this disease. The work of Castle and Locke has definitely established and expanded this conclusion. They fed beef-steak to normal persons, recovered the meat by causing vomiting, and refed it to patients with pernicious anæmia, thus causing distinct clinical improvement and an identical response on the part of the bone marrow to that following the use of liver or liver extract. Raw and desiccated gastric substance have yielded similar results. Conner in an extension of this work, has treated sixty patients suffering from pernicious anæmia with the raw gastric tissue of swine or with tripe. Forty-six of the patients have been carefully studied under observation in a hospital and raw and dried preparations have given equivalently good results. The mucosa, the remainder of the stomach after the mucosa was removed and whole gastric wall were used separately and each proved effective in the cases treated. The results with 240 grams of raw whole stomach make it appear that this is the curative dose. With desiccated hog stomach, the usual dose is from 20 to 40 grams. About half the curative dose is required for maintenance purposes. Tissue from the fundus and pylorus, each used separately, produced satisfactory if not equal results. The effect on the reticulocytes, mature erythrocytes, hæmoglobin and leucocytes are similar and apparently equivalent to those obtained by feeding liver or liver extract. As the substance, which causes the favourable reaction in the bone marrow is thermolabile, cooked gastric tissue is valueless.

H. M. Conner, "Hereditary Aspects of Achlorhydria in Pernicious Anæmia" (*Journ. Amer. Med. Assoc.*, 1930, xciv., 606). W. B. Castle and E. A. Locke, "Observations on the Etiological Relationship of Achylia Gastrica to Pernicious Anæmia" (*Journ. Clin. Investig.*, 1928, vi., 2). H. M. Conner, "The Feeding of Gastric Tissue in the Treatment of Pernicious Anæmia" (*Journ. Amer. Med. Assoc.*, 1931, xcvi., 500).

A. R. G.

THE HYPOCHLORHYDRIA OF ASTHMA IN CHILDHOOD.

Experimenters have shown that the gastro-enteric canal of normal infants is permeable to undigested protein in small amounts. Recently various workers have suggested that this undigested protein or its early cleavage products are responsible for allergic reactions. Further, when a whole protein gives a strong skin or constitutional reaction, the amino acid of the corresponding protein does not. In other words, the further one gets from the true protein the less the reaction, so that it is suggested that these "reaction producing substances" are normally destroyed by digestive processes.

Such facts led the author to investigate the digestive functions in over 200 asthmatic children by means of fractional analysis. The

age of the patients varied from six to twelve years. In 9 per cent. of the cases there was complete absence of free hydrochloric acid over a period of two and three-quarter hours following the meal; in 48 per cent. there was marked hypochlorhydria; and in 23 per cent. a mild hypochlorhydria. Thus in 80 per cent. of the cases the response of gastric secretion was below the average normal. A control series of fifty perfectly healthy children showed that in less than 10 per cent. was any deficiency of acid secretion manifested. This hypochlorhydria in asthmatic children was due to an actually deficient secretion of hydrochloric acid and not to excessive neutralisation, as evidenced by a low normal total chloride curve. Such deficient secretion might have been produced in several ways, but, it is suggested, in view of certain bio-chemical investigations of the blood, that asthmatic children have a tendency to alkalosis and that hypochlorhydria is frequent because the blood has so little acid-forming material to spare. In consequence of the deficient secretion allergy to certain proteins is produced, since, with insufficient acid, protein digestion is inadequate and large amounts of undigested protein with their accompanying "reaction producing substances" are absorbed.

To compensate for the hypochlorhydria it was decided to give hydrochloric acid by the mouth at meal times, gradually working up to an optimum dose of twenty to thirty minims three times a day. It is claimed that with this therapy alone there was an immediate improvement in appetite together with an increase in weight. Sleep became sounder, and the attacks became progressively of shorter duration, of lesser intensity and of diminished frequency. After three to four months, depending on the severity of the case, the attacks ceased, though when the medicine was stopped there was, in some cases, a tendency to mild recurrence. This treatment has been so successful in several hundreds of cases of asthma in children, that the author is applying acid therapy to all cases of allergy in which a hypochlorhydria is determined by gastric analysis.

GEORGE W. BRAY (*Quarterly Journal of Medicine*, January 1931, 181).

D. M. D.

THE BOLTZ (A.A.S.) TEST IN CEREBROSPINAL FLUID. A CRITICAL REVIEW.

In the year 1923 Boltz announced his observation that the spinal fluid of cases of general paralysis gives a characteristic colour reaction with acetic anhydride and sulphuric acid. The technic of the test is as follows—to 1 c.c. of the fluid to be tested add 0.3 c.c. of acetic anhydride, drop by drop, with shaking. To this mixture is added in a similar manner, 0.8 c.c. of concentrated sulphuric acid. After