

the cerebrospinal fluid in conspicuous quantities. The most that such injections accomplish is the neutralization of the circulating toxin, that which is not yet on its way to the central nervous system through the motor nerves. It is, of course, important to neutralize the circulating toxin and it must be done quickly, for in the course of a few hours the fatal quantity of toxin may have been absorbed; "a dose of antitoxin which would save in the morning may be without effect in the evening."

At the same time it is of greater immediate importance to neutralize that which has been already taken up by the nervous tissue, and if possible to tear away some of the toxin already bound by the ganglionic cells. To accomplish this object, or to attempt it, special procedures are demanded. We may then consider the antitoxic treatment as follows:

First: The neutralization of the toxin which has already been absorbed by the peripheral nerves and spinal cord at a point as near the vital centers as possible. This involves surgical exposure of the large nerves of the part as near the trunk as possible and their infiltration with antitoxin (Ransom and Meyer), and in desperate cases the infiltration of the antitoxin into the spinal cord in the vicinity of the medullary centers. From five to fifteen minims may be injected into the nerve trunks at a sitting, and the operation may be repeated on subsequent days; the needle should be partially withdrawn and reinserted in different directions during the injection. Rogers' recommends tying loose ligatures around the nerves after the operation so that they may be readily drawn up and identified for further injections. In order to reach the medulla the intracerebral method of Roux or that of Rogers may be utilized. Kocher has devised a technic for the intracerebral injections. Anterior to the parieto-frontal suture and to one side of the median line the scalp is prepared, and a hole drilled through the skin and skull, having its direction toward the foramen magnum. By means of a long needle, the ventricle is penetrated and the serum, after injection, finds its way to the fourth ventricle to the imperiled respiratory and cardiac centers; 10 c.c. may be injected. Rogers seeks to accomplish the same end by a different technic. He introduces the needle between the sixth and seventh cervical vertebrae, punctures the cord deeply, and injects from 20 to 30 minims at a sitting. Although there is danger of intraspinal hemorrhage in the procedure, no ill effects were noted. It has been recommended also that the cerebrospinal fluid be withdrawn by means of lumbar puncture and substituted by antitoxin. Some physicians who have used this method report favorable results.

Second: The neutralization of all toxin which is not yet bound by the nervous tissue or absorbed by the motor nerves. This demands the infiltration of the wound and surrounding tissue with the antitoxin, and injection of a sufficient amount of the serum into the circulation in order that circulating toxin may be neutralized. The intraneural, intraspinal or intracerebral injections should always be supplemented by subcutaneous or intravascular injections. The first dose should be given intravenously, whereas subsequent injections may be given subcutaneously. The injections should always be repeated.

Unfortunately, tetanus antitoxin is not standardized by American manufacturers and dosage can not be controlled with any accuracy. Although standardization can not be accomplished with the same degree of accuracy as in the case of diphtheria antitoxin, its approximate value can be determined (within 5 or 6 per cent.), which is sufficient for practical purposes. The antitetanic serums of Behring, Tizzoni and the Pasteur Institute are all standardized, but on somewhat different bases. Behring advises the administration of 20 units of his serum for prophylactic purposes, and 100 units as the "simple" curative dose when given soon after the development of symptoms.

Not less than 10 c.c. of American serum should be given for prophylaxis, and the dose should be repeated. No definite lim-

its can be given as to the amount which may reasonably be given for curative purposes. Ten cubic centimeters given intravenously at once, and an equal amount subcutaneously on subsequent days, would seem to be sufficient to neutralize the unbound toxin if the serum has reasonable strength. Standardized serums certainly are to be preferred.

Agglutination has no practical significance for diagnostic purposes. An agglutinating power has been noted in the serum on the eighth day. Agglutinins may be produced by immunizing animals (rabbits) either with the bacilli or the toxin. In the latter case the formation of the agglutinin is due to the presence of agglutinogenic receptors in the toxin solution.

## New Instrument

### AN IMPROVED NEEDLE HOLDER.

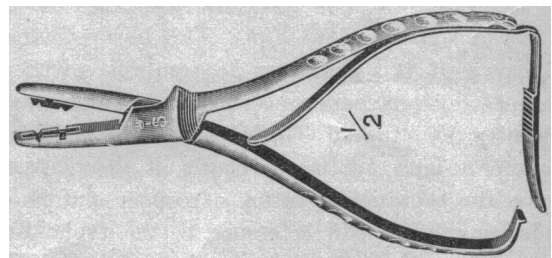
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The needle holders now on the market are by no means perfect and, while I understand fully that my new device will be criticised, I feel that some members of the profession will appreciate its advantages and use it in preference to any previous instruments.

A matter of common complaint is that the holders known as the "Harris," "Emmett," "improved Russian," "Ferguson," "Halstead," "Hagedorn," "Byford," "Henchett," "Whiting," "Rhenier," "Abbe," do not come up to expectations and that great annoyance is caused during their use. Some of the above holders are useful for certain needles, but not one can be relied on to hold properly every kind of needle.

The needle holders which lock with a firm grasp and unlock when more pressure is used are very poor. I have a number of times broken needles, while they were in the tissues, by trying to unlock the holders, which is very unpleasant.



The accompanying cut shows my holder. Its advantages are:

1. It can be used with or without the clasp.
2. The fine ratchet-like clasp assures gradual pressure on needles, absolutely preventing them, no matter how fine, from breaking.
3. Hagedorn or any other kind of needle can be used in the V and square notch, while the two V notches are perfectly adapted to Hagedorn's.
4. Near the top of the handle there is a flange which is used as a support for thumb or finger. During the insertion of a needle, if the instrument and hand are wet, this flange will be found of great assistance in preventing the holder from slipping and will insure a firm hold.

Medicine and morals are inextricably intertwined. The immoral physician is foredoomed to failure. Let this axiom be clearly sounded from every chair in every medical college in the country. Whoever would be a successful physician must be a teacher and practitioner of morality—not necessarily by word of mouth—there are already too many such moralists—but by influence and conduct. He must persistently and consistently frown on immorality, because immorality *per se* is a powerful—perhaps, the most powerful—etiologic factor in a pathologic condition of mind and body which is pledged to combat and uproot.—*Medical Standard*.

1. "The Treatment of Tetanus by Intraneural and Intraspinal Injections of Antitoxin," Rogers. *THE JOURNAL*, July 1, 1905.