

in vogue in Great Britain, was a pure broth culture of the typhoid organism, just a simple broth culture, and when that had been treated—the germs killed, &c.—that was used as the prophylactic and injected. The other method, known as the German method, differs from that in this respect, that the bacteria are not grown in broth, but are grown on a hard medium, ordinary agaragar medium, and then they are scraped off that and put into plain salt solution, normal salt solution, so that you get rid of the broth by the German method of separation; you eliminate the actual broth, which, of course, is present in the English method of preparation.

Now, I have no hesitation whatever in saying that the presence of the broth in a prophylactic is answerable in a certain number of cases for those bad results which we have mentioned so often under the objection against its use. I have seen these bad results due to broth in other forms of prophylactic treatment; for instance, practically the same method of preparation is employed in making plague prophylactic and cholera prophylactic, simple broth culture—and the extract of meat, which constitutes the broth, every now and then causes decided trouble when injected beneath the skin. It is here, Senator David, that I would draw your attention to one of the factors producing these bad results—that there is a point that has been or can be eliminated. What the nature of that reaction is that is caused by the actual broth we do not know, but every now and then we seem to strike some meat extract which gives rise to trouble. That is quite apart from the germs themselves, quite apart.

The second great point or factor to be noted in eliminating the troubles is the method of application. In all cases of prophylaxis we find that you need a skilled man to administer them. It is a simple operation in itself, but in the hands of the untrained man you find more of those troublesome results arising than you do when it is administered by a man trained to the work. There is another cause of those undesirable results—that every now and then say in the army, wherever the inoculation takes place, you get a reaction which may be due to faulty administration, that is bad technique, bad surgery, to put it in plain terms. Of course, all the objectionable results are put down to the credit of the prophylactic itself, whereas in reality they are extraneous factors. The point that I would like to bring out is that I would strongly recommend the use of the German preparation, or to have the prophylactic prepared by the German method, because thus you eliminate a good many of the causes of trouble, and you certainly get a very fine preparation indeed, much superior, in my estimation, to the English method.

Dr. SCHAFFNER, M.P.—Has it been commercialized? Can you get it in any city?

Prof. STARKEY.—No, there are only one or two places where it is being prepared at the present time. For instance, on this continent, at the Army Medical School; they have a laboratory in Washington where large quantities of it are being prepared. So far as I know that is the most reliable station on this continent; they have some men that have been working on it for several years. And there is another point showing you the importance of having trained men; it is found that men who are highly skilled in the work turn out a very safe, reliable prophylactic, whereas if you put it into the hands of non-trained men you are very liable to get a prophylactic turned out which may cause trouble. It is the perfection of preparation.

Hon. Mr. MURPHY.—It is made by the German method on this side I suppose.

Prof. STARKEY.—Yes.

Hon. Mr. DAVID.—Was it used in Germany before it was used elsewhere? Where was it used first?

Prof. STARKEY.—As far as I know the first application of it was out in India while I was there; I do not know of any earlier application of it. There it was tried on some troops that were in an area very much infested with typhoid fever. It was purely