nity results were very good and compared favorably with those noted after the use of 1/10 L+ mixtures..

1/10 L+ mixtures of toxin-antitoxin have given successful immunity results in from 80 to 95 per cent of injected school children. *At the Schick retest many of these children show a moderate to marked pseudo-reaction.* This indicates the necessity of always making a control test when the Schick retest is made to check up on the immunity results. Mixtures containing 1/10 L+ lose some of their immunizing efficiency on standing at icebox temperature for several months. In judging the immunity results after injections of toxin-antitoxin we have to consider not only the special mixture, but also the individual group of children treated and the period of time elapsed after the injections.

The time factor in the Schick retest is especially important. More than 50 per cent of those who were found to be still susceptible at the end of three to six months gave a negative Schick reaction when retested one year later without having received further injections of toxin-antitoxin.

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The significance of the pseudoreaction in the Dick test and methods used for its identification.

By ABRAHAM ZINGHER.

[*From the Bureau of Laboratories, Department of Health, New York City.*]

Pseudoreactions due to the autolyzed streptococcus protein and other protein constituents of the toxin broth test fluid have an important bearing in the interpretation of the Dick reaction. Of 589 children tested in one of the public schools 459 were found to be immune. Of these, 190 or 41.4 per cent gave a pseudoreaction. Of the 130 susceptible children, 45 or 34.6 per cent gave a combined positive and pseudo reaction. Of another group of 950 children, who received the Dick test in two institutions, 686 were found to be immune. Of these, 232 or 33.8 per cent gave a pseudoreaction. Of the 264 non-immunes, 90 or 34.0 per cent gave a combined reaction. In children under 5

years the percentage of negative pseudo and positive combined reactions is much less and is closely analogous to the similar small percentages of pseudo reactions found with the Schick test in this age group.

To make the readings of the Dick reactions more accurate and avoid the confusion that is very likely to arise between positive and negative pseudoreactions it is important to use a control test, which will show with a great deal of accuracy the difference between the four different reactions described before this society at its March meeting in connection with the Dick test: the positive, negative, negative pseudo and positive combined. The control test is thus closely analogous to the one used with the Schick test and serves the same purpose. It is even more important, however, to use a control with the Dick test than it is with the Schick test where it is strongly indicated in older children and adults. As the positive reactions appear within 24 hours the time element used by some to separate the positive and negative pseudoreactions in the Schick test is practically of little or no value in differentiating the reactions noted with the Dick test.

For the control three different solutions can be used: (1) A dilution of the toxin which contains 25 per cent of convalescent serum or plasma, obtained from three weeks' scarlet fever convalescents. To make the dilution add 1 cc. of 1:10 dilution of the toxin to 75 cc. saline (containing 0.25 per cent phenol) and 25 cc. of convalescent serum or plasma. This gives an ultimate dilution of the toxin 1:1000 which would be the same as that used for the Dick test. If the ultimate dilution of the toxin should be 1:500, add 2 cc., etc.

(2) A dilution of the toxin which contains 25 per cent of normal serum or plasma, obtained from individuals who give a negative Dick test. The dilution is made in the same manner as with convalescent serum.

(3) Streptococcus scarlet fever toxin which has been heated in a water bath at boiling temperature for one hour. The toxin that gives rise to the positive reactions is destroyed by the heat, while the reacting proteins that cause the pseudoreactions are not affected. It is best to heat the toxin in a primary dilution of 1:100, the final dilution being made as required. The final dilution, however, as used for the Dick test, can also be heated for one hour and then used without further dilution as a control.

The heated scarlet fever streptococcus toxin may be ultimately used as a control as it can be more conveniently prepared. However the following results are rather significant: In a group of 200 children who received the Dick test and two controls (heated toxin and toxin neutralized with 25 per cent mixed convalescent plasma) 52 or 26.0 per cent gave positive Dick reactions, 40 or 20.0 per cent showed a slight reaction with the heated control and no reaction with the neutralized control and 5 or 2.5 per cent gave combined reactions, in which both controls appeared, but were much less marked than the Dick reaction. Of the immune children, 80 or 40.0 per cent gave a negative Dick reaction and negative controls and 23 or 12.5 per cent gave negative-pseudo reactions, in which the Dick test and the two controls were exactly similar. *It is interesting to note that in this group of* 200 *children there were* 40 *on whom the neutralized convalescent plasma toxin acted as a more perfect control than the heated toxin.*

All dilutions of the scarlet fever toxin should be made with normal saline (0.85 per cent) containing 0.25 per cent phenol if they are to be kept for a few days.

The final dilution (1:1000) of the scarlet fever streptococcus toxin is more stable than the final dilution of diphtheria toxin for the Schick test. The final dilution can be kept and used for two weeks and probably longer without noticing any appreciable diminution in its toxic strength.

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The irritating local effect of human blood serum or plasma containing chyle obtained soon after meals.

By ABRAHAM ZINGHER.

[*From the Bureau of Laboratories, Department of Health, New York City.*]

In carrying on work with the intradermal blanching test in scarlet fever rashes we noted that serum or plasma obtained from human beings soon after meals and containing a consider-