Diseases of the gall-bladder and bile-ducts / by A.W. Mayo Robson.

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MAYO ROBSON

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THE GALL-BLADDER AND BILE-DUCTS.

BY

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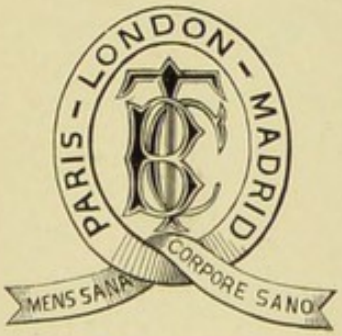

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1897.

TO

MY COLLEAGUES

ON THE COUNCIL OF THE ROYAL COLLEGE OF SURGEONS,

AND TO

MY FRIENDS

IN THE COLLEGE COUNCIL CLUB,

I DEDICATE

THIS VOLUME OF LECTURES

PREFACE.

THE present volume is a reproduction of the lectures which, as Hunterian Professor, I had the honour of delivering at the Royal College of Surgeons of England in 1897. The views enunciated are the result of many years of observation on a class of cases to which until lately too little attention had been paid.

Thanks to my medical colleagues on the staff of the General Infirmary at Leeds, and to my many medical friends, I have had the opportunity of seeing a very considerable number of cases of the diseases in question, and of operating on those where surgical interference was required. Perhaps not the least useful part of the work is the synopsis of a consecutive series of operations performed on the gall-bladder and bile-ducts, which, for convenience of reference, I have had placed in a tabulated form at the end of the volume.

I am fortunately able to state that I have never lost a single patient after any operation for gall-stones in the absence of malignant disease, deep jaundice, or infective cholangitis, and it will be found, on reference to the list, that cholecystotomy for gall-stones, even including the infective cholangitis and deeply-jaundiced cases, only shows a mortality of 1·7 per cent.

I feel, therefore, in advancing the proposition 'that as soon as gall-stones give serious trouble their removal by operation is the most rational method of treatment,' it is one that can be safely supported, since it is only from the complications, which in many cases of cholelithiasis arise

sooner or later, that any danger after operation need be apprehended.

I must not fail to thank most sincerely the pathological curators of the Hunterian and of the various London Medical School Museums, for their unfailing courtesy and kindness in giving me every facility for the study of the valuable specimens under their care, and the pathological committees of the various schools for their kindness in allowing me to show the original specimens at the college on the occasion of my lectures, and to have them photographed to illustrate the present volume.

My thanks are due to my friend and late assistant, Dr. H. Colligan Donald, for making a synopsis of and arranging my cases; to Dr. F. Gairdner and Dr. Morton, for their assistance with the diagrams; to Mr. Godart, for the excellent photographs of the specimens; and last, though not least, to my most obliging publisher, Mr. A. A. Tindall, for his courtesy and help in illustrating and in publishing the work.

A. W. M. R.

7, PARK SQUARE, LEEDS,
June, 1897.

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DISEASES OF THE GALL-BLADDER AND BILE-DUCTS.

CHAPTER I.

INTRODUCTORY, WITH ANATOMICAL REFERENCES.

MR. PRESIDENT,—I would first express my thanks to the Council for the honour they have conferred on me in giving me the appointment of Hunterian Professor, and at the same time I should like to thank the pathological curators of this college, and of the various medical schools, for their unfailing kindness and courtesy, as, although I was fortunately able to draw on my own experience to a large extent for clinical cases, I felt it my duty to make myself acquainted with the valuable material reposing on the shelves of the various museums. In order to save detail that might be wearisome, I have prepared an abstract of the cases which I have operated on.

Considering the mass of literature appertaining to the subject that now has to be waded through, it is interesting to note that only lately have diseases of the gall-bladder and bile-ducts been considered worthy of a place of their own in medical literature.

The subject merits separate treatment, not only because of our increased knowledge of the diseases in question from a pathological point of view, but also from our greatly-improved methods of treatment. For, just as bacteriology has thrown light on the origin of some of the more obscure inflammatory affections, so has the treatment by surgical means,

of many of the diseases of the biliary passages, borne results not inferior to those obtained in any other region of the body.

Had time permitted, the anatomy of the gall-bladder and bile-ducts would have formed a subject of sufficient interest for my first lecture; but the number and importance of the matters I propose to consider clearly demonstrate such to be an impossibility, if I am to nearly complete my syllabus.

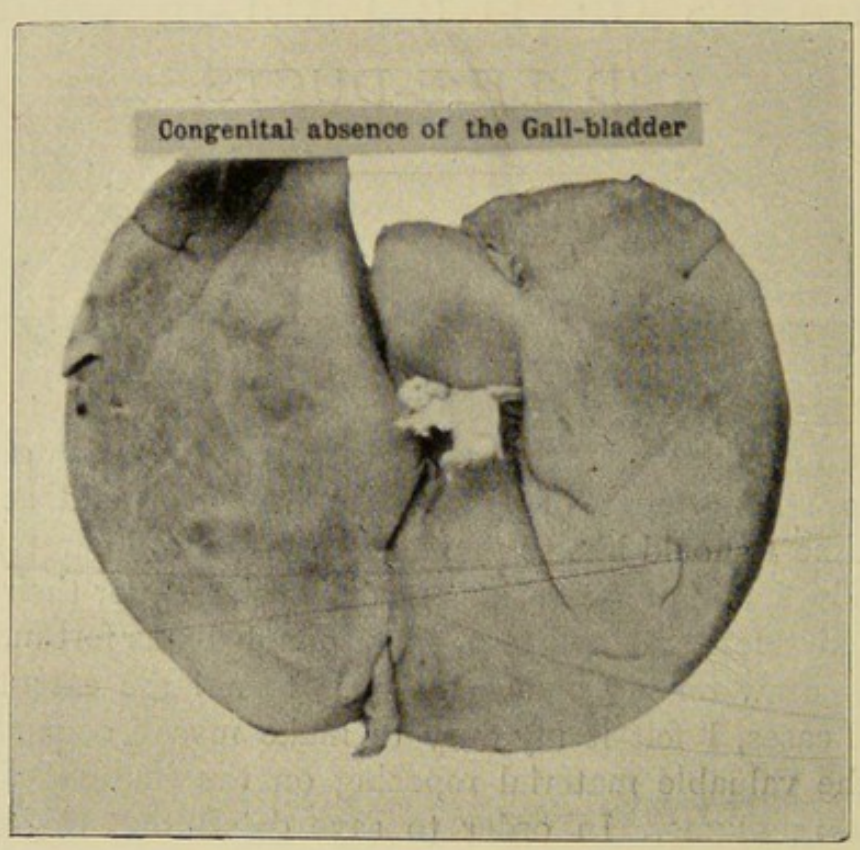

FIG. 1.

(No. 1,390, Guy's Museum.)

Some of the more important anatomical points, however, I must not omit.

Congenital Malformations.—There is apparently no part of the biliary apparatus, except the liver, which may not be absent; while it is not to be wondered at in the case of the gall-bladder and cystic duct (as in specimens No. 1,390 in Guy's Museum, in one specimen in St. Thomas's, and in two at Middlesex), since they are normally wanting in certain animals, and are frequently obliterated by disease in the human subject; it affords serious food for thought, to find

that life has been possible for six months, where even the hepatic and common ducts are represented by mere fibrous cords, as in specimen No. 973 in St. Mary's, and No. 1,017 in King's College Museums.

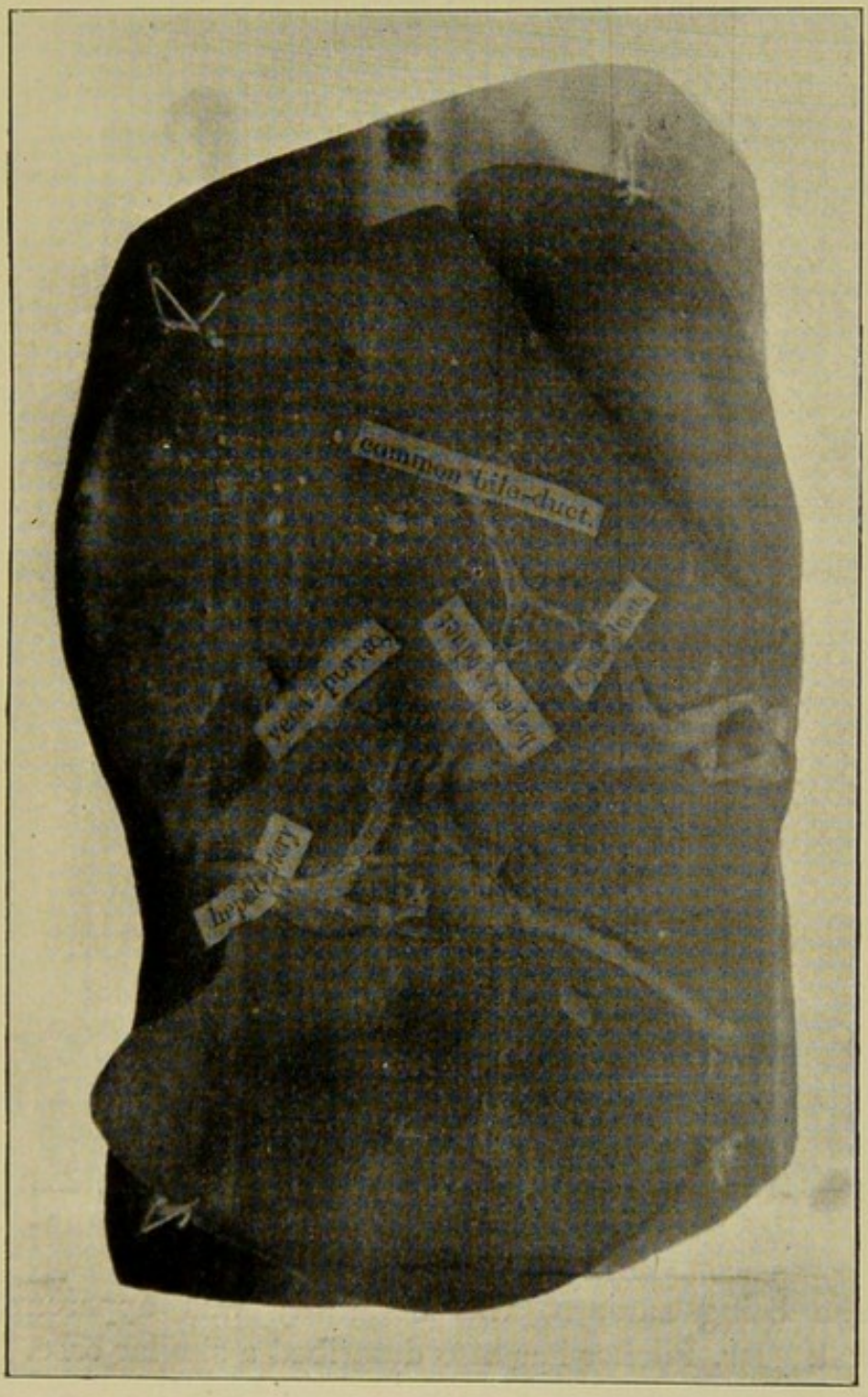

FIG. 2.—CONGENITAL ABSENCE OF COMMON, CYSTIC AND HEPATIC DUCTS. (No. 973, St. Mary's Museum.)

Hour-glass-shaped gall-bladder is probably not uncommon, for though I have found only one specimen in the museums, and that at Middlesex, I have myself operated on two cases

in which the distal part of the gall-bladder contained calculi, and was connected with the gall-bladder proper by a narrow neck. While in one case I thought this deformity might be due to the contraction of an ulcer, in the other, the mucous

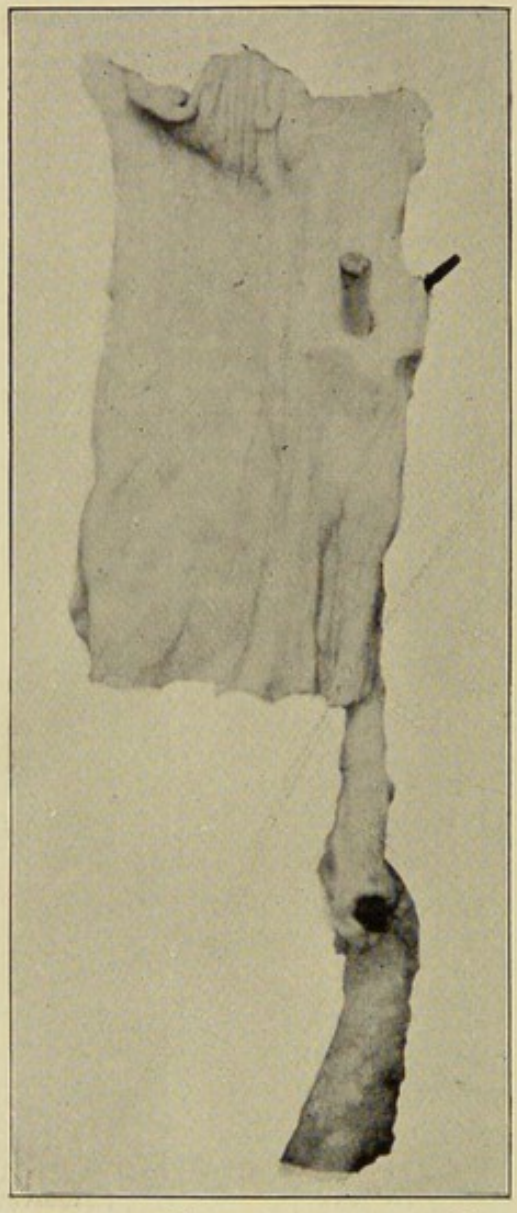

FIG. 3.—OBLITERATION OF GALL-BLADDER AND COMMON DUCT, THE RESULT OF GALL-STONE IRRITATION.

