REMARKS ON THE BACTERIAL THERAPY OF YELLOW FEVER.*

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Dr. A. H. Doty, health officer, who was to have addressed you to-night, has asked me to take his place and say a few words in a non-technical way on the general subject of the bacterial therapy of yellow fever. This perhaps will be best accomplished by taking a few extracts from a report which I am preparing on the bacterial treatment of yellow fever, and adding thereto the observations of other investigators.

Our experience with the bacterial therapy of yellow fever embraces: 1, the use of the blood-serum prepared from the bacillus icteroides of Sanarelli; 2, the use of the toxin of the bacillus icteroides employed as a vaccination fluid, and 3, the use of a prophylactic fluid prepared, according to Haffkine's methods, from this bacillus and the colon bacterium found at autopsy in the liver and heart blood of yellow fever patients.

The serum prepared from the bacillus icteroides was used on 4 patients with yellow fever at the Swinburne Island Hospital, 8 at Vera Cruz and 1 at Havana. The Vera Cruz cases were diagnosed and injected by Dr. Barnard, of Charleston. The results of the observations on the first case—that of Mr. Lackey—appeared to indicate a curative effect due to the serum, but the results as a whole indicate that the blood-serum prepared from the bacillus icteroides does not cure nor modify the course of the disease in any way. The above cases were selected ones, i. e., not too far advanced. The serum employed was prepared by me and 5 to 10 c.c. were required to cure a guinea-pig, weighing 250 gms., which had been injected with a fatal dose of the culture. This was the strength of the serum obtained by Sanarelli and employed by him.

Sanarelli¹ reported 22 cases of yellow fever treated by his serum, with 6 deaths, a mortality of 27 per cent. He claims that these results prove his serum to be curative. He also reports having used it with success in immunizing the inmates of a prison.

Dr. Archinard, of New Orleans, treated 11 patients with Sanarelli's serum, and could trace no modification nor cure of the disease due to the serum. The serum employed by Dr. Archinard was imported from South America, where it had been prepared under Sanarelli's direction. Dr. Wasdin, of the United States Marine-Hospital Service, also used the imported serum on 3 patients and noted no curative effects. I have endeavored to make the serum stronger, but have not succeeded. Professor Lutz, of Santos, Brazil, also states that the serum is not effective. The above results do not agree with Sanarelli's and indicate that the serum of the bacillus icteroides is not curative in man.

Dr. B. Baker, acting under instructions from the New York health officer's department, injected a number of yellow fever convalescents at Vera Cruz with 1 c.c. of the toxin of the bacillus icteroides (San.). The reaction caused by this injection in 6 cases showed Faget's pulse and temperature, namely, a rising temperature with a falling pulse. This pulse and temperature is held by Faget and others to be diagnostic of yellow fever. This observation is very interesting in its relation to the bacillus icteroides being the specific cause of yellow fever, but is by no means conclusive. If the bacillus icteroides be the specific cause of yellow fever, this observation

tends to show that the acquired immunity of the disease is only a partial immunity, i. e., it may protect against the infection, but does not protect against the toxin.

The use of the prophylactic fluid prepared according to Haffkine's methods, from the bacillus icteroides and the colon bacterium obtained from the blood of yellow fever patients, has given favorable results in animals but has not as yet been employed on man.

Dr. Agramonte, of the U. S. Army, has recently tried serum obtained from the veins of yellow fever convalescents on 4 patients with yellow fever, on or before the fifth day of the disease, and states that he succeeded in modifying the course. This method has been used before and, apart from the difficulty of obtaining enough serum, has not given very promising results.

To summarize: The serumtherapy of yellow fever is still in the stage of investigation and does not appear to warrant any conclusions other than that the blood-serum of the bacillus icteroides does not cure nor modify the disease, and that further investigation is necessary.

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ANTIRABIC SERUM IN THERAPY.*

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Up to this date attempts to inaugurate a serum treatment for rabies have not, so far as we know, proved successful. Tizzoni and Centanni, following in the lead of Valli, succeeded in immunizing animals with a virus attenuated by peptonization, and from such immunized animals obtained a serum for which they claimed both a preventive and a curative value. Briefly, their method was to give the animal to be immunized seventeen injections in a period of twenty days, each injection representing .25 gram of virus for every kilogram of the weight of the animal being immunized. After twenty-five days the animal was bled and the serum collected in the usual way. The immunizing dose of serum was represented by one part of serum for every 25,000 parts of body weight.

The report of their work showed a high degree of protective action in the serum. The method of inoculation of their test animals, however, is open to criticism and can not fail to cast a doubt in the mind of the reader as to whether the protective effect of the serum was rather apparent than real. This doubt is emphasized when we find that the serum is to be used only in conjunction with the already recognized effective preventive inoculations. There is a class of cases, however, where the serum, although of only doubtful value, might be used, that is, in cases where a long time has elapsed between the time of infection and the commencement of treatment.

As is well known, the Pasteur method of preventive inoculations is wholly without effect after the advent of symptoms, and it is in just such cases as these that the serum, if it has any value at all, might do good. For if it has the curative action claimed for it, even in a low degree, it might retard the period of invasion of the disease and thus allow the preventive inoculations to become effective.

The serum, unlike the attenuated virus, which depends on certain changes in the organism after inoculation to procure immunization, gives its protective action immediately on administration.

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