forgotten by the English people. It can be inferred, however, what would happen to our civil subjects, if foreign soldiers landed on our shore, by the behaviour of the German army to a hostile French civil population during the Franco-German war. No mercy was shown, but plunder, pillage, summary executions, burning of villages—in fact, the severest form of punishment was accorded, not only to civil offenders themselves, but whole communities were held responsible for individual actions.

The men who are so insistent on the necessity for compulsory training are not "alarmists," but calm, cautious, level-headed, experienced men, many of them England's most trusted sons. What is it they ask? It is simply this: that *all* our fellow-countrymen, physically fit, between the ages of 18 and 25, should be made to undergo four months' continuous military service, and subsequently to serve for four years in the Territorial Force, during which latter period two weeks' camp training only in each year would be necessary. What could be better for the physique and *morale* of the nation than this? It is proposed that the training should take place under canvas, not in barracks; that each man should be developed to his best by suitable exercise, food, and clothing; that he should be taught to shoot, to march, to ride; to think and act independently; to yield ready and implicit obedience to orders; to practise self-respect and good comradeship. During this time also each man would be under the care of a good doctor, specially trained, to look out for and correct the weaknesses which cause deterioration. A training such as this would have a striking influence on every class. "Duke's son and cook's son," by more intimate acquaintance, would learn a higher respect for each other. Our industries would flourish, because men engaged in them would be trained in habits of obedience, self-respect, and precision. "Overcrowding" and "our slums" would soon be gone, because, as a result of a couple of generations' training of our male population in the open air, a sounder public opinion would result, strong enough to enable our municipal authorities to remedy these crying evils.

I have watched over and over again the effect upon recruits of their first three months' service with the colours. It has been marvellous. The lank, ungainly, casual ill-developed loafer becomes an alert, strong, intelligent, orderly, self-respecting man. The good effect of even two weeks' training in camp on general health and physique is known to many of you. What would be the effect upon the character, the manliness, the physique, the patriotism of the nation if every able-bodied young man was compelled to train for the safety of his country in the open air for four months? England's sons now are of the same race as their heroic forefathers. The same blood runs in their veins as that which flowed on many a battlefield in the earlier days of Britain's history. The greatness of our country and its immense reserve of power is not denied. Will our sons prepare themselves to defend it or wait for defeat (which would mean destruction as a nation) to awaken them from lethargy? Cannot we influence the nation on the importance of this training, not only as necessary for maintaining the place and honour of Britain amongst other nations, but as essential for the improvement of our national health?

The vital question only remains: Can we as a profession take concerted practical steps to stem decay among our fellow countrymen on the one hand and to foster sound racial development on the other?

While sociologists discuss, the canker grows. While medicine works some triumphs, deterioration is spreading far and wide.

Must degeneration necessarily increase? Is our race so exhausted by the excitement and overstrain of the last few generations that she cannot recover? No; she can and will do so, as soon as the enlightenment of every class is seriously undertaken.

A lofty estimate of family life must be restored as a foundation for the re-establishment of our national life and strength.

In such an effort our part should be no ignoble one. The issue of a battle depends not alone on the intelligence of the commander, but to some extent upon the weapons he employs. In the great campaign against decay the profession of medicine should be one of the most formidable weapons. Her members have unequalled

privileges. They penetrate the closed door; they are the recipients of the secrets of many a forlorn and stricken heart. Their voices find thoughtful listeners, not only in the councils of the wise, but among those whose perplexed and troubled minds would be deaf to any other guidance.

Do we shrink from the task, because we are not invited to undertake it, because the public do not realize the danger, because the exigencies of life are such that we have neither leisure nor means to fight in the battle; *or are we afraid?* I think not. Once convinced that the work must be done, our profession will be true to her traditions and resolutely wage war against ignorance and vice, giving no thought to public estimate or gain. Nay, her members will, with inexhaustible faith in the power to right much that is wrong, join heartily with those already in the field, those who have thrown their influence and their service into the scales, so that by the weight of combined opinion and by strenuous effort the balance will be found on the side of such judicious thought and fearless action as shall eventually bring about a greater and more lasting strength in our national life, health, and habits.

May I sum up my simple reflections in a sentence? He does a great deed who heals the sick; but the watchful physician who inculcates sound habits amongst a people performs a nobler task.

A Lecture

ON

FISTULA BETWEEN THE STOMACH AND BILE PASSAGES.

WITH REMARKS ON OTHER INTERNAL BILIARY
FISTULAE.

DELIVERED BEFORE THE LONDON MEDICAL GRADUATES'
COLLEGE AND POLYCLINIC.

