the muscular wall and not by the skin. The relaxation occurs when fluid flows in at pressures of only two or three centimeters of salt solution, and a contraction occurs when fluid is flowing out of the stomach.

The active contraction or relaxation of the rectus abdominis in response to changes of volume of the stomach or changes in volume of intra-peritoneal fluid ceased on section of the dorsal root fibers of the spinal nerves supplying the muscle, and after transection of the spinal cord at the level of the lower cervical roots. Some change in the position of the writing point of the muscle lever occurred when the stomach was distended after each of these procedures, and even a few minutes after death, but the magnitude of the changes was much less than when the central nervous system and the afferent channels were intact. Bilateral vagotomy had no marked effect on the response of the muscle.

We regard the change in length of the rectus abdominis as a necessary result of the operation of a mechanism for maintaining the relative constancy of intra-abdominal pressure. Without such a compensatory change in length of the abdominal muscles, troublesome circulatory and visceral disturbances would arise when a change in the volume of the abdominal contents occurred. Food could not enter the stomach at such low pressures as have been reported without a corresponding change in the abdominal volume.

24 (1202)

## A simple method of detecting the circulation of antigen in the blood. (Preliminary note.)

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Experience with different immunity reactions has brought in the last few years a realization of very important limitations of their usefulness. It is generally conceded that it is impossible by means of immunity reactions to differentiate between actual infection and the state of immunity following it. This difficulty

was especially brought out in the beginning of the present war, when it became necessary to differentiate between the soldiers who gave positive Widal reactions due to previous prophylactic vaccinations, and those actually infected, or those who may be carriers. It was suggested by German authors that the complement deviation test may solve this problem in so much as, in their experience, artificial immunization by means of a vaccine, although followed by the development of agglutinins, did not seem to influence the production of the complement-fixing antibody in any marked degree. This suggestion was followed up in many laboratories abroad as well as in this country. In our own laboratory, for instance, this question was studied during the last two years by Doctors G. C. Simpson and J. R. Johnston, but the conclusions drawn were not very encouraging. The necessity of differentiating between actual disease and the state of immunity is not limited to the case of typhoid. Since it has become the practice in large institutions to apply the Shick test, it has also become necessary to differentiate between individuals containing antitoxin in their blood as a result of natural immunity and those who may be harboring a mild infection or those who may be carriers. In case of diagnosis of gonnorhea many workers have noticed that often very old cases without any symptoms of the old infection for many years, still frequently give a positive complement deviation test. The same is true for tuberculosis, syphilis and, in fact, for any infectious disease, for antibodies are known to persist in the blood for a certain length of time after the actual recovery from the infection. It is evident that if it were possible in addition to detection of antibody in the blood to detect also the antigen, where it is present, it would permit one to differentiate the condition of disease in its incubation period or in its mild course, from the condition of immunity, following the disease or artificial immunization.

Recently, in the midst of other work, which will follow later, we have made an observation which seems to indicate this possibility. We noticed that in certain stages of different infectious diseases the antigen and antibody coëxist in the blood and may cause the fixation of complement. The fluctuations in the complement content of the blood were noticed long since, but the

observers failed to find any laws governing these fluctuations, and therefore did not attribute any diagnostic significance to this phenomenon. As any antigen and its corresponding antibody will cause fixation of the complement of the blood, it i evident that the reaction is not specific and could not be used instead of accepted methods for diagnosis. However, if this reaction is used in addition to other tests it gives very valuable information, Thus, for instance, in the cases of syphilis treated with salvarsan. the Wassermann reaction may remain positive, whereas our test gives negative reaction as soon as the antigen disappears from the blood. In cases of gonnorhea of many years standing, we obtained negative reactions, whereas the cases of short duration or with discharge at present gave positive reactions.

Thus, the negative outcome of the test seems to be of great value, especially in the face of positive findings by usual methods. Since the positive outcome of this test may be influenced by many different conditions, we hesitate at present to attribute to it any more value than that of a very promising suggestion. We hope, however, to be able by isolating the antigen from its combination with antibody in the blood, to make also the positive phase of the test of more value in determining the circulation of antigen.

25 (1203)

## The new-formation of hemal nodes in the omentum and mesentery of the dog after splenectomy and ligation of the splenic veins. (Preliminary report.)

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The question of the new-formation of splenic or hemolymph-node tissue in the dog after splenectomy has been opened up again by Meyer,[1] who, as the result of the findings of eight dogs examined after splenectomy, at periods of 30, 41, 53, 77, 89, 98, 112 and 126 days after the operation, found no changes in the lymph-nodes, either of the nature of a hyperplasia or regeneration. Doubt was,

[1] *Journal of Experimental Zoölogy*, 1914.