course of two months, seven were reported negative and twenty positive. Of the seven negative cases, six proved to be certainly not typhoid, and one was very doubtful. Excluding the doubtful case, there is a record of 100 per cent. in cases ranging from the fifth to the nineteenth day. By means of litmus-lactose-agar plates, reports can be made in 24 hours with a fair degree of certainty. After incubating the bile-blood over night, streaks are drawn over the plates, and in 5 or 6 hours a growth may be visible. If the growth prove to be a bacillus which reacts to a microscopical Widal test the case is reported positive.

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The inconstant action of muscles.

By **WARREN P. LOMBARD** and **F. M. ABBOTT.**

[*From the Physiological Laboratory of the University of Michigan.*]

The movements of the hind leg of the frog which are generally ascribed to finely adjusted nervous coördination, are in fact largely the result of the mechanical conditions under which the muscles act. These conditions differ with each new position of the bones entering into the joints of the limb, and consequently alter the effects of the contractions of muscles as the positions of the bones change during the course of any given movement. Thus a muscle which in one position of a bone may act as a flexor, in another position may act as an extensor, and a muscle which in one position of a bone may carry it dorsally, in another position may carry it ventrally. Manifestly it is absurd to try to class muscles as flexors and extensors, for example, or to try to name them according to the movement which they are supposed to produce. Nor can one, without qualification, speak of certain muscles as antagonists, when under slightly modified conditions of action they act as synergists. Moreover, it is evident that we can form no estimate of the part played by the central nervous system in coördinated movements of locomotion, for example, until we have ascertained in how far the coördination observed is due to the mechanical conditions under which the muscles are acting. A study of central coördination must, in short, be postponed until

the effects of peripheral coördination based on joint and muscle mechanics has been ascertained. These statements are the result of two years of careful study of the effect of mechanical conditions on the action of the separate muscles of the hind leg of the frog, when these muscles have been electrically excited to action, in different positions of the bones.

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The senses and intelligence of the Chinese dancing mouse.

By **ROBERT M. YERKES.**

[*From the Psychological Laboratory of Harvard University.*]

For a few days during the first month of post-natal life the dancing mice which I have studied respond definitely to sounds, but neither direct nor indirect methods of testing auditory sensitiveness furnish any evidence of it in the adult.

Brightness vision is fairly acute; color vision is poorly developed. I have some evidence of the discrimination of red and blue, and of red and green, but no evidence that blue and green can be distinguished. In visual discrimination the mice apparently depend upon brightness differences.

The behavior of the dancing mouse is readily modifiable. Choice, by exclusion, of one of two objects which differ in brightness, with electrical stimulation in the case of a wrong choice, indicates that from 40 to 100 repetitions of an experience is necessary for the formation of a perfect habit. Such a modification of behavior lasts for from two to five weeks.

Modifications of behavior occur more rapidly in the male than in the female. Individual differences in plasticity and in the permanency of modification are marked.

There is little evidence of any form of imitative tendency in behavior.

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On the motor activities of the alimentary canal after splanchnic and vagus section.

By **W. B. CANNON.**

[*From the Laboratory of Physiology in the Harvard Medical School.*]

In this investigation one series of animals was studied with only