By A. W. MAYO ROBSON, D.Sc., F.R.C.S.

My reason for selecting this subject was a remark recently made by a medical friend at a consultation we held on a case of biliary fistula communicating freely with the stomach. When I told him that his was the fifth case of biliary gastric fistula that I had personally seen, he asked me why I had not reported the cases, seeing that the literature on the subject in the ordinary textbooks was so meagre that he had been unable to get any trustworthy information on it. As a matter of fact, however, there is a chapter on fistulae in my work on *Diseases of the Gall Bladder and Bile Ducts*, though it does not deal specially with fistula between the stomach and biliary passages.

Fistulae communicating with the surface, or so-called external fistulae, are so obvious that no skill is needed in their diagnosis, but the same cannot be said of the internal or intervisceral fistulae, which, though far from uncommon, are often exceedingly difficult, or at times even impossible, to diagnose. Though they may result from the progress and breaking-down of a malignant growth, from ulceration of the stomach, duodenum, or colon, or from hydatid disease, yet the most frequent cause of internal biliary fistulae is gall stones. It is not my purpose in this lecture to consider the question of external fistulae, or of internal fistulae due to growth, but to give some of my experiences of those occurring between the biliary channels and the gastro-intestinal canal.

The channel of a fistula may be either direct, in which the two organs immediately communicate, or indirect, owing to an abscess having formed and burst into contiguous hollow viscera, which then communicate indirectly through the abscess cavity.

The former, or direct fistulae, are for the most part due to gall stones producing ulceration in the gall bladder or bile ducts, and as the ulceration advances towards the peritoneal surface a local peritonitis ensues and causes adhesions to a neighbouring hollow viscus. The ulceration continuing, a communication is established between the two channels.

Although the formation of an internal fistula is at times

dangerous from perforation, or from extension of inflammation, in some cases it effects a cure by allowing the gall stones to escape into the intestinal canal and so to be passed. In other cases, the gall stones after passing into the intestines may set up secondary troubles—for instance, when they have passed into the intestine, intestinal obstruction; when into the stomach, violent vomiting; when into the kidney, symptoms resembling those of renal calculus.

In one of my cases a gall stone lodged in the ileum and formed the centre of a tuberculous deposit leading to a stricture, which I was able to treat by excising about 18 in. of the small intestine. The patient was well some years later.

Many internal fistulae, as will be seen by the appended classification, are mere pathological curiosities, quite undiagnosable, and only capable of being discovered at the time of operation or at necropsy.

Many must form and heal, leaving the patient cured, and thus not only are they undiscovered, but they are probably not even suspected; for, contrary to what one might suppose, fistulae between the bile passages and other hollow viscera in the majority of cases heal spontaneously, leaving only firm visceral adhesions; this accounts for the fact that internal biliary fistulae are comparatively seldom found *post mortem*.

Out of 10,866 necropsies made by Roth, Schroeder, and Schloth, 43 biliary fistulae were found: 1 between the gall bladder and stomach, 19 between the gall bladder and duodenum, 16 between the gall bladder and colon, 5 between the common bile duct and duodenum, 1 between the biliary passages themselves, and 1 between the gall bladder and liver.

I do not think that any complete collection of all the published cases of fistulae has been made since the work of Courvoisier and Naunyn, but even that can only give a very imperfect estimate of their frequency, for the reasons I have stated.

Published Cases of Internal Biliary Fistulae (Courvoisier and Naunyn).

Fistulae between the biliary passages themselves	8
" " biliary passages and the stomach	12
" " stomach and the liver	4
" " stomach and the gall bladder	8
" " biliary passages and the duodenum	108
" " duodenum and common bile duct	15
" " duodenum and gall bladder	93
" " jejunum and the gall bladder	1
" " ileum and the gall bladder	1
" " biliary passages and the colon	50
" " colon and the gall bladder	49
" " colon and the common bile duct	1
" " biliary passages and the urinary organs	6
" " biliary passages and the thoracic organs	10
" " biliary passages and the abdominal walls	184
" " biliary passages and the retroperitoneal tissues	4
	384

Usually the ulceration leading to fistula proceeds quietly and painlessly, producing very few symptoms until, it may be, a gall stone sets up obstruction in its passage down the intestinal canal; or, after the formation of a fistula, all the symptoms pass away and the patient makes a complete recovery. If, however, other gall stones have been present and have not escaped through the fistula, but passed into the cystic or common ducts, the symptoms are likely to recur when the fistula contracts, as in the following case:

CASE I.

History.