(No. 1,391, Guy's Museum.)

membrane being smooth, the deformity was apparently congenital. Dr. Pilcher has also described a similar case.

A curious malformation is seen in specimen No. 1,391 in Guy's Museum, in which the gall-bladder is dilated and turned to the left, forming an ovoid tumour 3 inches long, parallel with and projecting beyond the anterior edge of the liver.

On numerous occasions I have found the ordinary position of the gall-bladder vacant, and the shrunken viscus to be situated near the transverse fissure of the liver under cover of the pylorus, with the transverse colon adherent over it. Specimen No. 2,805 in the Hunterian Museum is an example.

On two occasions I have found the gall-bladder, containing gall-stones, displaced very much to the right. In one instance the liver was almost bifid, the left lobe predominating and pushing the right, and with it the gall-bladder, so far round as to make it project into the lumbar region.

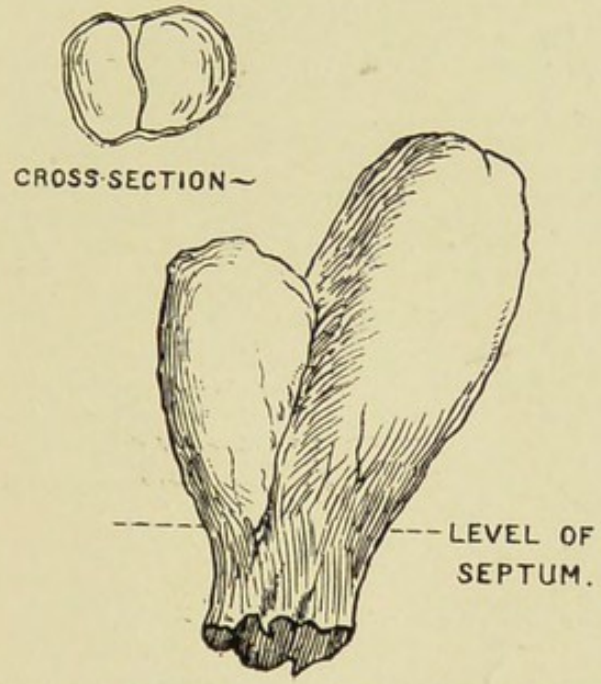

FIG. 4.—BIFID GALL-BLADDER FROM A SHEEP.
(Leeds Museum.)

Rarely the gall-bladder is partly divided longitudinally, but I have not been able to discover a specimen from the human subject, nor could I find one of hepato-cystic duct, or of double hepatic, replacing the common duct, both of which varieties are said to exist. The accompanying drawing is taken from a specimen of a bifid gall-bladder of a sheep, which was kindly given to me by my friend Dr. Beatson.

The common bile-duct has recently received much attention at the hands of several observers, and the papers by M. Le Dr. Quenu in the *Revue de Chirurgie* for 1895, and

by Dr. Fenger in the American *Journal of Medical Science* for February and March, 1896, are both of great practical utility. The former gives a number of exact measurements,

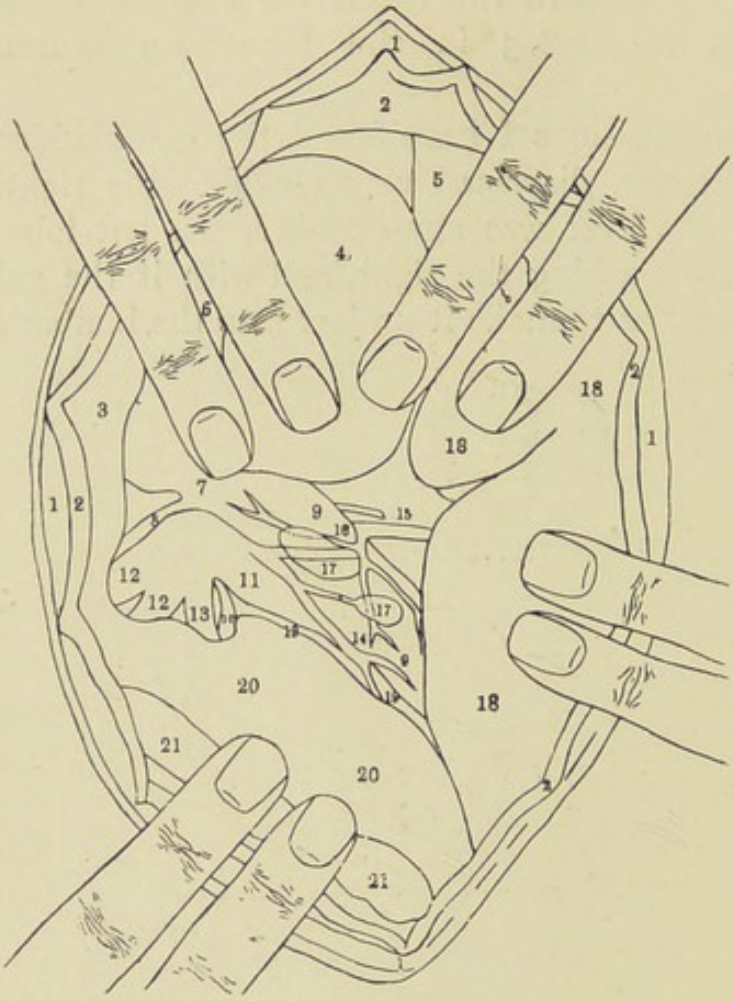

FIG. 5.—FIELD OF OPERATION. DIAGRAM TO SHOW RELATIONS OF COMMON BILE-DUCT. (AFTER FENGER.)

1, Wound through abdominal wall; 2, parietal peritoneum sutured to skin; 3, right lobe of liver, lower surface; 4, quadrate lobe of liver; 5, suspensory ligament of liver; 6, gall-bladder; 7, cystic duct; 8, hepatic duct; 9, common duct; 10, branch of hepatic duct to lobus Spigelii; 11, trunk of vena porta; 12, branches of vena porta to right lobe; 13, branches of vena porta to lobus Spigelii; 14, small branch of vena porta in hepatico-duodenal ligament; 15, hepatic artery; 16, branches of hepatic artery to hepatico-duodenal ligament; 17, lymph-glands in hepatico-duodenal ligament; 18, duodenum; 19, entrance to foramen of Winslow; 20, hepatico-colic ligament; 21, transverse colon.

and describes a small vessel, a branch of the pancreatico-duodenal artery, as also some branches of the portal vein and hepatic artery crossing over the duct, which might be seriously in the way in the operation of choledochotomy.

Dr. Fenger also shows how the portal vein, gradually winding round the common duct, comes to be placed on the

Fig. 6.—Melanotic Tumour of Gall-bladder and Glands in Portal Fissure
(No. 2,809, Hunterian Museum, Royal College of Surgeons.)

outer side of the upper third, even overlapping the front of it, and the termination of the cystic duct, thus demon-

strating that the middle portion of the ductus communis, and the upper two-thirds of the cystic duct, are the only convenient situations for choledochotomy. Perhaps the diagram will enable me to describe these points more clearly.

In palpating the common duct for gall-stones, the surgeon frequently feels several more or less hard nodules within the free border of the lesser omentum, by the side, or in front of, the common duct, and unless it be borne in mind that three or four lymphatic glands normally exist here, they may be apt to mislead, especially as they are not unusually con-

FIG. 7.—PERITONEAL POUCH ON RIGHT SIDE OF ABDOMEN.
X, Deepest part of the pouch; 5, stomach.

siderably enlarged where there is gall-stone irritation. I have frequently felt them as large as beans, and at times the size of filberts. No. 2,809 Hunterian Museum shows these glands much enlarged and melanotic (Fig. 6).

The large peritoneal pouch (Fig. 7) shown in the diagram—bounded above by the right lobe of the liver, below by the ascending layer of the transverse meso-colon covering the duodenum internally, externally by the peritoneum lining the parietes down to the crest of the ilium, posteriorly by the ascending meso-colon covering the kidney, and internally by the

peritoneum covering the spine—has been long recognised, but perhaps not sufficiently appreciated in gall-bladder surgery.

Mr. Rutherford Morison drew attention to it in a paper in the *British Medical Journal* for March 3, 1894.

I have been accustomed for several years to drain this pouch by means of a long glass tube, only occasionally making use of a lumbar drain. The author referred to, places such reliance on the ease and safety with which it can be drained that he does not advocate much time being spent in suturing incisions in the gall-bladder or bile-ducts. It is

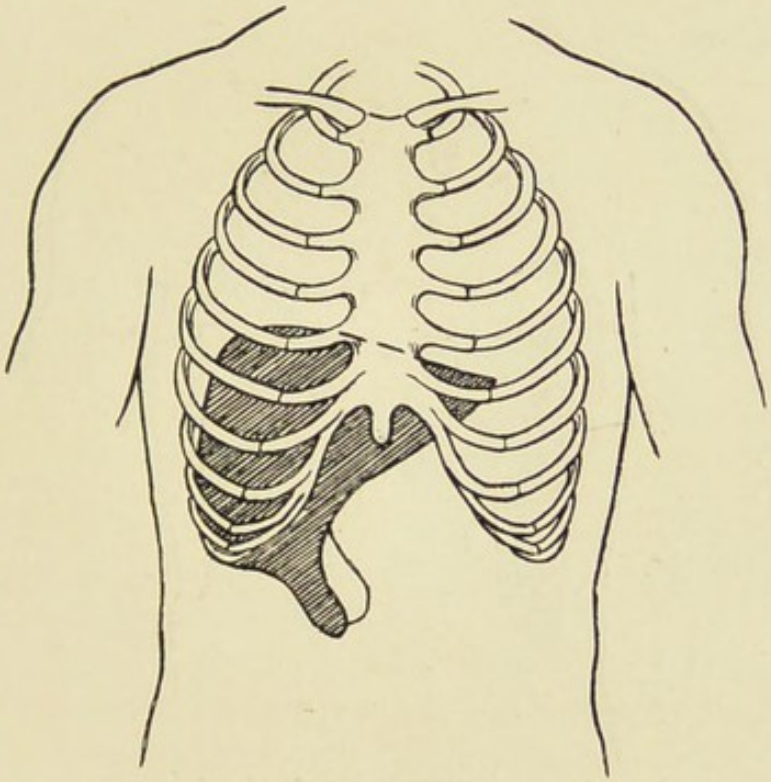

FIG. 8.—LINGUIFORM PROCESS OF LIVER.

interesting to note that it is capable of holding nearly a pint of fluid before it overflows into the general peritoneal cavity through the foramen of Winslow or over the pelvic brim.

A deformity of the liver, congenital or acquired, may at times lead to a difficulty in diagnosis or in treatment. I refer to a tongue-shaped prolongation of the right lobe, which may project below the costal margin for several inches, and simulate a tumour of the liver or an enlarged gall-bladder.

I am able to show one form of the enlargement in Cruveilhier's Atlas, which is supposed to have been due to

tight lacing; it is associated with dropsy of the gall-bladder and gall-stones.

In some instances the gall-bladder projects beyond the apex of the linguiform projection, as in a case described by my friend Dr. Hellier in the *British Medical Journal*, May 4, 1895 (Fig. 8).

In others the projection is external to the gall-bladder, which is then found lying on its inner side (Fig. 9).

