in burns, freezing, and intestinal trauma, a large factor in the production of the resultant shock and death is the loss of a large amount of plasma-like fluid from the blood stream. To test the hypothesis that the loss of a similar plasma-like fluid into the peritoneal cavity might be a large factor in the production of death in bile peritonitis, the present work was undertaken.

Bile peritonitis was produced by 3 methods: The intraperitoneal injection of sterile bile or bile salts, and ligation of the common duct followed by defundation of the gall bladder. In most instances the dogs used in these experiments died from 5 to 30 hours following the procedure. The results are shown in Table I. There was marked concentration of the blood with a greatly increased hemoglobin percentage and hematocrit reading and a marked fall in carotid blood pressure. Necropsy revealed an enormous collection of peritoneal fluid, amounting in several instances to over 3% of the body weight. This fluid clotted spontaneously and chemical analysis revealed that it conformed closely in amount of total protein, nonprotein nitrogen, sugar, and chloride content to the blood plasma of the animal in question. Cultures of the fluid revealed no constantly present organism.

Conclusion. The amount of plasma-like peritoneal exudate in experimental bile peritonitis indicates that the loss of this fluid from the blood stream is an important factor in the production of shock and death in this condition.

7821 P

Comparative Study of Respiratory Portion of the Lung.*

C. G. LOOSLI. (Introduced by W. Bloom.)

From Hull Anatomical Laboratory, University of Chicago.

All authors agree that the respiratory portions of lungs of Amphibia and Reptilia are lined by continuous, flattened, nucleated, epithelial membranes. Some investigators maintain that there is a continuous, flattened nucleated and non-nucleated epithelial membrane lining the respiratory portions of mammalian lungs, while others deny the presence of an epithelium. Some believe that the small, nucleated cells found in the meshes of the capillaries in the

* This research was aided by a grant to the University of Chicago by the Rockefeller Foundation.

alveolar septa are of mesenchymal origin. For a review of the literature on this subject see Fried.[1]

This work comprises a study made on the nature of the lining of frog, turtle, chicken, rabbit, guinea pig, and rat lungs. The lungs of the animals, after their lung capillaries had been filled with blood by ligating their pulmonary veins before the animals were killed, were fixed in Zenker-formol solution, embedded in nitrocellulose and stained to show collagenous, reticular and elastic fibers and cellular details. In addition, rabbit lungs, made atelectatic by phrenicotomy and pneumothorax were kept in a state of collapse from one to 40 days and were studied with the same histological methods. To demonstrate cell outlines, intratracheal and intravascular injections of 2% silver nitrate were also made into the lungs of other animals in each of the above groups.

A continuous layer of flattened, nucleated epithelium covering the alveolar surfaces in frog and turtle lungs is easily demonstrated both in the silver nitrate and Zenker-formol fixed preparations after they are stained respectively with hematoxylin eosin-azure and Mallory's phosphotungstic hematoxylin. The nuclei of the flattened cells are usually located in the meshes of the capillaries. Intratracheally silver-injected preparations show a system of black lines on the surfaces of the alveolar septa continuous with the limits of the cuboidal cells which line the main air passages. Intravascularly silvered lungs show an entirely different set of lines which do not cross the intercapillary spaces in the alveolar septa, but which are continuous with the lines which mark the limits of the endothelial cells of the blood vessels.

An epithelial membrane covering the capillaries is not demonstrable in the walls of the respiratory canaliculi of chick lungs. Intratracheally and intravascularly silvered preparations outline only the endothelium of the capillaries in the walls of the canaliculi.

Intratracheally and intravascularly silvered lungs of rabbits, guinea pigs, and rats show essentially the same features as the silvered chick lungs. The black, silver lines correspond to the limits of the capillary endothelium and follow the course of the capillaries from one side of a septum to the other. At the junction of the capillaries with the venules the black lines, following the capillaries in the septal walls, are continuous with the lines which mark the limits of the endothelial cells lining the veins. The septal cells are not delimited by the silver but remain isolated on the alveolar walls independent of the silvered lines. Non-nucleated plates were not seen.

[1] Fried, B. M., *Arch. Path.*, 1934, **17**, 76.

In completely collapsed, rabbit lungs, the lumina of the alveolar ducts, alveolar sacs and alveoli, the walls of which become shortened, thickened, and folded on themselves, are represented as narrow, branching clefts. At the junction of the terminal and respiratory bronchioles with the alveolar ducts, the bronchial epithelium and the reticular, basement membrane on which it rests cease abruptly. The connective tissue and blood vessels of the lamina propria of the smallest terminal and respiratory bronchioles continue on and form the walls of the alveolar ducts and alveoli. The free surfaces of the alveolar ducts between the mouths of the adjoining alveoli are covered with capillary loops, which are seen in thin sections to arise on one side of a septum and continue over the connective tissue knob and onto the adjacent septal wall.

Each alveolar septum contains a network of capillaries which course back and forth from one side of the septum to the other. The capillaries lie in the meshes of the reticular and elastic fiber networks and form loops which bulge into the almost obliterated, former, air spaces. The reticular and elastic fibers in and on which the capillaries rest are separated from the alveolar spaces by the capillary network. The septal cells do not form a continuous membrane over the capillary loops in the alveolar walls following collapse of the lung, but remain in the intercapillary spaces intimately associated with the connective tissue as isolated cells. In the alveolar walls the capillaries with their reticular and elastic tissue support are enclosed in an amorphous, ground substance, which can be demonstrated with the Mallory-Azan stain. In short, a continuous, histological epithelium is not demonstrable in the respiratory portion of the completely collapsed, rabbit lung.

An embryogenic study of the rat lung is being made to determine the origin of the septal cells.

7822 P

Pathogenesis of "White Bile."*

HANS G. ARONSOHN. (Introduced by Edmund Andrews.)

From the Department of Surgery, The University of Chicago.

White bile is a relatively rare but clinically important condition on account of its grave prognostic significance. My own previous work on this subject (experimental production of white bile in

* Work done under a grant from the Douglas Smith Foundation.