tane). Our preliminary studies indicate that this substance possesses properties similar to those reported here for spermine.

TABLE II.

Time, min.	mm³ O_2 consumed* Muscle	Muscle + .0037 M Spermine	Muscle + .0019 M Spermine	Muscle + .00027 M Spermine
0-60	540	517	528	497
60-120	378	210	338	358
120-180	165	33	84	139
180-240	32	21	23	27
Total O_2 consumption	1115	781	973	1021
Inhibition		30%	13%	8%

* Each vessel contains 1.6 cc muscle suspension (cooled guinea pig leg muscle minced and suspended in 5 vl. M/10 phosphate buffer, pH 6.8) + 1.0 cc muscle extract (guinea pig leg muscle minced + 1 volume water, kept in boiling water bath 10 minutes and filtered) + .3 cc 0.2 M sodium citrate + 0.2 cc spermine hydrochloride in 0.9 % NaCl made up to final molarities.

10713 P

Studies on the Colloidal Gold Curve of Blood Serum in Liver Disease.

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The quantitative alterations of the plasma proteins in liver disease have been recognized for many years. The work of Gros[1], Kendall[2] and de Vries[3] suggests, however, that a qualitative change in the plasma globulin, as indicated by an increase in the euglobulin fraction, may occur frequently in hepatic disease. These investigations indicate that an increase in euglobulin may distinguish the globulin of liver disease from that of other diseases. Since the plasma globulin[4] and, particularly, the euglobulin[5] have been shown to play an important rôle in colloidal gold precipitation, these studies of the colloidal gold reaction of blood serum in liver disease were undertaken.

1 Gros, W., *Deutsch. Arch. f. klin. Med.*, 1935, **177**, 461.

2 Kendall, F. E., *J. Clin. Investigation*, 1937, **16**, 921.

3 de Vries, A., *Act. med. Scandinav.*, 1938, **98**, 95.

4 Cruickshank, J., *Brit. J. Exp. Path.*, 1920, **1**, 71.

5 Mellanby, J., and Anwyl Davies, T., *Brit. J. Exp. Path.*, 1923, **4**, 132.

The method is essentially the same as that of the Lange test on spinal fluid except for serum dilution, salt concentration and acidity of the colloidal gold solution. One tenth of a cubic centimeter of the patient's blood serum is diluted to 1:350 with 0.9% sodium chloride, and serial dilutions are made as in the Lange reaction, using 0.3% sodium chloride in the ten tubes. Five cubic centimeters of colloidal gold, properly acidified, are added to each tube and the reactions are read in 12-24 hours. The colloidal gold solution is the same as that used routinely in the serology laboratory. The colloidal gold solution is acidified with 1/50 normal hydrochloric acid, and the degree of acidity is determined by testing the solutions with sera from normal patients and from patients with obvious liver disease. Standardization of acidity is done only once for each supply of colloidal gold prepared. The acid is added dropwise immediately before each test is performed. Usually 1.1 to 1.6 cc of 1/50 normal hydrochloric acid are added to every 50 cc of colloidal gold used. The pH is about 7.12 varying with the individual colloidal gold preparations. In reading the test the same numbers are used as in reading the spinal fluid Lange reaction. The greater the precipitation of colloidal gold the higher the number. Number 5 represents complete precipitation. The range of normal was found to vary from 0000000000 to 3332210000. The positive reaction was found to be a paretic curve consisting of complete precipitation[5] or incomplete precipitation[4] in one or more of the tubes on the left side of the curve as 5532110000 or 4432110000.

The colloidal gold reaction of blood serum was studied in 46 cases of liver cirrhosis, 14 cases of acute parenchymatous hepatic disease, 25 cases of neoplastic liver involvement and 11 cases of miscellaneous liver disease in which autopsy, biopsy or laparotomy confirmed the diagnosis, in 11 cases of the first group, 2 cases of the second, 13 cases of the third and 8 cases of the fourth.

Positive serum colloidal gold reactions, as indicated by paretic curves, were obtained in each of 46 cases of hepatic cirrhosis, in 13 of 14 cases of acute parenchymatous liver involvement, in 19 of 25 cases of hepatic neoplasm and in each of 11 cases of miscellaneous liver disease. The reaction was positive in 89 of 96 cases, or 92.7% in the total group of liver disease in which the diagnosis was confirmed by autopsy, biopsy or laparotomy in 34 cases. The serum colloidal gold reaction was negative in 20 normal adults and in 73 of 75 patients with various extrahepatic diseases. Autopsy, biopsy or laparotomy confirmed the presence of normal livers in 22 cases of this group.

The mechanism of the serum colloidal gold reaction in liver disease is not known. Positive reactions do not depend primarily upon a quantitative increase in globulin, lowering of albumin or inversion of the albumin-globulin ratio. Positive colloidal gold reactions were present in 29 of the 32 cases with normal plasma globulin determinations and in 21 of the 23 cases with normal albumin-globulin ratios. Conversely in the control series the colloidal gold reaction was negative in 13 of the 15 cases with elevated plasma globulin values and in each of the 15 cases with low or inverted albumin-globulin ratios. It is suggested that since the euglobulin is believed to play an important rôle in colloidal gold precipitation and is thought to be specifically increased in liver disease, it may be responsible for the positive reactions obtained.

10714 P

The Relationship of the P-P Factor to Gastrointestinal Motility.

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In a previous preliminary report we have outlined our observations on the effect of whole vitamin B complex[1] and of some of its components on functional digestive disturbances. We have studied 65 cases in which the diagnosis of functional digestive tract disorder was made after every attempt to reveal any existing pathology by X-ray examination and appropriate laboratory tests. The principal complaints of these patients have been distress, flatulence (bloating, passage of flatus, borborygmi), and constipation which might alternate with loose stools. Less constant symptoms are anorexia, weakness and fatigue, and nervousness. A group of 45 have been treated over periods of 2 months to 2 years with whole vitamin B complex; 70% of these have shown a satisfactory response to this therapy. The presence of a vitamin B deficiency in this group of individuals was indicated by determinations of urinary thiamin output, which was below normal in 17 of 22 patients. (That is, below 10 I.U. per day.)

[1] Crandall, L. A., Jr., and Chesley, F. F., *Proc. Inst. of Med., Chicago*, 1939, **12**, 359.