The reason why the gall bladder of the pregnant animal does not empty following the ingestion of a meal of fat has not been definitely determined. However, it has been observed that the fat leaves the stomach much more slowly in the pregnant than in the nonpregnant animal, and that while the lacteals and the lymph nodes of the nonpregnant animal are usually perfectly white at the time the gall bladder is empty, the lacteals of the pregnant animal never appear to become well delineated or markedly distended. It would appear that the control mechanism of the gastro-intestinal tract is retarded in pregnancy, and thus the gall bladder either does not empty or is greatly delayed in emptying. Increase of the intra-abdominal pressure produced by the growing fetuses should be considered as a possible cause for the delay or the prevention of emptying the gall bladder following the ingestion of fat, yet this is not of great importance, as is shown by the fact that the gall bladder of a spermophile may not empty, or may empty only slightly, when the fetuses are no larger than the fecal material in the large intestine. In this connection it should be noted that in the two instances in which partial emptying of the gall bladder was noted in the dog, the gall bladders of the fetuses were also partially empty and dark-colored bile was found in the duodenum, as contrasted with the distended gall bladder and the duodenum free from bile, observed in the large number of fetuses removed from dogs whose gall bladders did not empty in the shorter period of time following the ingestion of egg yolk and cream. It is suggested that the failure of the gall bladder of the pregnant animal to empty following the ingestion of food may bear some relation to the high incidence of gall stones following pregnancy in the human being.

This is a preliminary report.

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Emptying of Gall Bladder and Mechanism of Common Bile Duct of Guinea Pig.

FRANK C. MANN AND GEORGE M. HIGGINS.

From the Division of Experimental Surgery and Pathology, The Mayo Foundation, Rochester, Minn.

The observations of Boyden[1] that a meal of fat is followed by partial or complete emptying of the gall bladder, proved definitely that the viscus emptied. The experiments of Boyden,[1] Whitaker,[2]

Higgins and Mann,[3] and Hamrick[4] demonstrated that this emptying of the gall bladder was due to the contraction of its own intrinsic musculature. Other observers, Kodama,[5] Graham,[6] and Burget[7] have failed to empty the viscus by contracting its own intrinsic musculature. It should be noted, especially in relation to the experiments of Burget,[7] that whenever contraction of the gall bladder and expulsion of bile has been demonstrated it does not occur under an anesthetic.

We have found that under certain definite conditions the gall bladder of the guinea pig will contract and completely empty its contents within a brief period. A description of this simple experiment is given, not because it may bear any direct relationship to the normal physiologic mechanism of the gall bladder, since we have previously demonstrated that the viscus of this animal will empty following a meal of egg yolk and cream, but because it is possible to use this experiment as a classroom demonstration. Even an amateur in laboratory technic can demonstrate the emptying of the gall bladder by the contraction of its own musculature. The routine of the experiment is as follows:

A guinea pig which has been fasted only a few hours, is killed quickly with chloroform. The abdomen is opened immediately and the duodenum exposed. Gentle traction is made on the duodenum, and the entire biliary tract exposed. The gall bladder will be found partially or completely filled with bile. Gentle stroking of the gall bladder with thumb forceps or the edge of a knife will cause it to begin to contract immediately and in from three to seven minutes its entire contents will be forced into the duodenum. As the traction on the duodenum has raised the point of discharge of the bile above the level of the gall bladder, the bile is discharged against gravity. While contracting, the surface of the gall bladder becomes covered with bleb-like projections which appear to be small herniations of mucosa forced out between breaks in the musculature of the wall of the gall bladder. It is rare that the gall bladder of the guinea pig will not empty completely under the conditions described. It can also be made to empty, with the animal under light anesthesia, by stimulation with electricity. It usually does not empty as quickly with the anesthetic as immediately after the animal is killed. We have occasionally seen the contraction and partial emptying of the gall bladder of other species, as the cat and dog, following stimulation of the wall of the viscus when the animal had been killed quickly.

One of the most interesting points in connection with the biliary apparatus of the guinea pig is a peculiar muscular organ situated at

the duodenal end of the common bile duct. This was shown by us several years ago in a drawing of the biliary apparatus of the guinea pig. The structure is formed by a definite dilatation and partial sacculation of the common bile duct and contains a thick layer of smooth muscle almost as great as the muscularis of the duodenum. This organ pulsates during the emptying of the gall bladder. However, the emptying of the gall bladder is not necessarily dependent on this peculiar structure because, when a cannula is inserted in the common bile duct on the hepatic side of this structure, and the gall bladder stimulated, it will still contract and produce considerable pressure (80 mm. water) in a straight glass manometer. No similar structure has been found in any of the many other species of animals examined. A complete report on the mechanism of the biliary tract of the guinea pig will be made later.

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Blood Sugar Level and Activity in Rats.

MARY M. SHIRLEY. (Introduced by F. H. Scott.)

From the Departments of Physiology and Psychology, University of Minnesota.

The primary problem in the study of activity is to discover those internal factors and conditions which stimulate an animal to become active. Since the energy for muscular contraction comes from the oxidation of glucose it is conceivable that a relation exists between blood sugar and activity.

In studying this relationship 45 male albino rats, 5 months old, were used; these were divided into 2 groups of 19 and 26 animals respectively. Their activity was recorded in revolving drums of the type used by Slonaker, Hoskins, and others who have worked on activity. The animals lived in these cages for six weeks; they were fed 30 cc. of bread and milk at a regular hour each day, and daily turns of each cage recorded. Temperature and light conditions