

attributed to "biliousness" and a "torpid liver", ailments not infrequently accompanied by more or less tinging of the conjunctiva.

It is easy, on this supposition, to understand the good results often resulting from the employment of the so-called hepatic stimulants, such as mercury, podophyllin, and rhubarb, which, as we now know, have little direct action on the liver cells, but a very distinct action on the gastro-intestinal mucosa.

Closely associated with any retardation in the on-flow of the bile in the ducts is another important factor in the production of disease in these passages, namely, the infection of the bile by micro-organisms. In health the bile is sterile. Attempts to prove that it is not so have not been confirmed, though the old idea that it possesses marked antiseptic properties has been overthrown, and investigators have shown that many forms of micro-organisms may grow luxuriantly in it under certain conditions.

Infection by bacteria may take place in two ways. We may have an ascending infection through the biliary passages from the duodenum. In this case an infection is possible from either the bacillus coli or the streptococcus, as these bacteria are frequently present both in the duodenum and in the lower end of the ductus choledochus. We may also have an infection through the portal circulation; bacteria absorbed from the intestine may pass in the blood through the portal vein, be eliminated by the liver, and pass into the bile. Fütterer (4) has demonstrated that typhoid bacilli may readily pass in this way into the gall bladder. Fraenkel and Krause (5) have shown that the bile is a much frequented habitat of the typhoid bacillus, and cultures made from bile in the gall-bladder in 30 autopsies of patients dying of typhoid fever showed the bacillus typhosus in 21. Chiari (6) found the typhoid bacillus in 19 out of 22 cases of typhoid fever, and Osler (7) states that Flexner found them in 7 out of 14 cases, but in no case was there any clinical or pathological evidence of an inflammatory reaction in the gall bladder. To permit an active infection some stagnation in the bile current appears to be necessary.

Naunyn's experiments demonstrated that only after ligature of the common duct will an injection into the hepatic duct of a culture of the bacillus coli be followed by inflammation. Peterson, (8) referring to cases of cholelithiasis occurring in Czerny's Klinik, says, "after the operation the bile which escaped in the fistulous opening was examined from time to time, and it was found that the bacteria diminished rapidly as the bile continued to flow, and were often found to have disappeared at the end of eight days, almost always after three to four weeks." In one experiment Cushing (9) found that the typhoid bacilli