

## The Control of Scarlet Fever—*Continued*

with a similar series of three hundred cases treated without antitoxin, the incidence of complications was 8 per cent. in the antitoxin series and 38 per cent. in the series which received no antitoxin. Gordon has reported another series of 500 cases treated with antitoxin and 500 treated without antitoxin. He found a similar reduction in the number and severity of complications in those treated with antitoxin.

In addition to its use in the treatment of scarlet fever, the antitoxin may be given prophylactically in selected cases as an emergency measure to prevent the development of scarlet fever in susceptible persons already exposed to the disease and infected with scarlet fever streptococci as shown by nose and throat cultures. Such passive protection with antitoxin is purely an emergency measure and it must be kept in mind that the protection is only temporary, lasting at the most two or three weeks. As soon as the foreign serum is eliminated from the body, the individual again becomes susceptible to scarlet fever and may contract the disease again.

### *The Only Permanent Protection*

The only permanent form of protection is that furnished by active immunization with graduated doses of scarlet fever toxin which stimulates the individual to produce his own antitoxin.

Not everyone is susceptible to scarlet fever. Some have spontaneously acquired immunity to the disease through having had an attack or by repeated exposure. To learn which individuals in any group are susceptible so that they need to be immunized and which ones are immune and do not require immunization, skin tests are made. This is accomplished by injecting just beneath the upper layer of the skin exactly one-tenth of a cubic centimeter of a dilute and accurately standardized solution of scarlet fever toxin. The injection should be made on the anterior surface of the forearm, at the junction of the upper and middle thirds. The result of the test is observed between twenty and twenty-four hours later. This observation should be made in a bright light in order not to overlook slightly positive reactions.

An area of reddening one centimeter in any diameter constitutes a positive reaction and indicates some

degree of susceptibility to scarlet fever. There is no induration in the positive tests—only reddening with slight superficial swelling and positive reactions have usually disappeared in 30 to 48 hours so that the results of observations made more than 24 hours after the test would not be reliable. On the other hand, the observations should not be made too soon—not earlier than 20 hours. According to the degree of susceptibility of the individual, the skin reaction may vary in color from faint pink to intense red; in size up to five centimeters in diameter.

### *Incidence of Susceptibility*

In a series of skin tests made in thirty thousand persons, it was found that infants under 6 months showed less frequent and less strongly positive reactions than older children. During the first year there is apparently a gradual increase in susceptibility. Between one and six years of age, 90 per cent. of children living under good conditions may show positive reactions indicating that they have not yet had scarlet fever. After the children start to go to school they are exposed to scarlet fever from time to time and some of them contract the disease. This results in a decrease in the incidence of susceptibility with increasing age. The more crowded the schools and living conditions, the more rapidly this spontaneous immunization takes place due to the fact that crowding favors the spread of infection. Extremes of susceptibility due to differences in living conditions are illustrated by two institutions. The first is an orphanage of 3,000 where the children live in cottages and are out doors most of the time when they are not in school. In this orphanage 63 per cent. were found susceptible to scarlet fever, indicating that 37 per cent. had had the disease in some form. The other institution was one of 3,000 feeble-minded children who were kept indoors in crowded buildings. Here only 13 per cent. were found susceptible, showing that 87 per cent. had had scarlet fever.

*Science News-Letter, August 25, 1928*

### Footnote on Scarlet Fever

#### *Medicine*

Editorial comment on Dr. Dick's article, prepared by the American Association for Medical Progress.

In the article on the Control of Scarlet Fever, by Dr. Gladys H. Dick, the second installment of which appears in this number of SCIENCE

NEWS-LETTER, no attempt was made to indicate the many important ramifications which the study of this disease has had to pursue, since experimental methods were systematically applied to it.

Earlier experimenters had succeeded in obtaining a pure culture of streptococcus germs which produced the characteristic toxic symptoms of scarlet fever. Others had used both the toxic filtrate from a culture and the bacteria themselves for the immunization of horses in such manner that the serum would neutralize the poisons of scarlet fever or destroy the bacteria supposed to cause the disease. Moser of Vienna in 1902 inoculated a horse with a mixture containing both bacteria and the toxic products formed by the bacteria growing in broth. Serum subsequently produced from the horse's blood was found to have excellent therapeutic value in treating scarlet fever.

Savchenko a few years later showed that in scarlet fever there are present both the local action of bacteria and the diffusion of a poison or toxin. In 1907 Dabritschewsky, another Russian, developed an experimental vaccine for immunizing against scarlet fever by using a combination of the poison and killed streptococcus bacteria.

In spite of these successes with vaccine and therapeutic serums, there still remained doubts in many minds as to the specific nature of the bacteria responsible for scarlet fever and as to other details in the disease process. It had not been possible to produce the disease by inoculating experimental animals. Doctors George and Gladys Dick were the first to subject volunteers to deliberate infection, and they developed the use of minute quantities of pure scarlet fever toxin, injected into the skin, as a test of susceptibility to the disease.

Parallel with the work of the Dicks in this country was the experimental research of A. R. Dochez and associates, which resulted in the production of a scarlet fever antitoxin by injecting into horses successive small amounts of melted nutrient agar carrying scarlet fever streptococcus. The serum produced in this manner was found to be remarkably effective in clearing up scarlet fever within a few hours, even when highly diluted.

*Science News-Letter, August 25, 1928*