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**Experimental cirrhosis of the liver.**By **EUGENE L. OPIE.**

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Administration of chloroform by inhalation prolonged during one or more hours produces necrosis implicating the central part of the liver lobule. When recovery follows, connective tissue does not replace the destroyed parenchyma. By removing bits of liver tissue shortly after prolonged chloroform anesthesia Whipple has recently shown that necrosis destroying from one third to three fifths of the liver lobule rapidly undergoes repair so that at the end of three weeks the organ has returned to normal.

Herter and Williams have produced well marked cirrhosis by inhalation of chloroform repeated during several weeks. The following experiments are described because they show that advanced cirrhosis with portal obstruction may be produced in dogs by repeated administration of chloroform by mouth ; that two different lesions may be produced by the same substance.

One animal received thirty-three times 6.25 c.c. of chloroform in oil, doses being given on three succeeding days, followed by an interval of three days. The veins over the abdomen became markedly distended and there was jaundice. The animal died at the end of two months. The veins of the portal system were widely dilated, the mucous membrane of the intestinal tract was congested and the peritoneal cavity contained a small amount of fluid. The liver was small and mottled with yellow and gray. Microscopical examination shows that about one third of the liver substance consists of newly formed cellular connective tissue, in which are numerous proliferated bile ducts. The liver parenchyma is in process of regeneration ; mitotic figures occur and the columns of liver cells have assumed a tubular form with nuclei regularly arranged at the edges of the columns.

A second animal received twenty-one times 20 c.c. of chloroform. The doses were repeated on three succeeding days, followed by an interval of six days. The abdominal veins

became moderately distended and there was well-marked jaundice. The animal died at the end of two months. The peritoneal cavity contained a small amount of fluid. The liver was large and bright yellow. Microscopical examination showed advanced fatty degeneration with cirrhosis. Connective tissue, which is more sclerotic than in the former experiments, occupies about one third of the liver substance. The parenchyma shows advanced fatty degeneration, but little evidence of regeneration. Newly formed bile ducts are rare.

In other animals, which have received chloroform, dilatation of the superficial abdominal veins indicates the presence of hepatic cirrhosis.

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### Shaking experiments with protozoa.

By **MAX MORSE.**

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DeBary, Hofmeister, Horvath and Meltzer have observed that various species of lower plants (Myxomycetes, Diatoms, Oscillaria and Bacteria) when shaken, are brought to a quiescent condition, for a longer or shorter time or even killed. The present observations were based upon cultures of *Paramecium*, *Euglena*, *Stylonychia* and *Spirillum* (a species of Schizomycetes). Two methods of shaking were used: (1) Shaking was produced by means of a rotating arm moving in a radius of 25 cm. at a velocity varying from 66 to 83 revolutions per minute and carrying a tube, 6 cm. long within which was a phial holding 2.5 c.c. of the infusion of protozoa. During each revolution, consequently, the protozoa received two shocks from the falling of the smaller phial within the larger one. (2) Following the method of Horvath and adopted by Meltzer in his experiments, a horizontal shaker, making 100 excursions per minute through a path of 8.50 cm. was employed. A 250 c.c. bottle containing 10 c.c. of the infusion and bearing a pycnometer thermometer for registering temperature was fastened in the machine and another bottle similarly equipped was placed near as a check. The animals were shaken for from one to twenty-four hours.