In one case of this kind, where the gall-bladder was contracted, and calculi were impacted in the cystic duct, I found

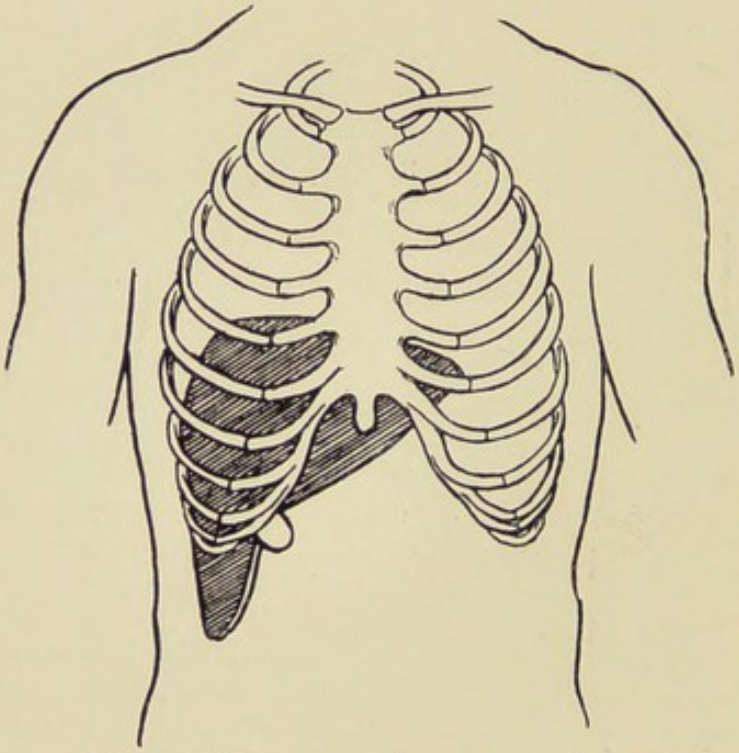

FIG. 9.—LINGUIFORM PROCESS OF LIVER.

the greatest difficulty in extracting them, owing to the limited space for manipulation caused by the abnormality.

Professor Riedel has described it, and the projection is sometimes known as Riedel's lobe. It is said to be uniformly due to cholelithiasis, but in one case at least in my experience it was not associated with gall-stones.

I propose to consider my subject under four headings:

1. Inflammatory affections.
2. Intestinal obstruction dependent on gall-stones.
3. Tumours.
4. The surgical treatment of gall-stones.

CHAPTER II.

INFLAMMATORY AFFECTIONS.

INFLAMMATORY affections may be conveniently considered under the following headings :

1. Catarrhal Inflammation.

(*a*) Acute catarrhal cholangitis.
(*b*) Chronic catarrhal cholangitis.
(*c*) Catarrhal cholecystitis, or chronic catarrh of the gall-bladder.

2. Suppurative Inflammation.

(*a*) Simple suppurative cholecystitis, or suppurative catarrh or simple empyema of the gall-bladder.
(*b*) Suppurative and infective cholangitis.
(*c*) Acute parenchymatous inflammation, or phlegmonous cholecystitis and gangrene of the gall-bladder.
(*d*) Ulceration of the gall-bladder and bile-ducts.
(*e*) Stricture of the gall-bladder and bile-ducts.
(*f*) Perforation of the gall-bladder and bile-ducts.
(*g*) Fistula of the gall-bladder and bile-ducts.

CATARRH OF THE GALL-BLADDER AND BILE-DUCTS.

The larger bile-ducts and the gall-bladder, being lined with mucous membrane having cylindrical epithelium and ordinary racemose glands, are, like other mucous passages, subject to catarrh, which may be acute or chronic.

As, however, acute and chronic catarrhal jaundice are subjects of medical rather than surgical interest, I shall only

briefly consider them ; but we must not forget that chronic catarrhal cholangitis, by simulating jaundice due to organic mischief, or from its frequent association with serious disease, such as cholelithiasis, cancer, or hydatids, has some important surgical bearings, and that, when medical means have failed, surgical treatment may be worth seriously considering.

We must also bear in mind that the jaundice accompanying cancer of the liver is frequently catarrhal, and therefore capable of being relieved by treatment, although the original disease persists. Also that the evanescent jaundice following on cholelithic attacks is frequently catarrhal, and not due to the mechanical obstruction of a gall-stone.

(*a*) **Acute catarrh** is supposed to give rise to the evanescent form of icterus, known as *catarrhal jaundice*, which, more frequently occurring in young persons, usually comes on as a sequence of dyspepsia or as a result of exposure to cold, and is ordinarily unaccompanied by pain or serious illness, but for which help is sought on account of the marked objective symptom of jaundice.

When it is borne in mind that the bile-ducts have only a limited calibre, that the mucous lining is capable of swelling so as to occlude the passage, and that the secretion of bile takes place under very low blood-tension (according to Naunyn, 110 to 220 mm. of water), and is therefore arrested by slight backward pressure, it is easy to comprehend how catarrh in this situation should lead to jaundice, though absolute proof of the correctness of the theory is wanting, since simple catarrhal jaundice furnishes no post-mortem subjects.

Etiology.—An extension from the duodenum is probably the usual cause of acute catarrhal jaundice, and as the common bile-duct traverses the walls of the duodenum very obliquely, it is to be expected that the narrow terminal portion of the duct will be the first to suffer, and be the seat of the primary obstruction.

Beside gastro-intestinal catarrh, exposure to cold, extension to the bile-ducts of inflammation from the parenchyma of the liver, carcinoma of the liver, gall-stones, hydatids, pneumonia, and other acute inflammations and infectious

fevers, must be mentioned as causes of catarrh, direct or indirect. Murchison gives gout and syphilis as causes, and Dr. Fagge includes under this heading jaundice due to fright and that occurring in epidemics.

Although it is well known that in cancer of the liver jaundice is a very variable sign, it is not always recognised that the icterus is at times dependent on the associated catarrh, which may be relieved by treatment, though the original disease persists.

As the symptoms, diagnosis, and treatment of catarrhal jaundice are so distinctly subjects of medical rather than surgical interest, I will at once pass on to consider the chronic form, which from a diagnostic point of view has important surgical bearings.

(*b*) **Chronic cholangitis**, or chronic catarrh of the bile-ducts, may be simply a sequel to the acute form, and may then give rise to a more or less persistent jaundice leading to a suspicion of serious organic disease.

Although there are dyspeptic symptoms due to the associated gastro-intestinal catarrh, with jaundice and some loss of weight, the retention of strength and the absence of serious sequelæ, such as ascites and hæmorrhage, generally enable a good prognosis to be given, especially as the symptoms usually yield to proper treatment.

Catarrh of the bile-ducts probably always accompanies jaundice from whatever cause, and, as Dr. Moxon has pointed out, a colourless mucus is always found in the bile-ducts when an obstruction in the common duct is complete. A search through the pathological records of Guy's Hospital for twenty years failed to discover any exception to this rule. When the obstruction is only partial, the mucus may be well charged with bile, as the backward pressure is not sufficient to stop the secretion and pouring out of bile into the ducts.

Specimen 1,420 in Guy's Museum shows dilated bile-ducts in the liver holding a pint of clear mucus (Fig. 10). There was a small cancerous growth in the common duct. Case 35 in my list of operations is an example, the obstruction being due to gall-stones.

As a concomitant of cancer of the liver or of the bile-

ducts, chronic catarrh is common, and is frequently the cause of the accompanying icterus. This accounts for the relief to the jaundice afforded by treatment in a necessarily fatal disease; whereas, when the jaundice is simply dependent on the mechanical pressure of the growth in the ducts, the jaundice will be only slightly, or not at all, influenced by remedies.

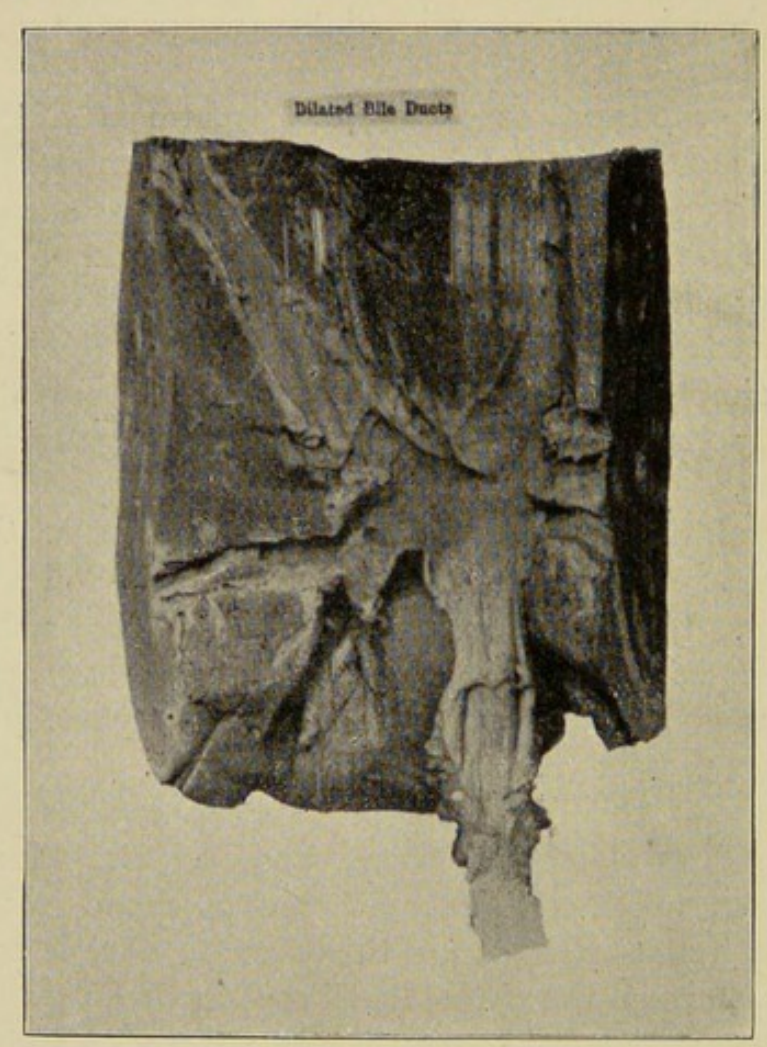

FIG. 10.—CHRONIC CATARRH WITH DILATATION OF BILE-DUCTS IN LIVER, DEPENDENT ON SMALL CANCEROUS GROWTH IN COMMON DUCT.

(No. 1,420, Guy's Museum.)

The same remarks apply to hydatid disease, to abscess, and to other organic diseases of the liver.

Cases 152, 157, and 161 are good examples of chronic catarrhal jaundice produced by the irritation of hydatid cysts in the liver, the catarrh and its accompaniment (jaundice) being cured by the removal of the cause.

Gall-stones are probably always accompanied by catarrh, which, giving rise to the formation of thick ropy mucus, leads to attacks of pain when passing, and it seems not unlikely that some of the minor seizures of pain not followed by jaundice, or, if so, only to a slight extent, and where no gall-stones are subsequently found in the evacuations, are of this nature.

Although the jaundice in cholelithiasis is usually produced by a gall-stone obstructing the common or hepatic ducts, I am convinced that in many cases jaundice is present when the concretion is in the gall-bladder or in the cystic duct, the obstruction to the flow of bile being caused by an inflammatory swelling of the mucous membrane of the bile channels caused by extension from the seat of obstruction; in other words, the jaundice is dependent on catarrhal inflammation.

I have seen this in many cases on which I have operated, and after performing cholecystotomy and removing gall-stones from the gall-bladder and cystic duct and proving the common duct to be free of concretions, all the bile has flowed through the tube for several days, or until the inflammatory swelling has had time to subside.

Riedel (*Ref. Gumprecht Deutch Med. Woch.*, 1895, No. 15) states that about two-fifths of the cases of jaundice in cholelithiasis arise in this way. He quotes one case where the gall-stone was outside the bile channel in a perforative abscess cavity, and in a case I saw with Dr. Chadwick at the Leeds Infirmary this was so (the case is reported in the *British Medical Journal*, May 25, 1895).

The treatment of chronic catarrhal jaundice is at first medical, and if the disease prove obstinate, a course at Harrogate or Carlsbad will be likely to do good if the ailment be functional; but that failing, the question of some organic cause that may be removable by surgical treatment should be considered.

Dr. Thudichum, who published a treatise on gall-stones in 1863, describes a catarrh of the finest ramifications of the bile-ducts which causes their lining to be shed in the shape of biliary casts. He considers that these often form the nucleus of gall-stones, where the catarrh is associated with

decomposition of bile due to bacteria invading the obstructed bile-ducts.

This has been termed by Meckel 'lithiatic catarrh'; perhaps a better term is desquamating angio-cholitis, or stone-forming catarrh of the bile-ducts.