Mr. L., aged 50, had been subject to painful attacks called indigestion from the age of 14 to 16, but he had been free from seizures for eighteen years—that is, until sixteen years ago, when acute pain was felt, followed by jaundice and associated with fevers and rigors. Since that time he had had similar attacks at varying intervals, but lately there had been five or six severe seizures in rapid succession accompanied by rigors, continued fever, and increase of jaundice. When seen by me the liver was 1½ in. below the costal margin, but no tenderness could be detected anywhere. A slight icteric tinge was present in the conjunctivae. The attacks appeared to have been brought on by gastro-duodenal catarrh extending to the

common bile duct and to the pancreas. A diagnosis of gall stones in the common duct was made and an operation advised.

Operation.

On January 29th, 1903, the gall bladder was found firmly adherent to the surrounding structures, and was separated with difficulty. A fistula between the gall bladder and the duodenum was thus exposed, and after separating the gall bladder, the opening in the duodenum was closed by a purse-string suture. Two stones were felt in the pancreatic portion of the common duct, and there was also some swelling of the head of the pancreas. The stones in the duct were extracted by the scoop after incising the duct. No more stones could be detected in the ducts, and a probe readily passed down into the duodenum. The gall bladder was small and contracted, and the cystic duct was strictured at the junction with the common duct.

Cholecystectomy was performed, and the hepatic duct was drained by a tube passing through the incision in the duct, which was closed around it by a catgut suture. A gauze drain was passed down by the side of the tube and the wound closed.

The patient made a good recovery, and is now well.

The sequence of events in this case clearly pointed to gall stones, then to the escape of some by ulceration. So long as the fistula remained freely patent, there was an absence of symptoms, as there was no back pressure in the bile ducts, but as soon as the fistula narrowed the gall-stone troubles returned.

CASE II.

History.

A similar sequence of events occurred in another case that I saw in September, 1903, where there was also a twenty years' history of gall stones, though during the previous four years the attacks had been more frequent, and for nine months there had been slight jaundice with symptoms of infective cholangitis.

Operation.

In this case not only was there found a fistula between the gall bladder and duodenum that had resulted from the ulceration of a gall stone into the duodenum many years previously, but there were also gall stones in the gall bladder and in the common duct. So long as the fistula was freely open, the patient had been free from jaundice, but as soon as the fistula contracted—for at the time it had become very small and would no longer allow the bile to escape—jaundice supervened, and the damming back of infected bile into the bile ducts was the cause of the infective cholangitis. The removal of the gall bladder and calculi, the closure of the opening in the duodenum, and drainage of the bile ducts resulted in complete and permanent recovery.

But the presence of gall stones is not necessary for a recurrence of the pain, as in the following case:

CASE III.

Miss H., aged 55, seen on November 23rd, 1904, on account of attacks of pain in the region of the gall bladder, which had been continuing off and on for ten years.

History.

The patient gave a history that about twenty years previously she had been very seriously ill with intestinal obstruction, and had passed some large gall stones, which fortunately had been retained, and which she showed me. For ten years she was well. She said that then she began to again suffer from occasional attacks of pain in the gall bladder region, which attacks had recently become more and more severe, though they were never accompanied by jaundice.

Operation.

On December 1st, 1904, I removed a contracted gall bladder, in which a cavity that would hold a large pea was communicating with the duodenum by a very minute channel that would only admit a No. 1 catheter. The cystic duct was completely strictured. After the removal of the gall bladder and closure of the duodenal opening she made a complete and satisfactory recovery.

The case is interesting from the fact that the gall stones had evidently ulcerated their way into the duodenum twenty years before my seeing her, that so long as the fistula was widely patent no trouble was experienced, but, as soon as the fistula began to contract, mucus collecting in the remains of the gall bladder gave pain in its passage into the bowel along the fistula, as the contents of the gall bladder could not escape into the common duct on account of stricture of the cystic duct.

Symptoms of Formation of Fistula.

Although the ulceration may at times occur quietly and without any serious disturbance to health, it is not always accomplished without symptoms, such as pain beneath the right costal margin, more or less continuous fever of an irregular type, possibly associated with rigors and other symptoms pointing to infection. On examination there will be found rigidity of the right rectus, distension of the

upper abdomen, owing to paresis of the stomach and colon, and possibly the presence of a tumour due to matted omentum and swollen and adherent viscera.

Haemorrhage into the stomach or intestines may occur from ulceration into a large vessel while the fistula is forming, or subsequently, and in one case reported to me by a friend the haematemesis proved fatal.

