## Choledochoduodenal Junction

The *interior of the second portion of the duodenum* harbors the *major papilla* of Vater as a rule, on the medial aspect, between the *circular folds of the intestine* (*valvulae conniventes*). This papilla (1) with the longitudinal fold (3) constitute the *choledochoduodenal junction*, an oblique passageway through the duodenal wall traversed by the common bile duct (*ductus choledochus*) and the main *pancreatic duct* of Wirsung. These ducts may open separately or through the medium of a common chamber, the *hepatopancreatic ampulla* of Vater (Boyden). A *minor papilla* is often seen about 2 cm. above the papilla of Vater, where the accessory pancreatic duct of Santorini empties into the duodenum. This duct communicates usually with the main pancreatic duct within the head of the pancreas (see pages 26 and 27).

The *union between the common bile duct and the main pancreatic duct* varies individually. Most frequently, both ducts join within the wall of the duodenum and have a short common terminal portion. In other instances each duct has its own opening either at the papilla or, occasionally, at some distance — as much as 2 cm. apart. The third possibility is the union of both ducts before entering the duodenum, thus forming a long common terminal portion which transverses the duodenal wall. A slightly elevated longitudinal fold in the duodenum is a projection of the *ampulla of Vater*, which is a dilated part of the common terminal portion of both ducts. It is this common portion which may permit reflux of pancreatic juice into the biliary system or of bile into the pancreas. The potential reflux has been used to explain the etiology of cholecystitis or acute and chronic pancreatic necrosis, respectively. Such etiologic associations, however, have been questioned and are now considered to occur only rarely, despite the incidence of a sufficiently long common channel (29 to 64 per cent of cases studied by several investigators) which would favor a postulated reflux. Obstruction of the papillary orifice by a biliary calculus or a muscular spasm, naturally, is apt to facilitate reflux, except when the common portion is extremely short. Actually, bile flow from the common bile duct into the pancreatic duct has been found in only 16 per cent of individuals studied roentgenologically. Pancreatic enzymes have been demonstrated in gallbladder bile.

As the result of Boyden's painstaking studies of the papillary and ampullary structures, including the muscular arrangement designated as the sphincter of Oddi, it is now recognized that the common bile and pancreatic ducts with their sphincters pass through the duodenal wall in the form of an eye-shaped window, the size of which determines the influence of duodenal tonus and peristalsis upon bile flow as well as the passing of gallstones. Though the architecture of the sphincter muscles depends upon the various types of union discussed above, the prototype of this complex sphincter arrangement consists of the following parts:

1. The *sphincter choledochus* surrounds the common bile duct from its entrance into the duodenal wall to its junction with the pancreatic duct; it regulates the bile flow and, retrogressively, the filling of the gallbladder (see page 52).

2. The *pancreatic sphincter*, present only in a variable number of instances, surrounds the intraduodenal portion of the pancreatic duct.

3. The *sphincter ampullae*, variably developed, is an annular muscle extending from the junction of the ducts to the tip of the papilla; it is the muscle of the common channel and is responsible for the potential reflux mentioned before.

4. *Longitudinal muscle bundles*, extending from the entrance of the ducts into the duodenal wall to the tip of the papilla, connect the ducts with each other as well as with the duodenal muscles; their activity retracts or erects the papilla.

5. *Reinforcing fibers*, extending from the duodenal muscles to the longitudinal fibers, enforce the duodenal window and prevent its dilatation.

The choledochoduodenal junction (in the cat) is supplied by fibers which course as a gastroduodenal plexus along the gastroduodenal artery and also by way of an independent gastroduodenal nerve derived from both hepatic plexuses and the right vagus nerve.