It doubtless has great etiological importance in reference to gall-stones, especially when associated with decomposition due to the presence of micro-organisms in the stagnant fluid in the ducts.

(*c*) **Catarrhal cholecystitis,** or chronic catarrh of the gall-bladder without jaundice, forms a distinct and definite disease, and I have seen several cases in which cholelithiasis had been diagnosed and operation advised, but where neither the gall-bladder nor ducts contained anything firmer than thick ropy mucus, which was apparently the cause of painful contractions of the gall-bladder simulating gall-stone seizures.

In one case of this kind, in a lady of sixty, on whom I operated with Dr. Clifton, of Sheffield, in November, 1894, the gall-bladder contained bile mixed with thick ropy mucus, which formed plugs almost like small grains of boiled sago; there were no other signs of disease, but the gall-bladder was very large and pouched, and the mucous membrane thickened. Cholecystotomy was performed, and the drainage was continued for a fortnight, after which the wound was allowed to close. The patient, after two years, continues well, and is freed from her previously frequently-recurring attacks. (Case 101 in my list.)

Specimen No. 1,416 in Guy's Museum may be a case of this kind; it shows a gall-bladder distended with mucus, although there was no organic obstruction in the ducts. It was removed from a patient of Mr. Cock's who died from pyæmia following on acute necrosis.

In September, 1894, in a lady of thirty-two, whom I saw with Dr. Byers, of Belfast, the history of gall-stones was most characteristic, and, from the adhesions found at the time of operation, I have no doubt that at some time they had been present. At the time I operated, the gall-bladder and ducts were free from concretions, though, on opening

the gall-bladder, I found the thick ropy mucus mentioned as having been present in the last case.

Cholecystotomy and drainage for a week brought about relief, and although there was some repetition of the attacks, doubtless from the drainage not having been continued sufficiently long, a persistence, with appropriate medical treatment for a time, effected a cure, and the patient is now quite well. (Case 97.)

Case 165 on my list is one of the most marked examples, and as it occurred in a lady medically trained, who made her own diagnosis in the first instance, it has especial value, since it shows that the attacks due to catarrhal cholecystitis were equally severe with those undoubtedly due to gall-stones. In the early attacks gall-stones were passed, and discovered in the motions; the attacks persisting, operation was done, and catarrhal cholecystitis only discovered.

In another instance, in a lady of fifty-five, whom I saw with Dr. Parke, of Milnsbridge, two months after a negative abdominal exploration had been made, the characteristic gall-stone attacks were persisting, and after each temporary jaundice was noticed.

In this case the gall-bladder had not been drained, hence no good resulted from the operation. I suggested a course of medical treatment, and that failing, cholecystotomy to be performed.

Dr. Byron Robinson, in the *American Medico-Surgical Bulletin* for April 18, 1896, describes a case in which there were attacks of pain like cholelithic seizures, and which, he thought, were dependent on kinking of the common bile-duct, producing obstruction to the flow of bile into the duodenum, but which, I think, may be more easily explained on the hypothesis that it was a case of chronic catarrhal cholecystitis. It came on six months after the removal of gall-stones from the gall-bladder.

On opening the abdomen, the gall-bladder, though free from stones, was found to be considerably enlarged, although the duct was patent, as proved by syringing water through it into the duodenum. Cholecystotomy resulted in recovery.

In these cases the gall-bladder is usually distended, but it

rarely forms a distinct tumour, and there is an absence of pain on pressure over it. Unless gall-stones have been present at some time, there are usually no adhesions of the gall-bladder or ducts to the neighbouring viscera, proving that the inflammation has not extended through to the peritoneal coat, as it usually does when dependent on cholelithiasis.

This catarrh may be the sequence of gall-stone irritation, as in cases 97 and 165, but in other instances may probably be due to the dependent position of the fundus of the gall-bladder, or to chronic constipation and accumulation of fæces in the hepatic flexure of the colon interfering with the regular emptying of the gall-bladder.

I believe that in not a few of the cases where adhesions are found around a contracted gall-bladder, and no concretions are met with, the attacks are kept up by catarrh of the gall-bladder and ducts, which it is next to impossible to diagnose from the ordinary gall-stone seizures. Case 111 is a good example. The benefit derived from a systematic course of treatment in these cases renders it advisable that medical should always precede surgical treatment.

The diagnosis from cholelithiasis may usually be made by observing that the attacks are less severe and less prolonged than in true gall-stone seizures; that no gall-stones are found in the evacuations after an attack; that jaundice seldom supervenes, and if it does is only very slight; that there is no tenderness on pressure between the ninth costal cartilage and the umbilicus; and that the affection will usually completely yield to treatment. Should medical treatment fail to relieve, it may be difficult to distinguish chronic catarrh of the gall-bladder from cholelithiasis; but if, under the belief that the case is one of gall-stones, the gall-bladder be exposed, and no concretions found, drainage of the gall-bladder will be likely to effect a cure.

In chronic catarrh of the gall-bladder, regular exercise, massage over the hepatic region, the avoidance of anything tight around the waist which will increase the dependence of the fundus of the gall-bladder, careful regulation of the diet, and the judicious employment of saline aperients, should be in all cases adopted.

The spasmodic attacks may require the administration of a sedative; and in some cases, like those referred to, nothing short of a subcutaneous injection of morphia will do any good.

If after a few weeks of general treatment the symptoms are not relieved, the case will probably be thought to be one of gall-stones, and operative treatment will be considered advisable.

If the gall-bladder and ducts be found free from gall-stones, cholecystotomy and drainage should, nevertheless, be performed; and it will be found useful after the third day to gently syringe a little warm water through the drainage-tube daily so as to wash out the ducts; and after a fortnight or more the tube may be left out and the wound allowed to close.

General treatment directed to the cause should be continued for some time afterwards.

My proposal, in fact, is to treat obstinate catarrh of the gall-bladder as we do catarrh of the urinary bladder, first by medical and general remedies, and those failing, to secure physiological rest by means of drainage.

SUPPURATIVE INFLAMMATION OF THE BILE-PASSAGES, AND THEIR RELATION TO MICRO-ORGANISMS.

Suppurative Inflammation of the Bile-Passages.

At first sight suppurative inflammation of the gall-bladder and bile-ducts would seem to be capable of description in small compass and under one heading, but the subject is by no means as simple as it would appear.

For instance, simple empyema or suppurative catarrh of the gall-bladder, which is closely allied to suppurative cholangitis, differs *in toto* from phlegmonous cholecystitis, which, however, is also associated with pus in the gall-bladder, that may quite properly be called an empyema, but which is one of the most fatal of diseases if not operated on expeditiously, as not only is there a tendency to gangrene, but to a rapidly-spreading lethal peritonitis.

The different clinical characters of suppurative inflammation can probably be accounted for by the presence or absence of certain organisms, and although the bacteriology of this region is still in its infancy, sufficient good work has been done to make a review of it well worth considering.

It has been supposed that the bile is an antiseptic fluid, which tends to prevent decomposition in the alimentary canal; but in a series of observations which I published some years ago (Proceedings of the Royal Society, vol. xlvii.) on a case of biliary fistula, I found that the absence of bile from the intestine of a woman during a period of fifteen months did not lead to any irregular fermentative process, showing that the alleged antiseptic effect of bile on the fæces is probably imaginary.

Normal bile is, however, generally sterile. This was proved by Netter in 1884 (*Progrès Médical*, 1886), who experimented on dogs; and the fact has been confirmed by Gilbert and Girode (*Comptes Rendus, Soc. Biol.*, 1890, No. 39), and later by Naunyn ('Klinik der Cholelithiasis,' 1892), who found it sterile in two cases within a few hours of death.

Frequent inoculation experiments on animals have confirmed these observations, thus explaining a well-known fact, that in many cases bile has been extensively poured out into the peritoneal cavity without setting up peritonitis; but the fact of healthy bile doing no harm for a time, must not lead operators to be careless of extravasation when operating for disease of the gall-bladder or bile-ducts, as in such cases the bile is seldom or never sterile, and in that condition it is capable of producing severe peritonitis.

In a case of mucous fistula following operation for stricture of the cystic duct, the constant clean appearance of the edges of the fistula suggested to me the idea that the fluid secreted by the gall-bladder might possess antiseptic properties; and the observation that, when collecting the fluid for experimental purposes, I could leave the flasks exposed to the air for several days without any apparent change suggested the same conclusion.

Professor Birch, to whom I supplied some of this fluid, performed numerous cultivation experiments, and came to

the conclusion that its antiseptic properties were slight, the want of change being probably due to poverty of the fluid in nourishing materials (*Journal of Physiology*, No. VII.).

Bloch has demonstrated that the bile in cases of disease of the gall-bladder or bile-ducts always contains micro-organisms; hence he thinks it advisable to perform cholecystotomy in two stages, in order to avoid soiling the peritoneum and producing infective peritonitis.

When the flow of bile along the ducts is arrested, micro-organisms often invade the gall-bladder either from the blood or the intestine.

Charcot and Gombault (*Archives de Physiologie et Pathologie*, 1876, p. 453) demonstrated the organisms within it after ligaturing the common duct in dogs.

This was confirmed by Netter in 1886 (*Progrès Médical*, 1886, p. 992), who found that, twenty-four hours after aseptic ligature of the common duct in dogs, organisms (both staphylococcus and *B. coli commune*) could be cultivated from the bile.

The *B. coli commune* exists normally in the human body, and is said to be the most abundant and most constant of the bacteria found in man in health. It has been demonstrated in every part of the alimentary canal, from the mouth to the anus. It varies greatly in its virulence, and in experiments on animals it appears to be harmless when taken from the normal intestines.

If, however, the intestine or its diverticula become the seat of any morbid conditions, then the bacterium becomes at once virulent.

At one time, as shown by Escherich (*Fortschritte der Medecin*, 1885), it may act as an ordinary pyogenic organism, producing local abscesses; at another, as an active pathogenic germ, producing fatal septicæmia.

In simple catarrhal empyema of the gall-bladder, organisms, though probably present, are not always easily discovered; for instance, in a case (No. 106 on my list), where a tumour of the gall-bladder had been present for a year, and from which I removed sixteen gall-stones and 2 ounces of thick, creamy muco-pus, Dr. Buchanan failed to find any organisms.

In this case the walls of the gall-bladder were not thickened, and the serous coat was free from inflammation. Moreover, there were no adhesions, except over the cystic duct, where the largest gall-stone had been impacted.

On the other hand, Mr. C. B. Lockwood (*Lancet*, March 2, 1895) found streptococci and other organisms, but no *Amœbæ coli*, in an empyema of the gall-bladder.

Netter (*Archives de Physiologie Normale et Pathologique*, 1886, p. 7) found staphylococci and streptococci present in pathological human bile, and Martha (*ibid.*), Gilbert and Girode (*Comptes Rendus Société de Biologie*, 90 and 91), and Bouchard (*ibid.*, 1890) have found the *B. coli commune* in the bile in cases of inflammation of the biliary passages.

Terrier states that he has proved organisms (both *B. coli commune* and streptococci, to be present in all cases of inflammation of the bile-passages (*Revue de Chirurgie*, 1895, p. 965).

In acute or phlegmonous cholecystitis the walls of the gall-bladder are swollen and œdematous, and may be infiltrated with pus. In three out of five of such cases Naunyn found the *B. coli commune* in the pus.

Bonnecken in 1890 demonstrated these organisms in the sac of a strangulated hernia, although there was no perforation.

I recently operated on a case of general suppurative peritonitis within forty-eight hours of the onset of appendicitis, and although the abdomen contained a quantity of thin pus, the infection must have occurred through the unbroken wall of the appendix, as a most careful examination of the removed organ failed to discover any perforation.

Barbacci has also shown that peritoneal sepsis may occur without perforation of the gut. The spread of infection through the walls of the gall-bladder can readily be explained on the same hypothesis, showing how virulent peritonitis may arise in these cases though there be no perforation.

Drs. Gilbert and Girode (Biological Society of Paris, December 2, 1893) found typhoid bacilli in the pus from a case of empyema of the gall-bladder, which came on as a sequence of enteric fever.

Gilbert and Dominici also (Biological Society of Paris, December 23, 1893) assert that they produced suppuration

in the gall-bladder and liver of rabbits by injecting a culture of typhoid bacilli into the common duct.

These biological facts are borne out by the clinical observations of Dr. Murchison and Dr. Hale White, who have found evidence of inflammation and ulceration in the gall-bladder in well-marked and fatal cases of typhoid fever, there being no obstruction to the passage of bile, or other cause than the specific disease, to account for the trouble.

