normal gut on the 10th day, then suddenly decreased on the 11th day to about half-strength, again being on the increase on the 12th day. Entero-enterostomies performed with clamps are somewhat stronger than those performed with guy sutures, especially on the 2nd, 3rd, and 4th days, this being the critical period in repair.

4064

Effect on the Immunity Mechanism of Various Avitaminoses.

S. N. BLACKBERG. (Introduced by Dr. J. T. Halsey.)

From the Department of Pharmacology, Tulane University.

Various authors[1, 2, 3] have shown that avitaminosis increases the susceptibility to both bacterial invasion and to bacterial toxins.

In this laboratory, in several groups of white rats deprived of vitamins A and D, or B, or E, it has been found that the resistance to tetanus toxin, of these avitaminic animals, is very markedly diminished when compared with that of the normally nourished controls (from 40 to 100 times less).

In other series the effect of these avitaminoses on the formation of agglutinins and bacteriolysins was investigated by the usual methods of injecting typhoid bacilli, under constant conditions into avitaminic and control groups.

The results may be briefly summarized as follows:

After several injections of killed typhoid cultures, the serum of the avitaminic animals regularly showed a much lower agglutinin titre and less bacteriolytic power than that of the normally nourished controls. Following the injections of living typhoid bacilli, a similar but slighter difference was found in the serum of the avitaminic and control groups. With the injection of larger amounts of living bacilli it was manifest that this difference became progressively less. This latter finding appears to be well explained by the view that in the living cultures there were present sufficient amounts of the different vitamins to overcome, at least in part, the deficiencies of the diet. The increase in weight and the improvement of general conditions of the avitaminic rats, after receiving these larger amounts of the living cultures, seems to furnish evidence for the

[1] Werkman, C. H., *J. Infect. Dis.*, 1923, xxxii, 247.

[2] Findlay, G. M., *J. Path. and Bact.*, 1923, xxvi, 1.

[3] Findlay, G. M., *ibid.*, 485.

correctness of this view. Investigations of the effects of lack of these vitamins on the antitoxin production are under way.

4065

Sensitivity of Isolated Intestine of Athyroid, Normal and Thyroxinized Rabbits to Physostigmine and Adrenalin.

CHAPMAN REYNOLDS.

From the Department of Pharmacology, Tulane University.

It is generally accepted that increased thyroid secretion "sensitizes" the autonomic nerves, particularly the sympathetic. Evidence that this is so has been presented by Eppinger, Asher, Oswald, Cannon, Levy,[1] and others. The usual experimental method has been the quantitative determination of the blood pressure change induced by adrenalin, but "acute" experiments with thyroid substance or thyroxin have been generally negative.[2] The isolated intestine is such a delicate physiological test-agent, responding to both sympathetic and parasympathetic stimuli, that it was thought that investigation of the behavior of such segments in the presence of greater or less amounts of thyroid product might disclose significant differences. "Acute" experiments (*i. e.*, dropping thyroxin in one bath and not in the other of parallel segments) were done some years ago and were uniformly negative.

The plan of the present work was as follows: rabbits were thyroidectomized under local anesthesia without disturbing the parathyroids and about 2 or 3 weeks later their isolated intestinal responses were studied in the usual fashion in a Tyrode bath. During the same period other rabbits were given 2, 3 or more 0.1 mg. doses of thyroxin intravenously, and the sensitivity to autonomic stimulating drugs compared quantitatively with segments from the thyroidectomized and normal animals. Comparisons were always made simultaneously in order to be sure of uniform temperature, oxygen and other environment.* To insure a fair distribution of the drugs administered, a double-chamber bath as shown in Fig. 1

[1] Levy, R. L., *Am. J. Physiol.*, 1916, xli, 492.

[2] Feldberg and Schilf, *Arch. f. exp. Pharm. u. Path.*, 1927, cxxiv, 94. Herzfeld and Mosler, *Klin. Woch.* (Berlin), 1926, v, 1281.

* Keeping the intestine in a thyroxin solution from the time the animal was killed until observation was begun was tried a few times and made no apparent change in responses.