If the fistula occurs between the stomach and the gall bladder the stones may be vomited, as in two cases I have seen; but it does not follow that vomited gall stones come from a gall-bladder-stomach fistula, as in one reported case the patient died after the vomiting of gall stones, and at the necropsy a fistula was found between the cystic duct and the duodenum.

If the gall stone is of large size, as in a case that I will relate, it may remain in the stomach, producing great irritation with vomiting, and leading to symptoms of intestinal obstruction.

If the fistula is between the gall bladder and the duodenum (the most common variety), the whole length of the intestinal canal has to be traversed by the concretions, hence such cases are found to be more frequently associated with intestinal obstruction than when the fistula occurs between the gall bladder and the colon, for in the latter case the passage to the anus is usually accomplished without difficulty, though occasionally the concretions may lodge and cause trouble.

When a gall stone is impacted in the common duct just before entering the duodenum or in the ampulla of Vater, ulceration of the orifice of the duct is apt to occur, allowing the concretion to escape into the duodenum by an enlargement of the orifice of the papilla. There is also the possibility of a direct fistula developing between the common duct and the duodenum, instead of ulceration of the ampulla. Such gall stones are of moderate size, seldom larger than a filbert, and rarely give rise to any other trouble in passing through the intestine.

Intestinal Obstruction due to Gall Stones.

It must not be assumed that all cases of intestinal obstruction due to gall stones are dependent on gall stones ulcerating through the walls of the biliary tracts, though this is the ordinary explanation.

By intestinal obstruction from gall stones is usually understood the impaction of a large concretion in some part of the small intestine producing a mechanical block; but this is only one of the several varieties of obstruction of the intestines dependent on cholelithiasis. There are clearly four classes of obstruction depending essentially on gall stones:

1. Acute obstruction caused by local peritonitis in the region of the gall bladder leading to paralysis of the bowel. Of this variety I have seen several examples, all of which recovered without operation.

2. Volvulus of the small intestine, dependent either on the violence of the colic caused by the attack of gall stones or on the contortions induced by the passage of a large concretion through the small intestine. In two cases of this kind operation was performed, recovery following in each after simply untwisting the volvulus.

3. Mechanical obstruction due to the passage of a large concretion through the small intestine.

4. Obstruction coming on after the original cause has disappeared, and depending on adhesions left by local peritonitis due to gall-stone attacks, or on narrowing caused by the healing of a fistulous opening through which a large gall stone has made its way into the intestinal tract.

Gall-bladder-duodenal fistulae are not at all uncommon. I have operated on eight. There are a number of good specimens in the various pathological museums, for instance:

No. 2826, Royal College of Surgeons Museum, shows a gall stone in the act of extrusion, and it will be seen that the margins of the opening are ulcerating to allow of the passage. Death occurred after six weeks of suffering.

Specimens Nos. 2827 and 2828 in the same museum are also good examples.

No. 1399 in Guy's Museum shows a gall-bladder-duodenal fistula 1 in. from the pylorus, large enough to admit the finger; and 33 in. above the ileo-caecal valve is a large gall stone impacted in the ileum.

Nos. 2261 and 2262 in St. Bartholomew's Museum show gall-bladder-duodenal fistula.

No. 1676 in King's College Museum shows a gall-bladder-duodenal fistula. Death occurred from peritonitis, though the gall stone had passed per anum.

No. 1595 in the Middlesex Museum shows a gall-bladder-duodenal fistula, through which gall stones passed. Death occurred from intestinal obstruction.

Specimens of gall-bladder-colic fistulae are much less common than duodenal fistulae, probably because they do not often cause death. I have operated on four. There are, however, a sufficient number of examples to show that even this method of passing gall stones is not altogether a safe one.

CASE IV.—Gall-Bladder-Colic Fistula.

Mr. G., aged 50, seen with Dr. W.

History.

There was no history of spasms; the first attack of gall-stone colic occurred in October, 1897, followed by jaundice; severe seizures in December, 1897, with jaundice lasting two months and associated with ague-like seizures; slight attacks for a year, and then one very severe in December, 1898, and again in January, 1899. During the whole of the period the icterus deepened after each attack, and occasionally rigors occurred; lost over a stone in weight; jaundiced, but not deeply; liver not enlarged; no tumour of the gall bladder; tenderness above and to the right of the umbilicus; well-marked dilatation of the stomach.

Operation.

January 28th, 1900. Fistula between shrunken gall bladder and colon discovered; cystic duct shrunken; common duct dilated to size of small intestine, and containing large floating gall stone. After excising the gall bladder an incision was continued down the shrunken cystic duct until it reached the dilated common duct; a gall stone was crushed in removing it and the fragments were removed; tube introduced into common duct; fistulous opening into colon closed.