Chiari (*Zeit. f. Heilk.*, Bd. 15, p. 199) investigated systematically a series of twenty-two cases of typhoid fever. With the exception of three cases—one of which was in the infiltrating, and two in the necrotic, stage—he obtained typhoid bacilli invariably out of the gall-bladder, and in fifteen cases they were obtained in pure culture. They were generally present in considerable numbers. In thirteen of the nineteen cases in which a positive result was obtained, there was inflammation of the gall-bladder with small-celled infiltration, œdema, and hyperæmia. In all twenty-two cases the diagnosis of typhoid fever was confirmed by cultivations from the spleen, mesenteric glands, or liver, or from the larger bile-ducts.

How do they reach the gall-bladder?

There are three possibilities: either they enter by the bile-ducts, or from the blood, or directly through the wall of the gall-bladder. The last-mentioned manner must be very exceptional. Their entrance from the blood has been apparently disproved, and it is therefore probable that they enter by the bile-ducts.

There is no doubt that the bacilli multiply in the gall-bladder, and it is possible that they may be responsible for post-typhoidal cholecystitis, for gall-stones, and also for relapses of the disease.

Simple Empyema.

Suppurative catarrh, or simple empyema, of the gall-bladder, or suppurative cholecystitis, is, as a rule, associated with gall-stones; but tumours of the bile-ducts, typhoid and other fevers, and other unexplained conditions, may also be the predisposing factors, though infection by pyogenic organisms is probably in every case the true exciting cause.

Empyema of the gall-bladder must always be looked on as a serious affection, both on account of its causes and its sequelæ, but from a clinical standpoint there is one form which is decidedly less serious than the other. The less serious I prefer to discuss first under the term 'simple empyema of the gall-bladder'; the more serious form I shall consider as a distinct and special disease under the name of 'phlegmonous cholecystitis.'

When we bear in mind Charcot and Gombault's experiments on ligature of the common duct in dogs, just referred to, the wonder is that all impacted gall-stones are not associated with empyema, yet such is not the case, and it is only in a certain small percentage that the catarrh passes on to suppuration.

When there is an obstruction or any irritation in the cystic duct, a simple empyema may result, but when the obstruction is in the common duct, it may be associated with suppurative cholangitis—the former being a local suppurative process, the latter an extremely serious disease, rapidly followed by general symptoms, and, unless treated by operation, often ending fatally.

In simple empyema the symptoms will at first depend on the cause, and as this is, in the great majority of cases, cholelithiasis (Courvoisier found empyema to be caused by gall-stones in forty-one out of fifty-five cases), there will be the usual history of gall-stone seizures, followed by a swelling under the right lobe of the liver, and by a continued instead of an intermittent pain. (Cases 3, 27, 79, 100, 106, 134, 151, and 169 in my list are good examples.)

At first the constitutional symptoms may be only slightly marked, and there may be no increase of temperature, though in other cases in the later stages, and in some from the commencement, rigors or chills with fever will point to the formation of pus. The patient may be driven to bed at an early stage on account of the pain on movement.

The loss of appetite, fever, and general malaise, usually lead to loss of flesh and weight. As a rule, there is no jaundice or only a slight icteric tinge, dependent on associated catarrh of the bile-ducts. Tenderness is nearly always

present, in consequence of the local adhesive peritonitis, which is rarely absent.

The tumour, if seen at an early stage, will move with respiration, descending with the liver, and being felt as a rounded swelling. After a time the swelling may become more diffused and general, and the movements during respiration will be less marked, or may cease, owing to inflammation extending to the abdominal walls. If the suppuration extends beyond the gall-bladder, the pus may make its way through the parietes, and an abscess may form under the ribs, as in a case under the care of the late Mr. McGill in the Leeds Infirmary, where a superficial abscess was opened under the right costal margin, giving exit to a quantity of pus and a number of gall-stones. The pus usually, however, selects a more tortuous passage, and following the suspensory ligament of the liver, it reaches the umbilicus, as in Case 39 on my list, where, after a long illness, an abscess formed at the umbilicus and burst, discharging pus and mucus. There was nothing to show the origin of the trouble except a history of spasms for years, without jaundice. On laying open the fistula, I was able to remove a large number of gall-stones from the gall-bladder. The patient remains in good health.

The abscess may even burst at a distance from its origin —for instance, over the pubes or over the cæcum.

There are generally peritoneal adhesions which prevent extravasation into the general peritoneal cavity, but the pus may make its way into neighbouring organs, as in Case 27 on my list, where it burrowed into the liver and formed an abscess, which I evacuated.

In speaking of fistulæ, I shall have to mention cases where an empyema has burst into the colon, duodenum, right renal pelvis, stomach, portal vein, vena cava, etc.

In King's College Museum, No. 1,706, is an example of a gall-stone which was removed from the pleura of a patient by Professor Rose, and as the patient had coughed up a quantity of bile-stained pus, an empyema of the gall-bladder had probably burst through the pleura, though no communication could be discovered after death, which occurred a few weeks after operation.

In one case, I successfully evacuated and drained a large subphrenic abscess caused by an empyema of the gall-bladder becoming extravasated between the liver and diaphragm.

If we bear in mind the pouch of peritoneum I have described, it is not to be wondered at, that a collection of pus should at times form in that region resembling a perirenal abscess, though inside the peritoneum and limited by adhesions.

Needless to say, an abscess of the gall-bladder only requires treating on general surgical principles by opening and drainage; but, at the same time, the cause must not be overlooked, as it may often be removed at the same time that the abscess is evacuated.

Where the pus is in the gall-bladder, cholecystotomy will be advisable. After exposing the gall-bladder, it will be wise to aspirate before opening it, in order to avoid soiling the tissues with pus.

The walls of the gall-bladder may be found so rotten as to be incapable of holding sutures, or, as in a case lately recorded by Dr. Willie Meyer, there may be small abscesses in the inflamed wall of the gall-bladder itself; in such cases cholecystectomy may be required. In two cases of empyema of the gall-bladder I simply evacuated the pus, removed gall-stones, and packed the cavity with iodoform gauze, and, although the peritoneal cavity was widely opened, no harm resulted, as a lymph barrier was soon thrown out, limiting the only partly-disinfected area.

In abscess due to empyema of the gall-bladder, forming at a distance from the seat of origin, it may be wise at first simply to open and drain the abscess, and on some future occasion to perform cholecystotomy. This was the course I successfully followed in Case 79.

In some cases of empyema the patient may not be in a fit condition to bear a prolonged operation, and it may therefore be wiser to perform a simple cholecystotomy and to defer the removal of the cause until an examination of the discharge shows it to be sterile or nearly so.

Acute Phlegmonous Cholecystitis and Gangrene of the Gall-bladder.

Acute or phlegmonous inflammation of the gall-bladder was described by Courvoisier in 1890, under the name of acute progressive empyema of the gall-bladder, and he states that it usually terminates fatally in a few days from diffuse peritonitis. Only seven cases are recorded in Courvoisier's statistics.

Potain (*Journal de Médecine et Chirurgie*, November, 1882) also mentions that, in addition to the ordinary variety of empyema of the gall-bladder, there is a very grave condition of acute empyema, which is followed by rapid peritonitis and death.

In one case, which he describes, death occurred on the second day after the onset of the attack, and although there was no perforation of the walls of the viscus, infection had spread through the coats to the general peritoneal cavity.

Osler ('Principles and Practice of Medicine') refers to it as an extremely rare disease.

A case described by Mr. W. Arbuthnot Lane in the *Lancet* for February 25, 1893, affords a good example of phlegmonous inflammation simulating acute intestinal obstruction.

A man, aged fifty-four, was suddenly seized with abdominal pain immediately after a rather hearty meal.

This continued, and was accompanied by frequent vomiting. Next day the vomiting became less frequent, and then ceased; ingestion of food, however, caused much distress and renewed vomiting.

The abdomen became much distended, and both pain and distension were now marked on the right side.

These symptoms increased in severity till the fourth day of the illness, when Mr. Lane first saw him. The bowels had not moved since the onset. He was now in a very prostrate condition, with a small rapid pulse and a very distended, painful, and tender abdomen, the hardness and fulness being most distinct about the right hypochondriac region and its vicinity.

There was no previous history of gall-bladder trouble nor of intestinal obstruction.

From the distended condition of the small intestines and cæcum, with the collapse of the colon on the left side, the case was supposed to be one of obstruction about the hepatic flexure.

On opening the peritoneal cavity, a very thick layer of firm lymph covering the edge of the liver, and extending down over the adjacent transverse colon, was found, beyond which the colon was empty, contrasting with the distended condition of the proximal part of the bowel.

In immediate relation with the transverse colon and the duodenum, which was also covered with lymph, was found a tensely-distended, livid gall-bladder, which was not larger than normal, and was evidently very acutely inflamed.

The whole of the lymph was carefully removed, and the gall-bladder tapped of its contents, which consisted of a thick muco-pus. The opening was then enlarged, a drainage-tube inserted, and the margins of the wound stitched to the peritoneum. No gall-stone was discovered. The patient made a complete recovery.

In the *Lancet*, March 2, 1895, is a case reported by Mr. Marmaduke Sheild, which is more fully described under perforation of the gall-bladder, but which was doubtless a case of phlegmonous cholecystitis following on typhoid fever, in a woman, aged thirty-one, under the care of Dr. Monier Williams.

She was operated on, on the fifty-first day of the disease, when the gall-bladder was found to be rigid, thickened, and of a dark plum colour, containing 1½ ounces of thick offensive pus; it was ulcerated and perforated. The abdomen was washed out and drained, complete recovery ensuing.

No. 2,806 in the Hunterian Museum is a case of typhoid cholecystitis, probably phlegmonous, as the peritoneal coat had much false membrane on it, like Mr. Lane's case, and pus was in the gall-bladder. It is from a case of typhoid fever, and death occurred in the fourth week.

Symptoms.—Although the condition is usually associated with gall-stones, acute cholecystitis may arise quite independently—in this way resembling appendicitis, which may occur without the presence of foreign bodies.

Typhoid and typhus fevers, cholera, malaria, sepsis after operation, puerperal fever, and other unknown conditions, may give rise to it.

Whatever be the cause, the disease usually manifests itself somewhat suddenly, with pain on the right side of the abdomen, rapidly becoming general. A rapid and feeble pulse, quick thoracic breathing, fever, intense depression, marked tenderness on pressure (especially over the right side of the abdomen), rapidly developing tympanites, persistent vomiting, and an extremely anxious expression of countenance, are usually present.

The acute peritonitis, which is significant of the disease, may be localized at first, but later becomes general.

Jaundice may or may not be present, and although an elevation of temperature is usual, it is by no means constant, and affords only slight assistance in the diagnosis or prognosis.

If the disease be of the very acute or gangrenous variety, death speedily occurs; but if of the subacute form, an abscess may develop around the gall-bladder, and the peritonitis may become localized, the disease then resembling a perityphlitic abscess in its course.

Diagnosis.—The diagnosis of phlegmonous cholecystitis practically resolves itself into the diagnosis of the cause of acute peritonitis, starting on the right side of the abdomen.

Although this may be due to perforation of the stomach at or near the pylorus, to perforation of the duodenum or ascending colon, to perforation of the gall-bladder or bile-ducts, and to other such-like peritoneal catastrophes, the chief affection for which it is likely to be mistaken is acute appendicitis.

In appendicitis the pain begins at a lower point in the abdomen, and passes towards the umbilicus; whereas in gall-bladder trouble it begins below the right costal margin, and passes towards the epigastrium and back to the right scapular region.

In all gall-bladder inflammations there is almost invariably a tender spot a little above and to the right of the umbilicus, or, to be more exact, at the junction of the upper two-thirds with the lower third of a line drawn from the ninth rib to the umbilicus.

In appendicitis there is in the same way a tender spot at the junction of the outer third with the inner two-thirds of a line drawn from the umbilicus to the anterior superior spine of the ilium, known as McBurney's Point.

The symptoms of acute peritonitis and paralytic obstruction of the bowels are common to both. Fortunately, the treatment by exploratory incision is appropriate to the various conditions mentioned, so that no serious error is likely to arise in case of mistaken diagnosis.

Treatment.—Relief of pain by subcutaneous injections of morphia will probably always be demanded as a primary measure, and as it is clearly impossible to make a diagnosis of the serious condition within the first few hours, warm applications, absolute rest, the stoppage of feeding by the mouth except in small quantities, and the relief of symptoms as they arise, must be followed out; but as soon as the diagnosis of phlegmonous cholecystitis can be established, and it is found that the patient is getting worse, an exploratory incision should be made, and the gall-bladder incised and drained, the cause if found being removed.

