

The Doctor, if conscientious, has to do his work over several times before getting the desired results, or the patient has to go to school vaccinated but not protected, because the virus did not take.

Immunity Conferred by Vaccination.—In the first place permit me to call attention to the fact that the Local Government Board of Great Britain require three separate and distinct vaccinations and claims it takes at least one-half square inch of vaccinated surface to afford complete and lasting immunity.

It is the custom of the United States to vaccinate at but one point; frequently this is sufficiently large to cover the requirements previously indicated.

Supposing that a person has been vaccinated to the point of saturation then the question is asked—how long will this protect against small-pox? We must not forget in attempting to answer this question, there are no two persons equally susceptible to any disease; in other words that the amount of natural immunity varies with the individual.

We must be guided by some rule in our work and in order to establish some basis for comparison, I have devised this chart.

You see, it stated in almost all literature on the question, that when a person is vaccinated in infancy and again at 10 or 12 years of age, the protection usually stands during life.

How true this may be in reference to smallpox, I do not know, but I know it is not true in reference to vaccination. Over and over again I have seen employes in our laboratory get a vaccine infection in almost any part of their body which happened to be scratched and was exposed when handling the virus, which vaccination may be repeated in three months' time, or in a year or longer.

I have seen some individuals who seem to be impervious to the disease altogether, yet if they continued handling the vaccine year after year a time will come when the natural immunity is at low ebb and the person will take the infection.

PRECAUTIONS TO BE OBSERVED IN STORING VACCINES FOR DISTRIBUTION.*

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The part assigned to me in the discussion of this evening relates entirely to the functions of the retail pharmacist as a distributor of these products upon the prescription or requisition of the medical practitioner.

As a distributor of Biologic Preparations the retail pharmacist has a much more important part than he is generally credited with or even than the majority of pharmacists appreciate. Owing to the high grade of technical skill and the large

*Read before the Philadelphia Branch, May 7, 1912.

capital required for the maintenance of a plant it is not likely that manufacturing establishments will be generally located near enough to the physician for him to be able to obtain his supplies direct from the maker without the intervention of the pharmacist as a distributor.

The time that would elapse in procuring the antitoxic serum or even the vaccine from the maker, notwithstanding modern methods of communication and transportation, would be serious and detrimental in most cases.

It therefore becomes a necessity to have supplies at hand in each locality, and logically and naturally the pharmacist is the recognized distributor.

To fully consider the responsibilities of the situation and the necessary precautions entailed upon the purveyor of this class of products is important for the pharmacist who intends handling serums and vaccines.

Ever since they were first produced there has been no material disagreement among experts that light, air and temperature are the important factors in the preservation and storage of this class of products, and the Pharmacopœia fully recognizes these principles in its directions for the preservation of Serum Antidiphthericum, the only one official, which is as follows: "It should be kept in sealed glass containers in a dark place at temperatures between 4.5 and 15 degrees Centigrade (40° to 50° F.)" Two of these factors, in so far as the distributor is concerned, have been cleverly controlled and eliminated by the makers, who have generally adopted packages consisting of either ampoules, or ampoules convertible into syringes which are packed in light-proof containers.

The third factor, or that of temperature, is therefore the one that is important for the distributor, and it may be tersely stated that it is useless for the pharmacist to attempt to handle this class of preparations who does not have a refrigerator and maintain in it a temperature of somewhere near 10 degrees Centigrade (50° F.) with a range of not more than ten degrees Fahrenheit or about 5 degrees Centigrade, either way.

It does not necessarily follow that the equipment must be elaborate or expensive, and there are a number of types of refrigerators on the market that are well adapted for the purpose. One of the best and easiest kept clean is made from thin plates of enamelled steel in both square and cylindrical shapes and of convenient sizes. The writer has found one of this type perfectly satisfactory and capable of maintaining on the average a temperature of about 50 degrees Fahrenheit under ordinary store conditions.

Another important matter is the question of age, but as the relation of age to efficiency has been pretty thoroughly worked out, and as every maker sends out his package with the limit of time for use plainly stated thereon, the only obligation upon the distributor is to dispense products within the time limit.

In this connection, it should be remembered that this time limit involves storage under prescribed conditions, and that deviation from what is recognized as a necessity in the situation can bring about a condition in the product that makes the time limit of no value whatever as an index to efficiency.