The patient made an uninterrupted recovery and remained well for six years.

As showing the importance of recognizing the presence of even a small fistula when separating adhesions, I had the experience some years ago of missing a minute fistula into the colon when separating very dense visceral adhesions, the result being escape of the visceral contents and peritonitis.

Biliary gastric fistula is apparently less common than one might expect, seeing that the pylorus is not infrequently fixed to the gall bladder by adhesions. The following is the description of a chronic case:

CASE V.—Biliary Gastric Fistula.

A lady, aged 60, suffered from constant dyspepsia, with frequent vomiting and steady loss of flesh.

Operation.

The stomach was found firmly adherent to the gall bladder, and on separating adhesions a fistula between the gall bladder and stomach was found. The edges of the fistula in the stomach were pared and the opening closed with two rows of sutures, while the opening in the gall bladder was utilized for removal of the gall stones and afterwards for drainage. The patient made an excellent recovery, and is now in good health.

In this case the discharge of septic bile into the stomach proved a constant source of trouble, leading to nausea and vomiting and giving rise to chronic septic absorption and a suspicion of malignancy.

The proposal, therefore, in obstructed common duct to drain the bile passages into the stomach seems to me undesirable.

CASE VI.—Gall-Bladder-Gastric Fistula Operated on in the Acute Stage.

On the evening of October 29th, 1906, I was asked by a surgical friend to see an urgent case with him about ten miles from town, the patient, a gentleman of 76, being very ill with symptoms of acute intestinal obstruction.

History.

He gave a history of having been perfectly well up to October 26th, on which morning he went out for a walk. Later in the day he was suddenly seized with acute pain in the upper part of the abdomen, slightly to the right side, and almost immediately began to vomit, first the contents of the stomach and afterwards mucus and any fluid that he took. The vomiting was repeated frequently, but at no time did it contain bile. The abdomen became somewhat distended, though more markedly at the upper part. Acute intestinal obstruction was diagnosed, and all food by the mouth was stopped, as even a little fluid was rejected, and the patient was fed only by nutrient enemata. On October 29th the vomiting continued, and the nutrient injections could not be retained.

When I saw him on October 29th I found the abdomen somewhat, though not enormously, distended, and a distinct, hard swelling could be felt beneath the right costal margin. The stomach was dilated and the ascending colon and caecum were

also manifestly more distended than the descending colon. Examination by the rectum showed well-marked ballooning. The urine was scanty but contained no albumen. The tongue was dry and the pulse quick, but the temperature was only a little above normal. There had never been any symptoms of gall stones, nor had he been specially troubled with constipation up to the onset of the acute seizure. The bowels were slightly moved as the result of an enema on Sunday and a little flatus was passed on Monday, but no decided relief resulted.

A diagnosis was made of obstruction at the pylorus and also at the hepatic flexure of the colon, the cause being probably a growth in the region of the gall bladder involving at the same time the stomach and bowel. The possibility of a gall stone ulcerating into the bowel was considered, but not thought to be probable, as there had never been any history whatever of gall-stone attacks in the past. An operation was proposed, but for family reasons could not be carried out until the following morning.

Operation.

On opening the abdomen the stomach and hepatic flexure of the colon were found firmly fixed to the under surface of the liver, and beneath them could be felt a hard swelling. On palpating the stomach a hard lump the size of a small hen's egg could be felt in it, and as this could be freely moved in the stomach cavity it was evidently a concretion.

It at once became clear that the patient had been suffering from cholecystitis due to gall stones, that one had ulcerated through into the stomach, and that another was probably ulcerating into the colon. After packing off the abdominal cavity by sterilized gauze, the stomach and colon were rapidly separated from the under surface of the liver and gall bladder, the pus and mucus which escaped being mopped up by gauze swabs. A fistula was exposed passing between the gall bladder and pyloric end of the stomach, and another was found between the gall bladder and colon. Through the former the large gall stone had passed into the stomach; in the latter the smaller gall stone was impacted, it not yet having effected its escape. The opening into the stomach had to be extended a little in the direction of the pylorus before the gall stone could be extracted, after which the stomach opening was closed by stretching open the sides of the fistula so as to bring the edges together transversely to the axis of the pylorus as in pyloroplasty. A No. 1 chromicized catgut suture was employed to bring the edges of the fistula together, and a Pagenstecher's suture brought together the serous surface. Attention was next directed to the opening in the colon, which was closed by a purse-string suture, after which the gall bladder was excised and the cystic duct ligatured beyond another small gall stone which was impacted in it.

