

sufficient to protect ten individuals from diphtheria. But in regard to this it must be borne in mind that the degree of immunity conferred is in direct proportion to the number of antitoxin units injected.

8. Although no reaction has been observed following the injection of the antitoxin, it is not improbable that such may occur, and Dr. Libbertz, Gartnerweg, of Frankfort, a/Main, has expressed himself prepared to collect and publish any such cases that may come under notice.

9. It is specially deserving of notice, and the fact had been determined beyond the shadow of a doubt that the specific action of blood serum is more certain and rapid and effectual with a smaller number of units of antitoxin the earlier the treatment is begun. The judgment may, therefore, already be pronounced, that of 100 cases that are treated within the first forty-eight hours of the commencement of the disease by the injection of a single dose of 600 units, not five cases will die of diphtheria. The later treatment is begun the larger will be the dose required, and not only that, the prospect of recovery even with larger doses of the stronger medicine is much less, as here, as a rule, complications have now arisen over which the antitoxin serum has no control.

10. The antitoxin contained in the blood serum is a substance soluble in water, it is very resistant to the ordinary atmospheric influences, concerning which, however, we do not know much except that it renders the diphtheria poison harmless. Beyond this diphtheria antitoxin, even in the strongest concentrations in which it can be prepared, has no action whatever. Neither plant nor animal life can be affected in any way by antitoxin. The only reagent that acts on diphtheria antitoxin is the living organism infected by diphtheria and poisoned by it. Diphtheria antitoxin is for this reason in an eminent degree a specific.

11. Blood serum treatment is, therefore, specific treatment. Each blood antitoxin has a curative and protective action only in regard to a single morbid product.

12. As regards the origin of diphtheria antitoxin, as all other blood antoxins, we must regard as its source the reaction albumen of the living body; the specific antitoxin arises from the reaction of the specific toxin on this albumen under such circumstances as point to a general disturbance of the regulatory appliances of the whole organism. The fever and other symptoms of disease that manifest themselves after a toxic infection we may look upon as an expression that the living organism is endeavoring by the aid of protective appliances provided by Nature to render harmless the disease poison that has gained entrance. In the natural course of things this endeavor is very often unsuccessful. In experiments on animals, however, we can arrange mat-

ters so that the natural curative powers gain the upper hand. The results of our immunizing labors are to be looked upon as a proof of this, that constantly larger doses of poison are rendered harmless by antitoxins.

13. When after such a spontaneous or arbitrarily produced infection we examine the juices of the body, we find that the toxin is not only compensated by the antitoxin, but we find an over-compensation, an excess of antitoxin. This excess of antitoxin is the reason why when it is wished to infect anew by a later introduction of toxin the dose has to be augmented. We can also make use of this excess in helping other individuals to overcome similar intoxication.

This is the basis of treatment by blood serum.

14. Bearing in mind that the antitoxins are chemical bodies soluble in water, it is not impossible that at some time they may be prepared synthetically, or, at least, outside the animal organism. The prospect of this is, however very slight, as is also that of procuring the antitoxin direct from the toxin, the prospect of procuring in the laboratory the antitoxin direct from the toxin is no better than that of procuring an alkali where-with to neutralize an acid direct from the acid itself.

Division 15 is taken up with what he holds to be erroneous views as to directly and indirectly acting curative bodies, as when the diphtheria poison itself, when attenuated by physical or chemical agents, has been thought to have acted beneficially in diphtheria. The author has thought it might be so used in the diphtheritic paralysis, but he has seen it only do harm in simple acute diphtheria. Kleb's attempts to treat diphtheria in this way he considers to have completely failed.

VIRCHOW'S VIEW OF THE NEW TREATMENT OF DIPHtheria.

Virchow's opinion of the efficacy of the new treatment by blood serum of diphtheria may be thus summarized: The serum exercises a strong protective effect for weeks, perhaps even for three to four months; but it remains to be seen whether this effect is permanent, and whether—and this is the cardinal question—it is really possible to cure diphtheria by this remedy. Much, however, is gained if we succeed in protecting even one child in a family in which three or four are ill of this malady. And that we may accomplish this appears extremely probable.—German Correspondent, *Med. Press*.

TERPINE IN CHRONIC BRONCHITIS.—Dr. Delmis, *Gaz. des Hôp.*, has employed terpine in chronic bronchitis, bronchiectasis and emphysema, as well as in phthisis, with successful results. It is best given in a pill of ten cgms., three to ten a day.