

not improve under arsenic, but did rapidly under the administration of potassium iodid, as did also his remaining symptoms.<sup>55</sup>

CASE 3.—The father of the patient at the age of 20 was luetically infected. He received several inunction treatments. He died soon after 40 of paresis. The mother, apparently, as is alleged, is entirely well. After one abortion she had four children, of which the first died soon after birth. The other three children (two sons and one daughter) developed physically entirely normally. The eldest of these, however (son) remained behind mentally, and finally had to be given over to an institute for feeble-minded children. The second child (daughter) became chlorotic at puberty. She suffers now from insomnia, nervous tachycardia, and extreme fatigue on bodily and mental exertion. The youngest child (son), who is mentally rather exceptionally developed, suffered since his seventeenth year from habitual headaches, migraine attacks and insomnia. Now, in his twenty-first year, as he was preparing for examination to the bar, he came down with an outspoken neurasthenia. From the report of the family physician, it is learned that this boy, when he was 1 year old, had a periosteal disease of the left tibia, which cleared up on antiluetic treatment.<sup>56</sup>

CASE 4.—The mother was strong and healthy. The father was infected eight years previously and was now showing the first signs of tabes. The child, boy, aged 3 years, was mentally alert and physically normal. He was unusually irritable and unsteady. He slept very restlessly, falling asleep only long after midnight—and then awakening again to remain awake for hours. Occasionally also he walked in his sleep. Hydrotherapy, sedatives, change of climate, etc., did not help, but potassium iodid began to improve the condition, which has steadily (after three years) become about normal.<sup>57</sup>

CASE 5.—Boy, aged 4 years, was brought to Nonne because he slept restlessly at night and had attacks of fear. The child showed nothing on examination, no signs of rickets, degeneration or lues. History of the father showed syphilis in the latter, ten years previously. Sedatives and tonics gave no relief. Under potassium iodid treatment the immediate improvement was striking.<sup>57</sup>

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## STUDY OF A RECENT TYPHOID EPIDEMIC WITH ESPECIAL REFERENCE TO THE USE OF ANTITYPHOID VACCINES

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In spite of the wealth of statistics collected from such reliable sources as the European and United States army reports, considerable difference of opinion exists as to the advisability of giving antityphoid vaccine to persons presumably infected. Wright<sup>1</sup> in his earlier communications emphasized a negative phase directly following administration of vaccines, and advised against their use in the presence of an epidemic. Leishman<sup>2</sup> and others are not positive of the existence of a negative phase and Russell<sup>3</sup> in a recent article insists that a negative phase does not exist. He notes, however, that a single injection of vaccine confers little or no immunity to typhoid fever.

A recent epidemic of typhoid fever at the St. Louis City Hospital offered us further opportunity for study along these lines.

There are, exclusive of patients, about 400 people in the personnel of City Hospital. This epidemic was traced to the kitchen and dining rooms where employees, nurses and doctors were served, so that probably 250 persons were exposed to infection. The total number of cases of typhoid was forty-three, or the percentage one would expect under such circumstances.<sup>4</sup>

Twenty-three cases developed among those who had received no vaccine. The average duration of the disease in these patients was a little under six weeks. There were no very severe cases and no deaths in this series. These cases may, therefore, be considered rather mild.

Twenty patients received one or more doses of vaccine. A summary of these cases may prove of interest.

Dr. A. received three injections of vaccine two years ago. The usual technic of giving 500,000,000, 1,000,000,000 and 1,000,000,000 dead bacilli at intervals of about ten days I presume was followed. The disease in him ran a very mild course. He left the hospital at the end of seventeen days.

Miss H. had three injections, the last on September 13. Her temperature ranged from 99 to 101 for four days beginning September 14. Such a temperature might be expected from a moderate reaction. A few rose spots were in evidence on September 17. Stool cultures, however, contained typhoid bacilli, and up to November 1, the organisms were still present.

Miss J. had three injections of vaccine, the last on August 28. At the time the last injection was given, she complained of headache and malaise. She had a moderate reaction following this injection. She had not recovered, September 2, and was sent to the ward. A blood culture taken the following day contained typhoid bacilli. The stool culture was also positive, as was the Widal reaction. The course of the disease was rather mild at first, but later the patient became very ill. She was discharged October 26.

Miss M. had one injection on August 31, with little discomfort. On September 9, she received a second injection. She had a moderate reaction from which she did not recover and was sent to the ward September 14. The diagnosis of typhoid was confirmed by laboratory findings during the following week. The disease ran a mild course and patient was discharged October 8.

D. S. A. had his second injection on September 8. He did not recover from the reaction, and was sent to the ward, September 14, with a diagnosis of typhoid. The disease in this case was moderately severe. He was discharged October 18.

In E. K., the disease ran a similar course to the preceding following his second injection on September 8. He was discharged October 22. These patients were both well when the second dose of vaccine was given.

Dr. B. had a severe reaction following his first injection on August 27. He had a severe cold at the time, to which his symptoms were in part attributed. On September 3, rose spots appeared and he was sent to the ward. On September 6 he was given a second injection without increasing the severity of his symptoms. His course was of average severity for three weeks, the fever then subsided and reached normal, where it remained for two days. He then suffered a relapse. He was discharged October 23.

55. Nonne's Case 388, *Syphilis und Nervensystem*, Berlin, 1909.

56. Case of Binswanger's (see his *Neurasthenie*, Jena, 1896, pp. 55-56).

57. Nonne: *Syphilis und Nervensystem*, Berlin, 1909, p. 558.

1. Wright, A. E.: On the Results Which Have Been Obtained by Anti-Typhoid Inoculation, *Lancet*, London, Sept. 6, 1902, p. 654.