After purification of the region of operation, the right kidney pouch was drained by a strip of gauze enclosed in an india-rubber tube and brought through a stab opening at the most dependent part. The abdominal wound was then closed by a continuous catgut suture, uniting the peritoneum and posterior aponeurosis, it being continued back along the anterior aponeurosis and sheath of the rectus, the union of the wound being strengthened by three silkworm gut sutures transfixing all the layers of the abdominal wall. The skin edges were brought together by Michel's clips. Five minims of strychnine were given subcutaneously, and a pint of saline with an ounce of brandy was administered by rectum and repeated in two hours.

After-History.

The operation, which occupied about half an hour, was completed with the patient in good condition. After the operation he had no further sickness, and the pulse during the next day did not exceed 100, nor was the temperature above normal. Flatus was passed on the second day, and the patient took plenty of fluid nourishment.

On November 2nd the pulse became more rapid and slight delirium was reported. From this time, although the wound progressed satisfactorily, he became excited and restless, and for some time his mental condition gave rise to anxiety, but eventually, as he got stronger, the mind completely cleared, and at the present time he is in perfect health both physically and mentally.

The measurement of the largest calculus removed from the stomach was 3½ by 3 cm. in diameter, and that of the smaller one 2.3 cm. by 2.3 cm. The smallest crumbled after removal.

CASE VII.

Last year I was asked to see a very interesting case by an eminent surgeon who had removed gall stones from the common duct, and at the same time he had had to remove the gall bladder which was the site of phlegmonous cholecystitis. Silk ligatures had been employed, as is the custom I find with a number of surgeons. A biliary fistula followed, and after a time the fistula began to discharge some of the stomach contents very shortly after food or fluid had been taken. My explanation of the case was that a silk ligature had ulcerated its way from the biliary passages into the stomach, and that probably the fistula would close if the tube was left out, as from the small amount of bile that had been discharged all along it was quite clear to me that there was no permanent obstruction of the common bile duct.

I was gratified to learn a few weeks later that the patient was quite well, and that within a week of leaving out the tube the fistula had permanently closed.

I cannot but think that the use of silk ligatures at any operation on the biliary passages is fraught with risk of

subsequent trouble, as it is universally recognized that in nearly every case where gall stones are present the bile contains septic organisms. Thus, if silk is used, it is likely to become infected, and so form an infected centre until it is discharged; moreover, an ample experience of the use of carefully prepared iodized catgut has convinced me that it is both safe and efficient, lasting a sufficient time in the tissues to effect its purpose, but not remaining longer than necessary.

On two occasions in which I have operated for disease of the gall bladder I have found it distended with gas; this unusual phenomenon was in both cases dependent on a fistula between the intestinal canal and the gall bladder. I will give brief notes of one case.

CASE VIII.—Gall Bladder Distended with Gas.

On October 10th, 1906, I was asked to see a lady aged 59.

History.

In 1889, after years of suffering from abdominal pain, she had passed several large gall stones. Relief followed, but she never completely regained her health, and six months before I saw her she began to have pain in the upper abdomen, with partial obstruction of the bowels. The pain, which was paroxysmal, was followed by rigors, but without jaundice. There was marked tenderness and some swelling below the right costal margin, and distinct rigidity of the right rectus. Though there was a tumour to be felt on palpation, it was resonant on percussion. A diagnosis was made of cholecystitis with ulceration, and it was suggested that there might be a fistula between the gall bladder and bowel, through which infection had passed to the gall bladder, setting up chronic septicæmia. At the operation very firm adhesions were found binding the viscera together below the liver. The gall bladder had thickened walls, and it was distended with gas, there being a communication between it and the duodenum. Cholecystectomy was performed, and the wound in the duodenum was closed by a purse-string suture. The patient made a good recovery, and when heard of some time later was in good health.

On several occasions I have had the good fortune to catch gall stones in the act of forming fistulae. In one case I found a gall stone half extruded through an ulcerated opening into the peritoneal cavity. Had operation been delayed a fatal peritonitis must have ensued, as the distal extremity of the concretion was free in the peritoneal cavity and was firmly plugging the opening, behind it being a gall bladder distended with mucus. The patient, a middle-aged man, recovered after cholecystectomy, and was living some years later. In one case I found a gall stone ulcerating into the colon and plugging the opening between the gall bladder and the colon.

Double fistulae are occasionally found. I have related one case in which a gall-bladder-gastric and a gall-bladder-colic fistula existed in the same individual, and others have been recorded where at the same time fistulae between the various parts of the biliary passages and the duodenum and colon have been found.

