

mainly of cholesterin, may form in a few days or even a few hours. Generally, however, they form slowly and they grow by addition of both cholesterin and bilirubin-calcium, thus making the different varieties of gall-stones, according to the proportion of their respective ingredients. The important deduction, therefore, follows that the components of gall-stones are not derived from the liver itself, but are locally generated by a local derangement of the mucous membrane of the biliary passages and of the gall-bladder.

We come now to the last question connected with this process. How does catarrh of the bile passages and of the gall-bladder come about? It is evident, in the first place, that whatever tends to cause a stasis in the flow of the bile from the liver itself will cause both an accumulation of bile in the gall-bladder and its subsequent concentration in that viscus. Many experimental observations show that the active contraction of the diaphragm, conjoined with that of the abdominal muscles, greatly aids in the flow of the bile, and hence nothing so tends to produce biliary stasis as sedentary life and habits. Gall-stones, therefore, are five times as frequent in women as in men, and for the same reason they increase with the advance in years, being found in fully 25 per cent. of all persons over sixty years of age. The effect of laxity of the abdominal walls is illustrated by the greater frequency in women who have borne many children. So also congestion of the liver from valvular diseases of the heart predisposes to the same result. But, however concentrated the bile may become from any of these influences, something else is necessary to set up the initial catarrh which completes the process. If the mucous membrane remains healthy, the bile will remain sterile, and no gall-stones be formed, however long it may remain in the gall-bladder. Here, therefore, we have one analogy to conditions occurring in the urinary bladder. An enlarged prostate may lead to the retention for indefinite periods of residual urine in an over-distended bladder, which has lost the power wholly to empty itself, but no cystitis occurs till the unlucky entrance of micro-organisms, brought in by a catheter, starts the whole subsequent mischief. So it is that our modern progress in the pathology of cholelithiasis has demonstrated that gall-stones are the direct results of infection. Everything else may be contributory, but it is the entrance into the biliary passages of micro-organisms which is the efficient cause, as it is due to them that catarrh of the mucous membrane is set up. The degree of this catarrh will then depend, on the one hand, upon the antecedent lowering of the nutrition of the epithelial cells by prolonged portal stasis, and, on the other, on the specific viru-