If, however, gangrene be discovered, the gall-bladder should be removed, the indications for that measure being as distinct as in the case of a gangrenous vermiform appendix.

If, in the subacute cases, the inflammation becomes localized, and a swelling with tenderness be found beneath the right costal margin, incision and drainage is called for, when at the same time cholecystotomy may be performed, and if gall-stones be present in the gall-bladder or ducts, they may be removed. If the patient be too ill to bear a prolonged operation, the latter procedure may be left to a subsequent occasion.

Gangrene of the Gall-bladder is probably only an extreme degree of phlegmonous cholecystitis.

The comparative frequency of gangrene in the vermiform appendix might lead one to suppose that gangrenous inflammation of the gall-bladder would not be uncommon; yet it is extremely rare, and, so far as I know, the case reported by Dr. L. W. Hotchkiss in the *Annals of Surgery*, February, 1894, is the only one recently recorded.

On looking through Guy's Museum, I found a well-marked specimen of gangrene of the gall-bladder (No. 1,397). The mucous membrane of the gall-bladder is dark brown, and there are patches of gangrene on the serous surface.

The common duct was obstructed by growth, and the patient had been jaundiced for three months.

He was under the care of Dr. Moxon.

In Dr. Hotchkiss's case, a boy, aged nineteen, was admitted to the Belle Vue Hospital, New York, with acute peritonitis, which had come on suddenly, and was thought to be due to appendicitis, as the pain was most severe over the cæcal region. No previous history of gall-stones was obtainable.

Exploration of the abdomen revealed a tumour of purplish hue, very tense, and markedly congested. Some pus was found on its outer side, and within it thin, sticky fluid of a yellowish-brown colour, together with a number of gall-stones.

The lower end of the gall-bladder was almost black, and its walls extremely thin and apparently gangrenous.

Death occurred seven hours after the operation, and thirty-four hours after the onset of the attack, the vomiting, rapid pulse, and high temperature continuing to the end.

In order to explain the occurrence of gangrene, three factors have to be borne in mind:

(*a*) Thrombosis of the nutrient vessels.

(*b*) Bacterial infection.

(*c*) Absence of drainage, and therefore tension.

The two latter are present in both gall-bladder and appendix inflammation, but the first factor is more frequent in the vermiform appendix, which is only supplied by one nutrient artery, whereas the gall-bladder has a very free blood-supply, not only through the branches of the cystic artery, but also through their anastomoses with the hepatic vessels, where the gall-bladder is fixed to the liver.

In Dr. Hotchkiss's case there was an abnormal circular constriction of the gall-bladder with lymph infiltration, which was apparently sufficient to cut off the blood-supply from the extremity of the gall-bladder.

Infective Cholangitis.

Infective cholangitis, or infective catarrh of the bile-ducts, is usually due to gall-stones in the common duct, which favour the entrance of organisms from the intestine through the duodenal orifice.

Courvoisier, Osler, and Fenger, have each described the ball-valve action of gall-stones in a dilated common bile-duct, thus accounting for the intermittent character of the jaundice and the irregular course of the disease.

Charcot was one of the first to describe the disease under the name of intermittent hepatic fever.

I have operated on a considerable number of cases of infective cholangitis dependent on gall-stones in the common duct, but although on several occasions the gall-stones were freely movable, or even floating, in by far the greater number they were multiple, and more or less impacted.

The usual history is one of spasms for several years, without jaundice; then comes a more severe seizure, followed by temporary icterus. If the gall-stone passes, there is an end of the trouble; but if not, the next attack of pain is probably immediately followed by a shiver, and by all the symptoms of an 'ague fit,' the temperature frequently reaching 104° or 105°. After it has passed off, the skin is more deeply tinged, and the jaundice may persist, though it varies in degree; it rarely, however, completely disappears between the attacks, there being usually a slight icteric tinge of the conjunctivæ, even though the interval between the attacks may be one of weeks or months. The rigors may be repeated daily, or at irregular intervals.

The gall-bladder may be felt as an enlargement below the right costal margin; but this is not usual, as where there are gall-stones it is more common to find the gall-bladder contracted. The liver at first is not enlarged, but later it may descend considerably.

Tenderness over the gall-bladder or in the epigastric region can generally be elicited. There is usually well-marked loss of flesh and strength, and if unrelieved by Nature or art, the

disease may run on into suppurative cholangitis and its complications.

Infective cholangitis may persist off and on for years, and may end in recovery; but, on the other hand, it may assume an acute form, and lead to death from pain, biliary toxæmia, and exhaustion. The complications which may follow are diffuse hepatitis, abscess of the liver, cholecystitis and empyema of the gall-bladder, perforation of the ducts, endocarditis, pleurisy, pneumonia, and other septic diseases.

Diagnosis.—Ague, being so rare in England, is not so readily thought of as it is in countries where malaria is endemic; but the regularity of the chills, and the slight jaundice and enlargement of the spleen in some cases, will usually suggest it, though the pain and tenderness, the history of cholelithiasis, and the absence of relief by large doses of quinine, soon settle the doubt.

As infective diseases in the bile-passages are prone to end in suppuration, abscess of the liver and suppurative cholangitis may supervene; but the more prolonged course of infective cholangitis, the comparative good health between the attacks, the irregularity in the course of the disease, and the absence of rapid and progressive deterioration of health, will usually enable a diagnosis to be made.

When suppuration exists, there are usually increased tenderness over the liver area, continued or irregular intermittent fever, and intense and persistent jaundice.

Treatment.—If possible, the cause should be removed; but should this prove impossible, the ducts can be drained. Fortunately, this may be accomplished with every prospect of success if, as is commonly the case, the disease be gall-stones. For instance, Cases 56, 57, 92, 136, 153, 161, 162, and others in my list of operations, are good examples.

There can, however, be no doubt in the minds of those who have observed many of these cases that it is better to anticipate the complication, and as soon as medical treatment has been fairly tried and failed, the removal of gall-stones by surgical means should be resorted to.

Suppurative Cholangitis.

Suppurative Cholangitis, or Suppurative Catarrh of the Bile-ducts, is a subject of deep interest, it being serious, not only on account of its causes, but from the combined effects of biliary obstruction and stagnation, with septic infection, and their local and constitutional effects.

Causes.—Cholelithiasis is by far the most common cause, and in the museums there are several cases illustrating it. Specimen No. 1,418 in Guy's Museum shows dilated hepatic ducts containing pus and many dark-coloured gall-stones, the ducts throughout the liver being inflamed and dilated, and there being several abscess cavities; one gall-stone is floating in the common duct. The specimen was taken from a woman, aged thirty, who had enteric fever five months before death. At first she had an enlargement of the gall-bladder, which, however, disappeared. Death occurred from pyrexia, accompanied by rigors.

But besides gall-stones, hydatid disease, cancer of the bile-ducts, typhoid fever, and influenza may cause suppurative cholangitis, and I suspect that the disease not infrequently complicates other acute infectious ailments.

Hydatid Disease causing infective cholangitis is apparently not rare, as the specimens in many of the museums show.

No. 2,252, St. Bartholomew's Museum, shows a hydatid membrane rolled up and blocking the common bile-duct, a portion of it projecting into the duodenum. There was a large hydatid cyst in the right lobe of the liver. It was taken from a boy, aged fourteen, who died from jaundice, accompanied by pain, fever, and delirium. Three months before death he was said to have hepatitis (Fig. 11).

No. 1,384, Guy's Museum, shows a hydatid cyst opening into the hepatic duct, a piece of hydatid membrane projecting through the papilla into the duodenum. The ducts throughout the liver are dilated and filled with pus. It occurred in a man of fifty, who had jaundice a month before admission, and died a week after.

No. 196A, St. George's, and No. 1,582, Middlesex, are also examples.

Case 161 on my list is an example of successful operation for infective cholangitis dependent on hydatid disease.

Mr. Jonathan Hutchinson junior has kindly furnished me with notes of a case of his, not yet published, in which he operated on a young woman suffering from intense paroxysmal

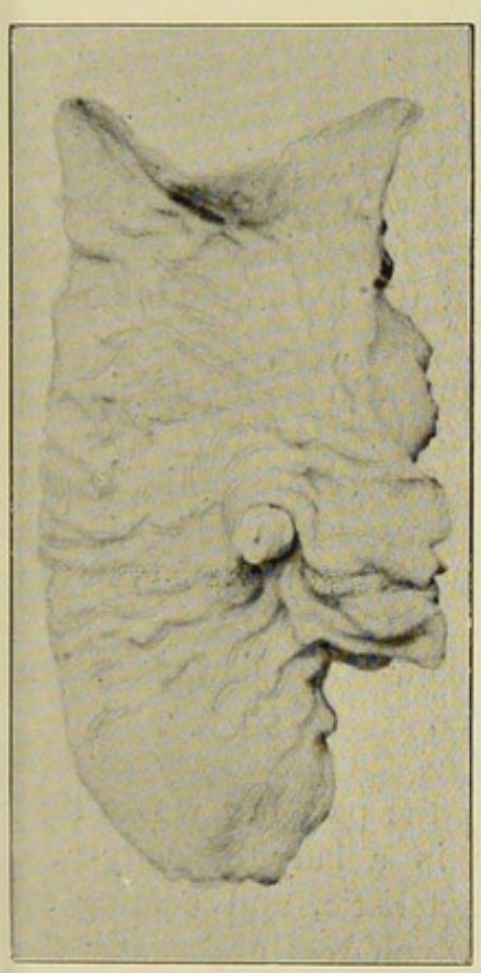

FIG. 11.—HYDATID, ROLLED UP AND BLOCKING COMMON BILE-DUCT, PORTION PROJECTING INTO DUODENUM.

Taken from a boy of fourteen, who had a large hydatid cyst in right lobe of liver. Death from suppurative cholangitis. (No. 2,252, St. Bartholomew's Museum.)

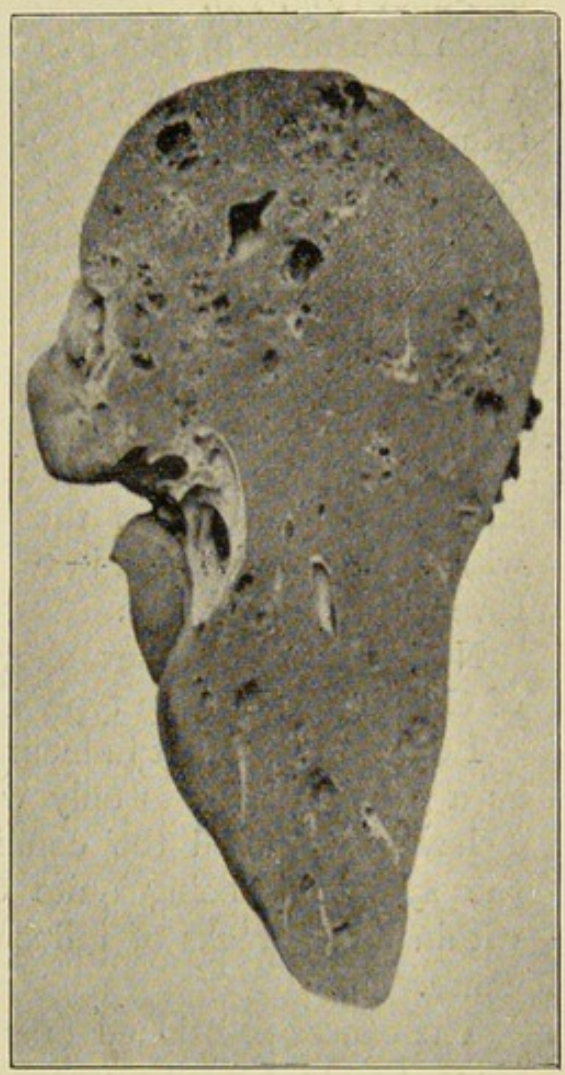

FIG. 12.—INFECTIVE CHOLANGITIS, SHOWING DILATED INTRA-HEPATIC DUCTS.

Cause—cancer of ampulla of Vater. (No. 1,307A, St. Thomas's Museum.)

pain with high temperature and sickness. The gall-bladder could be felt, and was very tense. Cholecystotomy was performed, and numerous hydatids let out. An opening could be felt between the cyst in the liver and the gall-bladder. Pus escaped with the bile for a time, but the patient is now nearly well.

Malignant Disease is a common cause.

There is an excellent example (1,307A) in St. Thomas's Hospital museum, where the ducts throughout the liver are dilated and filled with pus, the infective cholangitis being dependent on malignant disease of the papilla of the common bile-duct (Fig. 12).

