

direct infection may also take place, as occurs, for example, in typhoid fever, but the danger is much less than that of infection from the intestine. Not only the inflammatory affections of the biliary passages, but gall-stones also are due to bacterial infection. The infection causes some catarrhal inflammation of the gall bladder. Increased secretion of mucus results, and this leads to a precipitation of calcium salts, cholesterine, and bile pigment, of which the stones are composed. Clumps of bacteria may constitute the nucleus of a stone. Further it is at least possible that malignant diseases are caused by infection. In the bile passages, with few, if any exceptions, the development of malignant disease is preceded by gall-stones, from which we can fairly infer that the irritation produced by gall-stones offers a favorable condition for malignant infection, if there be such; hence the much greater frequency of malignant disease of the gall-bladder than of the bile ducts. The cardinal symptoms of disease of the bile passages are jaundice, pain, and fever.

*Jaundice* is the most common, as it is practically a constant symptom of the affections of the common bile duct.

As diseases of this duct always alter its calibre and therefore cause obstruction, it follows that jaundice must result. The converse is, I think, equally true, viz., that jaundice is always the consequence of obstruction of the common bile duct, or of its ramifications in the liver. A non-obstructive jaundice is described in the books, and acute yellow atrophy among others is given as belonging to this class; but in this disease, as in others of a similar character, there is ample proof of obstruction of the biliary canaliculi in the periphery of the hepatic lobules. It will certainly contribute to the definiteness of the pathological concept if jaundice signifies to us absorption of bile, and absorption that always results from its flow through the bile ducts being somewhere obstructed.

*Fever* is a frequent symptom in all forms of disease of the gall bladder and bile ducts. It is caused by the absorption of toxic material from the inflamed or ulcerated mucous membrane. Its severity usually accords closely with the gravity of the cause. In catarrhal jaundice the fever, if present, is slight, lasting three or four days; here the infection is mild. In marked obstruction, especially from gall stones, there may be recurrent chills with high temperature, the temperature being normal in the interval—the so-called hepatic intermittent fever. Chills and fever are more common, however, in suppurative cholangitis, which is very often associated with a history of gall-stone obstruction. It may occur also in obstruction from tumours, especially in rapidly growing cancers implicating the ducts. In gall-stone colic, even in the absence of suppuration, the chills and