaeger 6 have been brought up to 1 or 2. I have not used it in patients over 30. The strength is that Mr. Nesfield recommends—2 minims to an ounce of sterilized tap water. I use water which has passed through a Pasteur-Chamberland filter, but phenolaine possesses very high antiseptic and anaesthetic properties. Tap water has a great deal to do with its action, according to Mr. Nesfield.

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INTRAUTERINE AMPUTATION OF LEFT LEG.

On Monday forenoon, September 28th, 1925, I was called to see a woman, aged 33, who was due to have her eighth confinement in the beginning of November. She thought she was in labour, as she had been having pains since September 26th, and was alarmed at the delay.

The uterus was up to the level of the umbilicus and indicated a transverse presentation; the os uteri was well dilated with the right shoulder presenting. Under chloroform the shoulder was pushed up, and in manipulating for a foot my finger came against a very sharp end of bone, and I also felt a small foot and leg lying free inside the uterus. I secured the normal foot and easily delivered a live boy, my only fear being that the uterus might get damaged by the pointed stump of the femur. I then removed the detached foot and leg.

On examining the child I found that the left leg was amputated about the middle of the thigh, the stump being completely healed except that the femur projected about a quarter of an inch—a condition similar to that found during the war after circular amputations that had been allowed to granulate. The amputated part was macerated and much smaller than the other limb—about 5 months as compared to 7½ months. There was nothing abnormal about the placenta, which came away easily within ten minutes of the birth. The cord was somewhat longer than usual and very thin. The woman made an uneventful recovery and was up on the tenth day.