Although we have not sufficient data on diabetes mellitus, it appears that the non-treated severe diabetic figures approximate or surpass the upper limit of normal, dovetailing with the thyroid group, whereas the treated cases are grouped in the lower levels of the normal range. Some of the hypertensive cases also exceed the higher normal figures. On the other hand, many of the sera obtained from patients with jaundice, cirrhosis of the liver, hepatitis, anemia, arthritis, rheumatic fever, and hyperpyrexia reveal pronouncedly depressed values. Further studies are now being conducted to clarify the significance of these results.

Summary. The acetylcholine esterase activity of the blood serum was determined in 500 individuals including normal and pathological cases. A modification of the Ammon gasometric method was utilized. The acetylcholine esterase was relatively high in cases of untreated hyperthyroidism.

The acetylcholine esterase activity may be one of the elements related to the so-called sympathicotonicity or vagotonicity of an individual.

9112 P

Hepatic Excretion in Man of the Various Bile Acids Following Their Oral Administrations.

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It is well known that animals normally excrete in their bile the various bile acids specific to their species. When foreign bile acids are administered by mouth they are readily absorbed and excreted by the liver. Weiss[1] as well as Prevost and Binet[2] showed that orally administered, sodium glycocholate, ordinarily absent in dog's bile, is excreted in the bile. Jenke[3] found an excess of free cholic acid in the bile of a dog after feeding that acid in large amounts.

Human bile contains principally a mixture of cholic and desoxycholic acid in approximately equal proportions; about four-fifths of

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1 Weiss, A., *Centralbl. f. die Med. Wiss.*, 1885, **23**, 121.

2 Prevost, J. L., and Binet, Paul, *Comp. rend. acad. de. sc.*, Paris, 1888, **106**, 1690.

3 Jenke, M., *Arch. f. exp. Path. u. Pharmakol.*, 1928, **130**, 280.

these acids are normally combined with taurine and glycine to form the conjugated bile acids.[4] It was thought that the administration of various pure bile acids to a human might shed some light on the mechanism of their intestinal absorption and of their excretion by the liver cell.

Pure cholic and desoxycholic acids were fed in large amounts to a patient with a complete common bile duct fistula resulting from pancreatic obstruction. After removing a sample for analysis the total 24-hour excretion of bile was refed the next day in 3 portions. The extra bile acids administered were dissolved in a small quantity of water and added to the bile. A recently developed method[5] was used to analyze the daily excretion of bile for bile acids conjugated with taurine and with glycine, for cholic acid, for desoxycholic acid and for free bile acids.

During the first experimental period (Mar. 9-12), the addition of 3, 6 and 6 gm. of pure cholic acid on consecutive days, raised the percentage composition of the bile from 1.71% to 2.09%, the increase being mainly due to an increased percentage of cholic acid. There was a parallel increase in conjugation of the acids. This increase, however, was wholly in the form of glycine conjugated bile acids. The total excretion rose from 10 gm. to a maximum of 14.2 gm. The administration of cholic acid resulted mostly in the increased excretion of cholic acid, but it was noted that the amount of desoxycholic acid was also increased.

During the second experimental period very large amounts of both cholic acid and desoxycholic acids were fed to determine the maximum excretory power of the liver in the presence of an excessive intake. No untoward effects were noted by the patient. After a 3-day control period, a total of 40 gm. of pure desoxycholic acid was added to the bile intake of the next 3 days. The total bile acids rose from 1.1% to 1.79%, while the cholic acid fell from 0.4% to 0.13%. The rise therefore resulted from an increased excretion of desoxycholic acid. Conjugation kept pace with increased output of desoxycholic acid. The increase was entirely in the form of glycine conjugation. Two days after the cessation of desoxycholic acid administration, the total bile acid concentration was back to 1.08%; the cholic acid, however, was abnormally high, being 0.70%.

On the administration of 45 gm. of cholic acid during the next 3 days, the cholic acid rose to a maximum of about 1% (similar to

[4] Colp, R., and Doubilet, H., *Arch. Surg.*, 1936, **33**, 913.

[5] Doubilet, H., *J. Biol. Chem.*, 1936, **114**, 289.

that in the first experimental period). The desoxycholic acid percentage, however, rose to a surprisingly high figure, the maximum concentration of total bile acids reaching 2.83%. During that day the liver excreted 11.78 gm. of bile acids. The conjugated bile acids did not increase proportionately with the increase in total bile acids. The volume of bile rose from 390 cc. to a maximum of 690 cc. The bile acid output returned to the control level 5 days after the cessation of cholic acid administration.

Summary. In the patient studied the oral administration of cholic acid was more effective than that of desoxycholic acid in raising the concentration and total output of bile acids in the hepatic bile.

9113 P

An Excretory Test for Vitamin C Deficiency and Subnutrition.

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The excretion of vitamin C in the urine after an intravenous injection of 100 mg. of ascorbic acid was followed in a group of 12 normal subjects on diets adequate in vitamin C, in 3 normal subjects on diets low in vitamin C and in 13 cases of scurvy. The age of the normal subjects varied from 20 to 25 years. The subjects on the diet low in vitamin C were of the same age group. In the patients with scurvy 5 were under 40 years of age and 5 over 60 years of age. The symptoms of scurvy in these patients consisted in changes in the gums, present in all the patients and evidenced by ulceration, hemorrhage into the gums and piling up of the gums. Massive subcutaneous hemorrhage was present in 3 cases and petechiae over the legs and arms in 6 cases. The duration of the deficient diet was 3 months in 4 cases, 12 months in 5 cases and over 12 months in the rest of the patients.

The procedure for the test was as follows: In each group the excretion of vitamin C was determined for a 3-hour period and also for the following 21-hour period, prior to the administration of any vitamin C. The following day, after emptying the bladder, an injection of 100 mg. of ascorbic acid (Merck and Company) was given intravenously to the subject and the urine was again collected for 3 hours and for the following 21 hours. Vitamin C was deter-