The fistulae I have thus far mentioned have all had their origin in the bile passages, but I have also had experience of intervisceral biliary fistulae in which the origins have been from without the bile tracts—for instance, in cancer of the colon and stomach, and in hydatids of the liver bursting into the gall bladder and bile ducts—producing symptoms resembling in every way those of cholelithiasis.

I have also known ulcer of the duodenum and ulcer of the pylorus to perforate into the bile passages.

In the time at my disposal it is impossible to cover the whole of the ground; for instance, it would be interesting to relate examples of communications between the urinary tract and the bile passages, of which a number have been reported; in some of them gall stones had been passed by the urethra, and in others crushed in the bladder by the lithotrite or removed by lithotomy. Gall stones may enter the urinary tract either by direct ulceration into the pelvis of the kidney, or through a track extending along the round ligament to the umbilicus and then along a patent urachus, as in a case described and operated on by Krönlein.

Fistulae between the bile passages and genitals are also interesting, as, for instance, between the gall bladder and pregnant uterus, or between the gall bladder and an ovarian cyst, or between the bile passages and vagina, all of which examples have been recorded in literature.

Again, fistulae have occurred between the common or hepatic duct and the portal vein; four such cases have been recorded. I have on several occasions seen and operated on communications between cavities in the liver and the pancreas and the bile ducts, the communication being through a fistula established by ulceration.

Nor will time permit me to describe, except briefly, that interesting class of cases in which communications have been established between the bile tracts and the thoracic organs, the pericardium, the pleura and lungs.

Courvoisier collected 24 such cases of fistula between the biliary tracts, pleura and lung. Very few have been submitted to operation. I had a very interesting case of this kind sent to me from South Africa in May, 1903, of which the following are brief notes:

CASE IX.

History.

Mr. G., aged 28, was quite well up to April, 1894, when he had an illness accompanied by a cough, and on the third day he began to expectorate; shortly afterwards he coughed up a large quantity of pus and bile. Before this attack he had had no liver symptoms, except that on one occasion he had had pain in the gall-bladder region, which, it was surmised, might be due to gall stones. Since that time, for a period of nine years, he had regularly coughed up bile and pus. At first he was thought to be suffering from phthisis, especially as he lost flesh rapidly and had night sweats. During the year before coming to England he thinks he did not get thinner, though the amount expectorated did not lessen. When I saw him he was round-shouldered and old-looking, as if worn down by illness, and his fingers showed marked clubbing. An examination of the chest showed no positive sign of lung disease, though the breath sounds were diminished on the right side up to the level of the seventh rib. The liver was decidedly enlarged but not tender, and projected 3 in. below the costal margin. There was slight jaundice. From 1 to 1½ pints of extremely offensive bile and pus were coughed up in the twenty-four hours. The pus was crowded with bacteria but did not contain tubercle bacilli or elastic fibres, and was manifestly not from a bronchiectasis.

Operation.

Operation was performed on May 21st, 1903. No cyst or abscess cavity was discovered in the liver, which was enlarged, and showed signs of cirrhosis. After numerous firm adhesions between the shrunken gall bladder and the under surface of the liver, and the stomach, duodenum, and colon had been separated, a gall stone the size of a small nut was found impacted in the hepatic duct, and removed through an incision in the duct; numerous adhesions fixed the back and the dome of the liver to the diaphragm. Drainage of the hepatic duct was effected by a rubber catheter, and a gauze drain was passed through a split rubber tube to the neighbourhood of the incised duct. The expectoration of bile was immediately arrested but offensive pus continued to be coughed up. The expectoration of bile returned on the third day and then gradually lessened; the cough also gradually became less, and the purulent expectoration rapidly diminished. The wound healed by first intention except where the tube had been, this healing by granulation.

After-History.

Two months later the patient had improved very much, was gaining weight rapidly, and was only coughing up a small quantity of muco-pus without any bile. There was no jaundice, and all the bile was passing into the bowel. The wound had been soundly healed for a month, and he had been able to walk several miles a day. He returned to South Africa in the third month, and has since reported himself well.

Mr. Rigby also reported an interesting case in the BRITISH MEDICAL JOURNAL of August 8th, 1903, which was dependent on impacted gall stones and cured by cholecystectomy. Out of 18 autopsies collected by Courvoisier, 10 were due to gall stones, 6 to hydatids, and 2 to ascarides. It may, however, also be due to tropical abscess or to abscess of the liver from other causes.

CONCLUSION.

