

introduced directly into the gall bladder of the dog, disappeared in 24 hours with the free flow of bile. Many other experiments that I could mention indicate conclusively that without stagnation in the onflow of the bile, an active infection does not take place.

Still further, a retardation in the onflow of the bile associated with a catarrhal condition of the bile ducts, and a consequent increased secretion of mucus and exfoliation of epithelial cells, undoubtedly plays a very important, if not the most important, part in the formation of gall stones. The majority of gall stones, as we know, are formed chiefly of cholesterin, having a nucleus either of clumped bacteria or of bilirubin calcium. Cholesterin has been regarded as a normal constituent of bile, in which it is held in solution by the bile salts and by the small quantity of fats and soap present in bile, but it appears to be very doubtful whether it is actually formed in the liver cells. Experiments carried out in Naunyn's laboratory would indicate that there is no separation whatever of cholesterin from the blood by the liver cell, and that the amount found in the bile is in no way dependent upon the quantity or character of the food taken. Naunyn (10) considers that only a very small amount, if any, of the cholesterin in the bile is formed by the liver cells, but that a much larger amount is derived from the epithelium of the biliary passages and is a product of the disintegration of their protoplasm. He adds that whatever view may be taken of the source of the cholesterin of the bile in health, there can be little doubt that the biliary passages are its source in disease. What, then, are the conditions leading to its formation in increased quantities and to its precipitation? Statistics show that gall stones are extremely uncommon in young persons under 30, and are most frequently met with over 60. They are three to four times more common in women than in men; they are also much more frequent in those who suffer from conditions favouring retardation of the bile current. Such conditions exist in those who lead an inactive life, in persons suffering from mitral stenosis, and in those in whom the movements of the abdominal and respiratory muscles are hampered by tight-lacing, obesity, pregnancy, or abdominal tumour. Stasis in the onflow of bile in the ducts, therefore, appears to be an important etiological factor in the formation of gall stones. How does this stasis lead to cholelithiasis? Frerichs taught that under conditions of stasis changes took place in the bile, its reaction became acid, the bile salts were decomposed, and the cholesterin was precipitated. Naunyn, (11) however, questions this explanation, and, as the result of his investigations, regards the infection of the bile by micro-organisms as the efficient cause of the increased secretion