2. Leishman, quoted by Russell, F. F.: *Antityphoid Vaccination*, *Am. Jour. Med. Sc.*, December, 1913, p. 803.

3. Russell, F. F.: *Am. Jour. Med. Sc.*, December, 1913.

4. Two patients developed typhoid in the hospital during August and September. One, a fracture case, convalesced, and the other, a patient with tertiary syphilis, died in the third week. The necropsy protocol stated that death in this last case was due to acute endocarditis and bronchopneumonia, but typhoid ulcers were found in the intestine. These patients were widely separated, and as the infection could not be traced to the same source as the others of this series, they are not included. Neither of these patients received any vaccine.

Dr. S. gave a history of an illness resembling typhoid ten years ago, but decided to take vaccine. He had a moderate reaction following his first injection on September 15. He was at the infirmary at the time, but was sent to the hospital on September 26 with a mild case of typhoid. He was discharged October 19.

Miss M. S. had a moderate reaction following the first injection, but recovered in two days. After the second injection, September 12, she continued to have elevation of temperature and was sent to the ward September 17 with the diagnosis of typhoid fever. She is at present convalescing.

Dr. I. was on vacation from August 16 to September 8 in a locality where there were no known cases of typhoid. On September 10 he took his first injection of vaccine. The reaction was comparatively mild, but elevation of temperature persisted and the case was diagnosed as of typhoid on September 15. The disease ran a severe course with two relapses. He was convalescing at the time this paper was written.

Miss F. M. received one dose of vaccine on September 3. She had a mild reaction lasting two days. She was well for two weeks then had a mild attack of typhoid lasting about seventeen days.

Miss R. received one injection of vaccine on September 3. She had a mild reaction but the temperature ranged between 99 and 101 for five weeks. The Widal reaction as well as blood and stool cultures were negative and she did not develop rose spots. As a positive diagnosis of typhoid could not be made, she is not included in the series.

The remaining nine patients each received one dose of vaccine. All had moderate reactions, which terminated without remission in typhoid. All were of moderate severity, but all recovered.

There was apparently little difference in the severity of the disease in those who received vaccine and in those who did not. Complications were rare, consisting of a few small hemorrhages. There were furuncles in three cases, phlebitis in one case and pyelitis in two cases. Relapse was common, but not severe; five patients in all had temperature above 100 after having been normal for two or more days. Among the nurses and physicians who were directly under my care, rose spots were very pronounced in every case, and four cases developed two or three crops.

Of those who did not develop typhoid, 261 received one or more doses of vaccine, 136, two or more, 14, three doses and 8 had been immunized before August, 1914. The vaccine used was made by Parke, Davis & Co., and consisted of a suspension of dead typhoid bacilli which had been grown on agar slants in a normal salt solution containing 0.5 per cent. of trikresol. This vaccine resembles that used in the United States Army.

It will be noted that practically all vaccine was given between August 28 and September 14, or during the time when all of the cases of typhoid developed. The fact that only 20 of the 261 who received the vaccine developed typhoid speaks against any marked increase of susceptibility and the fact that 20 did develop typhoid is against any marked increase of resistance following recently given vaccine.

The appearance of symptoms directly following injections in so many cases may be explained in at least two ways. These patients were either well along in the stage of incubation when the injections were given, and therefore the vaccination was only an incident which caused them to be watched more closely, or the vaccine, acting as many other foreign substances do, temporarily lowered their resistance and thus precipitated the onset of the disease.

If the latter idea be accepted, it is possible to conceive of a few who, had it not been for this temporary lowering of resistance, might have overcome the infection.

#### CONCLUSIONS

The use of antityphoid vaccine in persons who are harboring typhoid bacilli does not increase the number of those who develop typhoid.

A single injection, or more, directly preceding or during the incubation period of the disease, does not render the individual immune.

The course of the disease does not seem to be modified by injections of vaccine directly preceding the onset in those who develop typhoid.

The advisability of giving antityphoid vaccine to those presumably infected seems questionable and may in a few instances precipitate an attack.

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### CLINICAL OBSERVATIONS ON ASIATIC CHOLERA IN MANILA IN 1914 \*

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After an absence of four months, cholera appeared in the city of Manila in July, 1914. The present epidemic, in which there were reported more than 1,100 cases, suspects and "carriers," did not differ greatly from the ordinary small epidemic. All patients, excepting those who died without medical attention, were treated at San Lazaro Hospital.

Of the number mentioned, 330 were genuine cases of cholera, 170 not cholera, and 570 were carriers, so-called; 99 were found dead and sent to San Lazaro morgue for confirmation of diagnosis. The total number of deaths with and without medical attention was 190.

The percentage of recoveries among those receiving medical attention at San Lazaro was 72.5.

When a patient is admitted to the hospital, a stool specimen is at once taken and sent to the Bureau of Science for bacteriologic examination, and no patient is discharged until at least two successive stool specimens taken on different days are reported negative for cholera vibrio.

When a case is beyond doubt clinically cholera, it is carried on the hospital records as cholera, and a case pronounced cholera at necropsy is taken up as such. When a case is merely possible or even probable cholera, either clinically or at necropsy, the final diagnosis depends entirely on the laboratory findings, so that there is little chance for error in the ultimate status of a case. The clinical diagnosis of Asiatic cholera was confirmed bacteriologically in 85 per cent. of the cases.

In reviewing the literature of cholera outbreaks, one notes in almost every epidemic the virulence or violence of the individual infections gradually decreasing as the epidemic lessens. In the present epidemic, it

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