cause, in addition to lesions of the aorta, degenerative changes in the myocardium which are most marked after the fifth injection. The majority of the animals (rabbits) which recover from the early injections exhibit a fibrous myocarditis either focal or diffuse. These proliferative changes are not analogous to those occasionally produced experimentally by bacterial toxins, but resemble rather those following obstruction of the coronary arteries. It is essentially a process of repair following degeneration of muscle fibers. The latter is due apparently to temporary ischemia of terminal vascular territories at a time when the heart muscle exerts an increased contractile effort necessary to overcome the greatly augmented intra-vascular tension. Thus both nutritive and mechanical disturbances appear to play a part in its etiology.

32 (124). **"Stable and detachable agglutinogen of typhoid bacilli": B. H. BUXTON** and **J. C. TORREY.**

By heating an emulsion of typhoid bacilli to 72° C. for half an hour a detachable agglutinin may be separated from the bacilli. This may be obtained in the filtrate on passage through a Berkefeld filter. Rabbits, which have been inoculated on the one hand by this filtrate and on the other by the heated bacilli, which have been thoroughly washed, show specific differences in their serums, as regards agglutination. The animal inoculated with the washed bacilli or stable agglutinin, produces a serum which agglutinates normal typhoid bacilli very slowly and with the formation of fine clumps. In contrast to this, the filtrate containing only detachable agglutinin gives rise to serum which clumps normal typhoid bacilli rapidly and with the formation of large flocculi.

Absorption experiments show, furthermore, that the *s* or stable agglutinin and the *d* or detachable agglutinin are distinct in character, for the heated and washed bacilli absorb nothing from the filtrate serum, but absorb all the agglutinin for normal typhoid bacilli from the bacillus serum. On the other hand the filtrate absorbs nothing from the bacillus serum, but takes up all the agglutinin from the filtrate serum.

It has also been determined that the substance in typhoid bacilli which gives rise to precipitins for filtrates of typhoid cultures is split off from the bacilli, together with the detachable agglutinums.

The possibility, further, suggests itself that the *d* agglutinin and the precipitin in a typhoid serum are identical.

33 (125). **"The effect of alcohol on hepatic glycogenesis": WILLIAM SALANT.**

In view of the current tendency to regard alcohol as a food it seemed desirable to make a study of its effect on hepatic glycogenesis, for if alcohol can replace the carbohydrates in food it might spare the carbohydrate radicals of the tissue proteins. An accumulation of glycogen in the liver after exclusive feeding with alcohol might therefore be expected. Indeed the work of Nebelthau,[1] who found 1.34 to 3.51 per cent. of glycogen in the liver of the hen after the administration of 10 c.c. per kilo of 96 per cent. alcohol on the seventh day of fasting, lends support to this view.

This suggestion was put to an experimental test. The investigation was carried out on rabbits which were fed exclusively on alcohol for periods of 4 to 6 days. Alcohol (30 or 60 per cent.) was given per os by means of a stomach tube in amounts varying between 3 to 9 c.c. per kilo daily. Control rabbits were subjected to the same preliminary treatment, but were given water instead of alcohol by stomach tube. At the expiration of 4 to 6 days the rabbits were killed under ether anesthesia and the livers examined for glycogen according to Pflüger's[2] shorter method. The amount of dextrose obtained by hydrolysis of the glycogen was determined by Allihn's method. Later in the course of the investigation, for reasons of economy of time, the amounts of copper were determined volumetrically by the iodin method instead of gravimetrically as originally recommended by Allihn.

The results at this stage of the investigation show that in rabbits fed exclusively on alcohol (10 c.c. of 30 per cent. alcohol per kilo or 12 c.c. of 60 per cent. alcohol per kilo daily for four or five days) there is no accumulation of glycogen in the liver, which shows that glycogen is not formed in the livers of rabbits when they are fed on alcohol alone. Previous to fasting or alcohol administration, these rabbits were fed on oats, hay and cabbage. As the for-

[1] Nebelthau: *Zeitschrift für Biologie*, 1892, xxviii, p. 146.

[2] Pflüger: *Archiv für die gesammte Physiologie*, 1902, xciii, p. 163.