On December 3, 1888 (Case 12 on my list), I operated on a man, aged forty-two, suffering from deep jaundice, with intermittent fever and ague-like attacks. Cholecystotomy gave relief, but the patient died a few weeks after, when a growth of a malignant character was found in the common bile-duct, and the ducts throughout the liver were inflamed and filled with pus.

Typhoid Fever furnishes the museums with several specimens of infective cholangitis and cholecystitis.

No. 1,395, Guy's, is a specimen of Dr. Hale White's, and shows inflammation of the bile-passages and cholecystitis without any obstruction in the ducts. Death occurred in the seventh week (Fig. 13).

No. 1,594A, Middlesex, shows inflammation and ulceration of the bile-passages in typhoid fever.

I do not think that influenza has been previously noticed as a cause, and it is only within the past few weeks that I have recognised the condition in a lady of sixty-two, the symptoms being quite characteristic, and coming on within a few weeks of influenza, which was apparently the cause.

The causes mentioned may be truly termed predisposing, since the true exciting cause is the presence of pyogenic organisms.

The *B. coli commune* produces an exudative inflammation of the ducts, and may actually cause abscesses within the walls of the biliary passages.

Hepatitis and liver abscess frequently follow on cholangitis, and this is usually followed by general and fatal infection of the system.

Endocarditis is at times set up, and as it has been known to follow cholangitis without hepatitis (Netter and Martha, *Archives de Physiologie*, vol. ix., 1886), and cholangitis without

abscess, this cause should never be lost sight of in any case of ulcerative endocarditis.

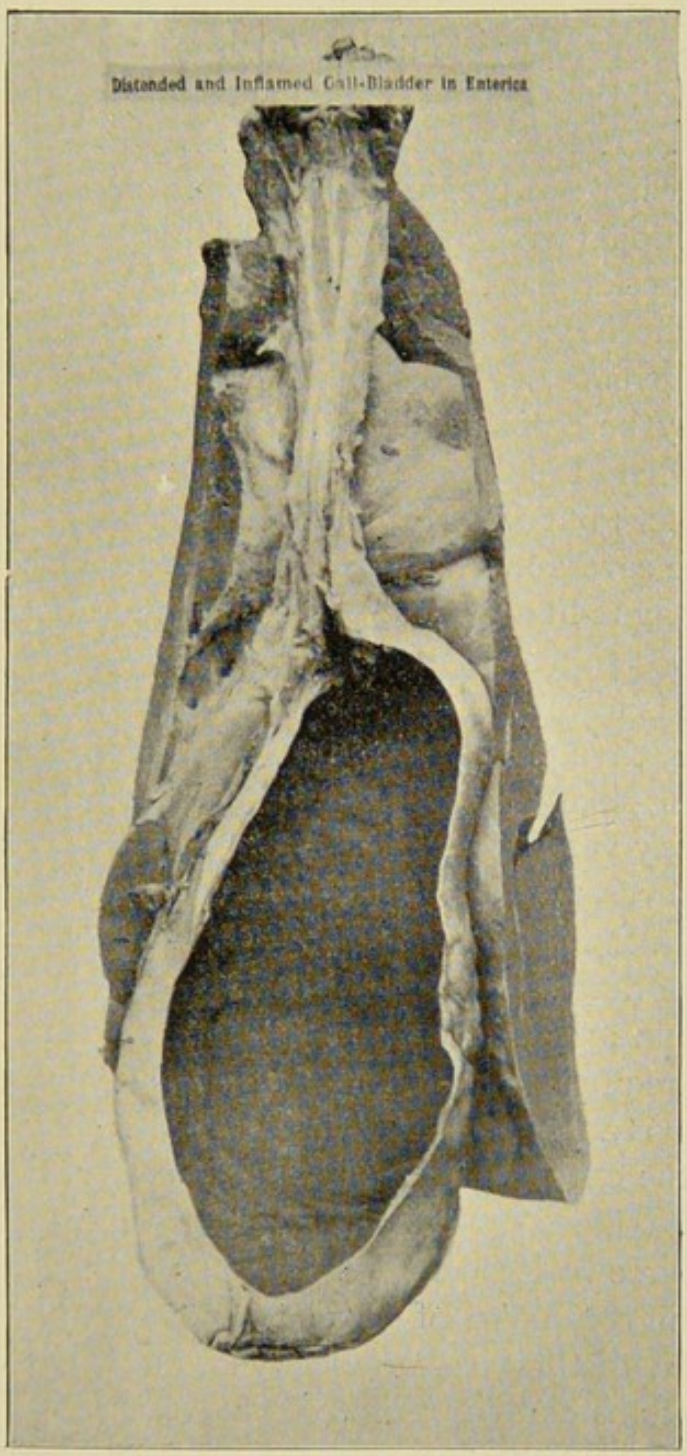

FIG. 13.—INFLAMMATION OF GALL-BLADDER AND BILE-DUCTS IN TYPHOID. Death in seventh week. (No. 1,395, Guy's Museum.)

The bacillus in these cases in the vegetations on the inflamed endocardium has been found to be identical with the one found in the bile.

Jaccoud and Aubert (Clin. Méd. de Lariboisière) also found endocarditis present in cases of cholangitis.

Symptoms.—In suppurative cholangitis there is progressive enlargement of the whole liver, which may descend as low as the umbilicus, the swelling being uniform, smooth, and tender to pressure. If the cause be in the common duct, and the gall-bladder has not previously become contracted, there will be the additional enlargement caused by its distension; but when contraction has taken place, and also when the obstruction is in the hepatic duct, there will be an absence of the signs of empyema of the gall-bladder.

Pain may be entirely absent, as in one case on which I operated, where the disease was dependent on cancer of the common duct; but where it is dependent on gall-stones, the pain may be severe and paroxysmal, each attack being accompanied by ague-like seizures and an intensification of the jaundice.

Jaundice is always present, and is usually both persistent and intense, though where the obstruction is a floating gall-stone acting like a ball-valve in the common duct, the jaundice may vary from time to time, and may almost disappear. Fever, with occasional rigors and profuse perspiration, form a feature of the disease, and with this there is rapid loss of flesh and strength.

Pneumonia and pleurisy, ending in empyema, are serious and not infrequent complications of suppurative cholangitis. The disease is an extremely serious one, and may prove fatal, though, if the cause can be removed at an early stage, recovery may occur.

If the course be less acute, the inflammation may concentrate itself in some part of the liver, leading to abscess, which may form a distinct tender swelling, and give rise to the usual symptoms and signs of hepatic abscess.

Treatment.—Unless free evacuation and drainage of the infected contents of the bile-passages can be accomplished, either naturally or artificially, treatment is practically useless. If practicable, cholecystotomy should, therefore, be performed, and free drainage established and continued until the bile is sterile, or nearly so.

Although good results cannot be expected in all cases, an amelioration of the symptoms may be looked for in a fair proportion, and complete relief in others.

If a localized abscess be discovered in the liver, it should be opened and drained, and though it is scarcely to be expected that operation can be always successful in these serious cases, the chance of permanent benefit is worth snatching at, even in the most desperate conditions.

Of general means, warm applications to the hepatic regions, an initial mercurial purge followed by milder laxatives, intestinal antisepsis by administering bismuth and salol, the relief of pain by sedatives if called for, and the treatment of symptoms as they arise, will afford some amelioration, though they will probably only give temporary relief.

Although surgeons have been performing cholecystotomy for infective cholecystitis and for gall-stones producing infective cholangitis for some years, Cases 3, 6, and 12 described in my list, operated on in 1888, being early examples of this operation, I think it is only right to give the chief credit of specially operating for cholangitis to M. Terrier.

He writes in the *Revue de Chirurgie* for 1895, p. 966: 'Thanks to the opening in the gall-bladder, a certain number of important therapeutic results follow:

'*First.* The septic contents of the gall-bladder are evacuated.

'*Second.* Calculi, which are most frequently present there, are removed.

'*Third.* The other biliary passages more or less obstructed, either by calculi or by swelling of their walls, are rendered as free as possible.

'*Fourth.* The septic bile is allowed to escape, and mechanically washes out the lower passages, carrying away through the drainage-tube many of the infectious elements.

'*Fifth.* The relief of pressure prevents absorption of the septic matter.

'*Sixth.* The relief to the kidneys, by allowing the bile to escape freely, is also of importance, as they are thus enabled to perform their function more freely in relieving the system of septic and other materials.'

In the paper referred to, M. Terrier relates several cases with the utmost detail, especially interesting on account of the bacteriological examination of the discharge from the fistula at different dates, conclusively showing the gradual diminution in the virulency of the discharge after the drainage has been proceeding for some days, and pointing to the need of rather more prolonged drainage than some of us have been wont to employ, *i.e.*, until a bacteriological examination of the discharge shows it to be sterile, or nearly so.

Ulceration of the Gall-bladder and Bile-duct.

Ulcers of the gall-bladder or bile-ducts vary greatly in number, size, and depth, as also in clinical importance.

They may be quite superficial, being mere abrasions of the epithelial lining of the mucous membrane, then being as a rule numerous and widespread, or they may be single and deep, extending into or through the muscular and serous coats.

Between these extremes every variety may be found, as the specimens on the table will show.

Although cholelithiasis is the most frequent, typhoid fever and cancer are quite common causes.

Cholera and tubercle are said to produce ulceration of the bile-passages, but I have been unable to find any specimens in illustration.

The slighter cases of erosion are seldom seen, though doubtless they frequently exist in cases operated on for gall-stones, and in others where the concretions are passed naturally; but the severer forms of ulceration are more frequently met with as the immediate cause of death.

Ulceration is chiefly of importance on account of the serious sequelæ — stricture, perforation, fistula, peritonitis local or general, hæmorrhage, septicæmia and pyæmia.

The inflammation accompanying ulceration usually extends to the peritoneal coat at the site of the ulcer, and leads to a plastic peritonitis, which causes the adjoining organs to adhere to the inflamed surface, thus in the greater number of cases keeping the peritonitis local.

Some years ago I pointed out that in nearly every case of gall-stones there are adhesions of the gall-bladder or ducts to neighbouring organs, showing that peritonitis is a frequent or nearly constant accompaniment of cholelithiasis. It is doubtless a salutary phenomenon, as otherwise general peritonitis would be much more common, especially in the many cases where the adhesions permit of fistulæ quietly forming between the contiguous viscera, and where localized abscesses form without general peritonitis.

The adhesions may, either by the anchoring of normally mobile organs or by subsequent contraction, themselves become sources of inconvenience or danger, as in the case of a lady of thirty-four (Case 97 in my list), who, besides suffering from severe spasmodic pain due to chronic catarrhal cholecystitis, had dilatation of the stomach owing to kinking of the pylorus, caused by adhesions passing between it and the gall-bladder. (See Fig. 25, p. 73.) After separation of the adhesions and drainage of the gall-bladder, complete recovery ensued.

Mr. Page, of Newcastle, recently (*British Medical Journal*, January 23, 1897) described a similar case in which an acute kink of the pylorus led to dilatation of the stomach, with vomiting and death. The gall-bladder, containing gall-stones, was adherent to the pylorus, and communicated with it through an ulcerated opening.

In other cases (Nos. 54, 63, 88, and 130), the fibrous transformation of the lymph led to contraction and stricture of the pylorus, in all the cases relieved by separating the adhesions; but in another case (No. 131) the strictured pylorus was so narrow that I had to perform pyloroplasty, which effected a complete cure.

In another instance (No. 160), the adhesions between the gall-bladder and colon led to partial obstruction of the bowels, with frequent recurrences of colic, all relieved by separating the fibrous bands.

On looking through the list of cases, it will be found that in eleven instances adhesions were found to account for the symptoms, and that their separation usually afforded relief or cured the patients.

The peritonitis may, however, become general, either from perforation, as in cases to be related under that heading, or by extension to the peritoneum, through the non-perforated walls, as in cases related under the description of phlegmonous or gangrenous cholecystitis.

Under such circumstances prompt surgical treatment will be required, or death will speedily follow.

Hæmorrhage.—As the ulcer extends, the vessels usually become thrombosed, but occasionally severe hæmorrhage results, leading either to hæmatemesis or melæna.

The notes of the following fatal case were furnished me by my friend, Dr. Peter McGregor, of Huddersfield.

A temperate man of forty-eight had suffered from gall-stone attacks since the age of twenty-six, but for a year had had no seizure, and had gained two stones in weight.

Without pain or other localizing sign, he began to vomit blood, and continued to do so two or three times a day until his death, which resulted from exhaustion in the third week.