It may be asked what purpose can be served by relating a large series of unusual cases. Quite apart from the interest attached to these cases, to the difficulty of diagnosis, and the possibility of their cure by operation, I should like to dwell on the fact I have so often mentioned before as to the serious responsibility of allowing gall-stone disease to pass on until complications such as those I have mentioned have supervened, since operation for cholelithiasis at a time before the gall bladder and bile ducts have become seriously damaged, and the neighbouring organs have participated in the trouble, is almost devoid of danger if the operation be performed by an experienced and careful surgeon; whereas, if operation is only done after the parts have become matted together, after fistulae have formed and the patient is run down by fever and other septic complications, the mortality will be greatly increased.

AN UNUSUAL CASE OF APPENDIX ABSCESS DUE TO THE PNEUMOCOCCUS AND BACILLUS COLI COMMUNIS.

TREATMENT BY DOUBLE VACCINE: RECOVERY.

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WITH OPSONIC ESTIMATIONS AND VACCINE TREATMENT

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THE case seems worthy of record not only on account of the unusually serious surgical conditions which had to be dealt with, but because distinct benefit appeared to be derived from the vaccine treatment during the time that the patient was so desperately ill from toxæmia. It would appear also that, as has been frequently insisted on by one of us (E. T.), in order to effect most good by bacterial vaccines, it is advisable to use a vaccine prepared from the organisms isolated from the patient's own pathological discharge, even if, as in this case, separation of the organisms is by no means an easy task.

S. H., a woman aged 27, was admitted to the Hull Royal Infirmary on June 10th, 1908, under the care of Dr. Turton.

History.

She had been ill for three weeks, with abdominal pain, general malaise, and headache. A week before admission the pain had become more intense, and was accompanied with vomiting, which persisted until admission, but was said never to have been faecal. The bowels had been open quite regularly, and there had been no diarrhoea. There was no history of previous attacks of pain, and menstruation had been regular.

Condition on Admission.

The patient was obviously very ill; her expression was anxious and her complexion earthy. The pulse was 130 per minute and very feeble, tongue dirty and dry, and respirations 24 per minute. She complained of pain all over the lower part of the abdomen, which moved slightly on respiration. Palpation of the abdomen was difficult on account of the large amount of abdominal fat; a large mass could, however, be felt below the umbilicus somewhat to the right of the middle line. It was dull on percussion, tender, and appeared to be freely movable. Nothing definite could be made out vaginally or per rectum. A provisional diagnosis of ovarian cyst, with twisted pedicle, was made by Dr. Turton and immediate operation advised.

First Operation (by Dr. Harrison).

Chloroform being administered, the abdomen was opened by an incision in the middle line, the incision being a somewhat lengthy one, on account of about 3 in. of fat which had to be cut through. On opening the peritoneum, a large mass was seen occupying the right iliac fossa and pelvis, and an effort was made to free it from the coils of intestine which were extensively adherent to it. The patient was placed in the Trendelenburg position and the upper abdomen packed off. An attempt was then made to isolate the mass by separating the adhesions, and it was seen that the greater part of the tumour was made up of matted mesentery. On working down in the pelvis, a gush of offensive pus was observed; this was mopped out and the patient placed in the horizontal position again. Owing to the great thickness of the abdominal parietes, it was now necessary to make an additional transverse incision dividing the right rectus. On further separation of the coils of the small intestine, the caecum was found in the abscess, with the stump of a ruptured and gangrenous appendix. This was removed, and, together with some pus and a soiled swab, was placed in a sterile tube for bacteriological examination by Dr. Turton. Drainage tubes were passed into the pouch of Douglas and the wound closed. On recovering from the anaesthetic, the patient, who was in a precarious condition, was placed in the Fowler position.

Progress.

The patient remained in an extremely critical condition for several days after the operation; the pulse was rapid and very feeble, and there was evidently severe toxæmia, although there appeared to be free drainage from the tubes. The result of the bacteriological examination had been to show the presence in the pus of the pneumococcus and *Bacillus coli communis*, and the opsonic index was estimated the day after operation and found to be 0.62 for the pneumococcus and 0.87 for the *Bacillus coli*. On the next day, June 12th, the indices were respectively 0.81 and 1.22, and a vaccine was given, consisting of 50 millions of *Bacillus coli*, made from a culture grown from the pus, and 10 millions of a stock vaccine of pneumococcus. There appeared to be very little improvement in the patient's condition, and the opsonic indices taken on June 16th showed the index for the pneumococcus to be still as low as 0.71, though the *coli* index was 1.4.

On June 18th there was found to be a reaccumulation of pus, and a counter incision was made above the crust of the right