

others were likewise successful. It was found in the course of these experiments that something more than the mere introduction of virulent germs into the gall-bladder was necessary for the production of stratified calculi. It was necessary to prevent the too-rapid expulsion of the soft precipitations, and this through the stagnation of the bile. The importance of stagnation of the bile as a factor in the formation of biliary calculi has long been recognized, but not in its true connection. Rokitansky attributed their development to a "morbid constitution of the bile, which may be abnormal when secreted, or subsequently become so from stagnation and retention."

Netter demonstrated experimentally that stagnation of the bile alone frequently suffices to cause an infection of the mucous membrane of the gall-bladder. If, then, infection plus stagnation results in the formation of gall-stones, and stagnation alone may result in infection, may we not justly conclude that stagnation of the bile in itself may result in the formation of gall-stones. Stagnation, wherever it occurs, promotes the growth and development of micro-organisms. Dilatation of the stomach, in which stagnation of the gastric contents is the invariable result, is characterized by a rich flora of bacteria, urinary stagnation, results in cystitis, etc. The normal peristalsis and muscular activity of an organ are preventives *par excellence* of the further growth and development of the germs contained therein. Germs are ever present, but without a proper soil they do not develop. Virulent bacteria that have gained entrance to the blood through such portals as the tonsils, Peyer's patches, etc., are excreted with the bile, but unless retained in the gall-bladder long enough to multiply and gain, as it were, a foot-hold, no infection occurs. Stagnation, then, is to be looked upon as a predisposing cause and infection as the exciting cause of gall-stones.

I have found little in the literature in explanation of the probable cause of stagnation of the bile in those cases where there exist no pathologic lesions, such as tumors pressing directly or indirectly upon the ducts, scar formation, congenital malformation of the gall-bladder, etc., etc. It is to this point that I have been aiming, and, though a very circuitous route has been taken, I trust the ground covered has been worth the while.

The etiology of cholelithiasis bears a very close relationship to its pathogenesis. A large percentage of gall-stones occurs in women; this is variously stated by different authorities. However, about 85 per cent. occur in the female and 90 per cent. of these in those that have born children.