An autopsy revealed contraction of the liver, with numerous gall-stones in the gall-bladder. One, the size of a large filbert, had ulcerated through the walls of the gall-bladder, and was projecting into the peritoneal cavity. There was no peritonitis, and death was due to hæmorrhage from the margin of the ulcerated opening.

Specimen No. 1,389, Guy's Museum, shows the gall-bladder and bile-ducts of a woman of fifty-four, who, after being jaundiced for two months, suddenly became collapsed, with a rapidly-increasing swelling of the gall-bladder. This was opened by Mr. Lane on the fifth day, and was found to be filled with blood-clot. She died a few hours after, when the bleeding was found to have proceeded from a laceration in a softened and ulcerated gall-bladder. (Clin. Soc. Reports, 1895, p. 160.)

It is to be borne in mind that hæmorrhage is predisposed to in these cases by the aplastic condition of blood occurring in long-standing jaundice.

As ulceration is always associated with the presence of pyogenic organisms, septic absorption frequently occurs, leading to constitutional disturbances in the shape of septic-æmia and pyæmia, as described under infective cholangitis.

Although cancer may lead to ulceration, it seems probable that long-standing ulceration of the gall-bladder or bile-ducts may predispose to malignant disease, as they are so frequently associated.

Among many other specimens, I have selected No. 2,822 from the Hunterian Museum as an example; but if time permits I propose to consider the subject more fully under the heading of Tumours.

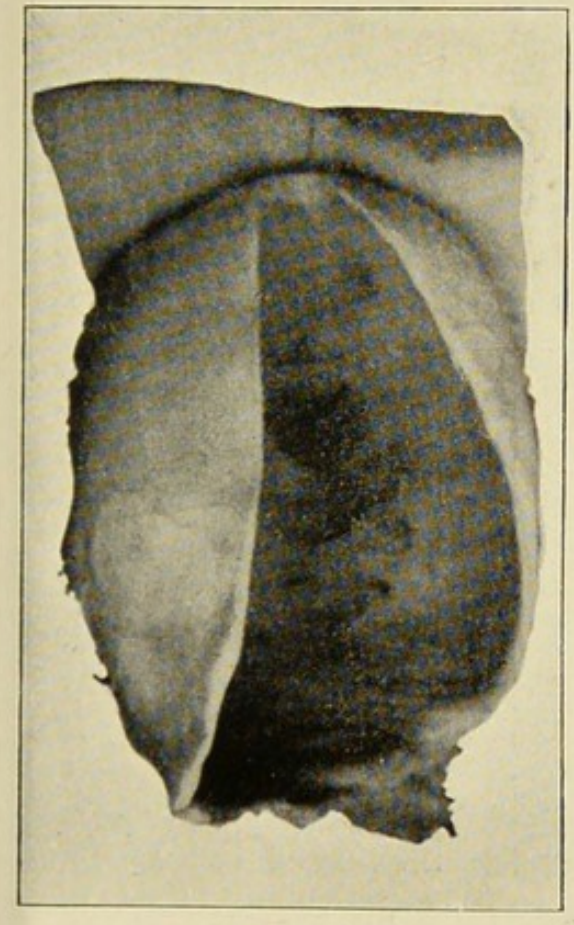

FIG. 14.—TYPHOID ULCERATION OF GALL-BLADDER.

(No. 1,594A, Middlesex Museum.)

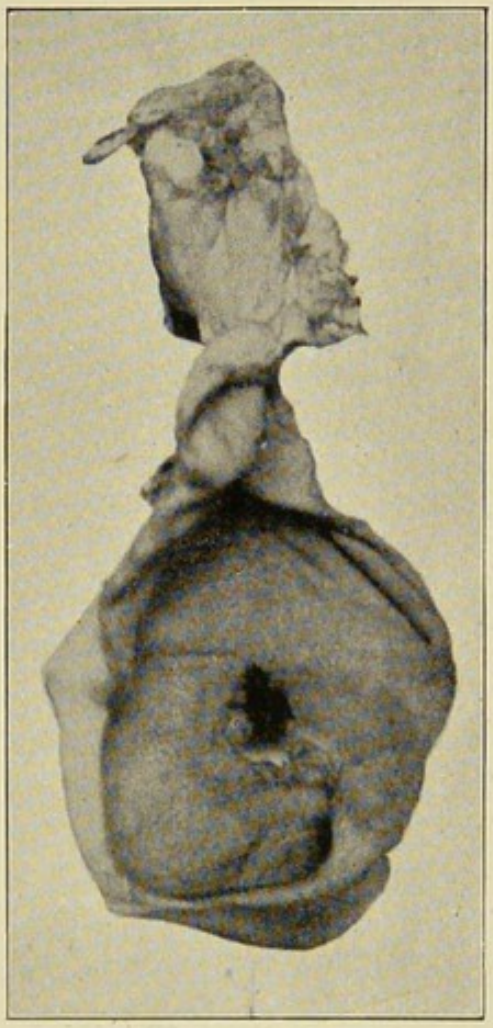

FIG. 15.—PERFORATING EPITHELIOMATOUS ULCER OF GALL-BLADDER.

(No. 1,021, St. Mary's Museum.)

A specimen illustrative of ulceration (No. 2,263, St. Bartholomew's) shows a circular ulcer in the gall-bladder, dependent on gall-stones.

No. 2,263A, St. Bartholomew's, shows many small ulcers, with one larger, that has perforated, and caused death from peritonitis. The walls of the gall-bladder are greatly thickened,

and there is a cholesterine coating, but there are no gall-stones. The patient was a man of sixty-seven.

No. 1,675, King's College Museum, shows numerous ulcers due to gall-stones.

FIG. 16.—CANCER OF GALL-BLADDER ULCERATING INTO COLON.

(No. 2,809A, Royal College of Surgeons Museum.)

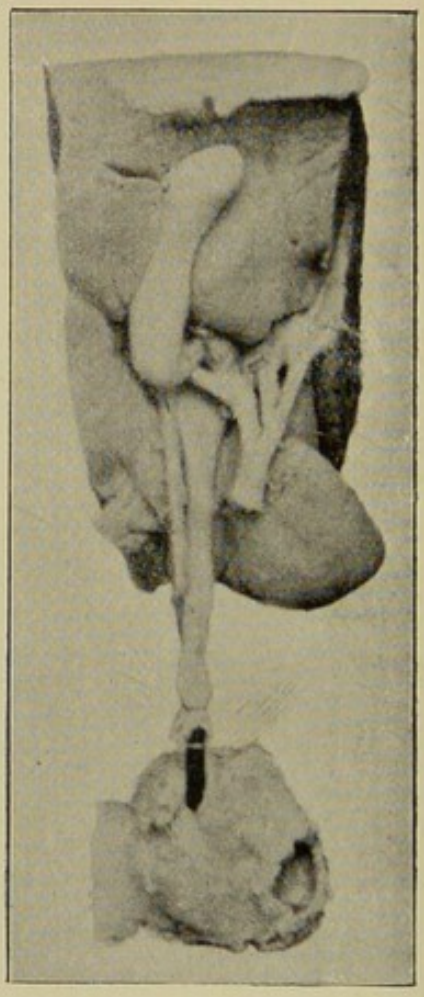

FIG. 17.—STRICTURE OF COMMON BILE-DUCT.

(No. 2,804, Royal College of Surgeons Museum.)

Case 8 of Mr. Warner's Jacksonian Essay, now in the College Museum, shows numerous small ulcers with biliary gravel, but no gall-stone. One small ulcer, the size of a pea, had perforated, and pus was found outside the gall-bladder. The patient had been ill for two weeks.

No. 1,594A, Middlesex Museum, affords a beautiful example of deep ulcers due to typhoid fever (Fig. 14).

No. 1,021, St. Mary's, shows an epithelioma of the gall-bladder, with a perforating ulcer, occurring in an old lady, and leading to death from peritonitis (Fig. 15); and No. 2,809A, from the Hunterian Museum, shows the ulceration of a malignant stricture causing a fistula between the gall-bladder and colon (Fig. 16).

Stricture of the Gall-bladder and Bile-ducts.

Stricture of the bile-ducts is one of the rarer sequelæ of ulceration, by which it is probably always preceded, except in those cases dependent on malignant disease, which I do not propose to consider under this heading.

Though there is no reason why stricture should not be a sequence of typhoid ulceration, such has yet to be proved, and the only cases with which I am acquainted, or concerning which I can glean information, have followed on cholelithiasis, or new growth.

Stricture may only render itself evident after the original cause has passed away, as in three cases of stricture of the cystic duct and one of the common duct where I myself removed the cause in the shape of gall-stones, and subsequently had to treat the strictures which developed, and in another case of stricture of the common duct, where the history of gall-stones was indubitable, though none were found when the abdomen was explored.

Much to my astonishment, I have failed to find but a single specimen illustrating simple stricture of the bile-ducts, and that is in the Hunterian Museum (No. 2,804A), and shows a long stricture of the common duct, though there are many showing stricture the result of new growth, and some representing obliteration of the whole duct (Fig. 17).

Symptoms.—If in the cystic duct, stricture leads to a gradual enlargement of the gall-bladder, which may be quite painless, as in Case 1, almost painless, as in Case 2, or which may give rise to considerable distress, as in Case 10.

If in the common duct, jaundice supervenes, at first being only slight, but ultimately becoming severe, and being asso-

ciated with all the usual distressing and dangerous symptoms of chronic icterus, as shown in Cases 3 and 143. The liver enlarges, and may descend to the level of the umbilicus ; the gall-bladder may also enlarge, though, if gall-stones have been the cause, the gall-bladder may have become contracted and so be incapable of distension.

Stricture of the hepatic duct is probably extremely rare, for I can only find an account of one case, and that by Dr. Wyeth, who related the history, and showed the specimen from a case of recurrent gall-stone obstruction, in which the gall-bladder was found collapsed and empty at operation, and the patient died unrelieved.

A post-mortem examination revealed a small concretion in the peritoneal cavity, and a stricture of the hepatic duct where the gall-stone had ulcerated its way through.

A form of stricture, not common, may be found in the gall-bladder, converting that ordinarily pear-shaped cavity into the form of an hour-glass. I have met with this condition twice in operating, but, fortunately for the patients, am unable to show you their gall-bladders, as both are now well.

In one case I found the upper cavity separated from the lower by an apparently impermeable stricture, though both cavities contained gall-stones. I amputated the upper sac, and drained the lower, after removing the concretions.

A specimen in the Middlesex Museum shows the condition very well.

Needless to say, stricture of the bile-passages will scarcely call for diagnosis apart from its cause, though different treatment will be demanded when the disease is recognised at the time of operation. In stricture of the cystic duct, the gall-bladder should be removed, as in Cases 2, 22, and 65, as either a recurrence of the symptoms will occur when the wound closes, or there will be a permanent mucous fistula, as in Case 1.

As an alternative, the gall-bladder may be short-circuited into the intestine, as in the case reported by Mr. Paul in the *Lancet* for March 24, 1895.

In stricture of the common duct, cholecystenterostomy

must be performed, as in Case 13, otherwise a permanent biliary fistula will certainly follow; at times, however, this may be impracticable, and in such cases drainage alone may be feasible.

Perforation of the Gall-bladder and Bile-duct.

Perforation of the gall-bladder or bile-ducts must always be serious on account of an escape of the visceral contents into the peritoneal cavity, the imminence of the danger, however, depending on two factors: first, the nature of the extravasated fluid: and secondly, the time allowed to elapse before surgical relief is afforded.

The presence of healthy bile in the peritoneum, as might occur from an injury such as a stab, a bullet wound, or a blow, in a healthy individual, may be tolerated for some time without serious damage, as in a case recorded by Thiersch, who successfully removed over 40 pints of bile from the abdominal cavity after the gall-bladder had been ruptured by a blow.

The experiments of Schuppel and Bosbrom apparently prove that the peritoneum can absorb extravasated bile without serious trouble, and there have been several cases reported, in which extravasated bile has been successfully evacuated, either by tapping or by incision and drainage.

Such a fortunate result cannot, however, always be looked for, as is shown by the specimens in some of the museums.

No. 2,267, St. Bartholomew's, shows a laceration $\frac{3}{4}$ inch long, in a gall-bladder previously dilated, as the result of a gall-stone lodging at the entrance of the cystic duct (Fig. 18).

The specimen is from a man of fifty, who was kicked when stooping.

No. 2,268 shows a rupture of the fundus of the gall-bladder, caused by a fall on a piece of timber. Bile escaped into the peritoneum, and death followed from peritonitis after five weeks (Fig. 19).

No. 2,268A shows a perforating wound of the gall-bladder from a boy of fifteen, who fell from a load of straw on to a pitchfork. Death occurred after five days, from extravasation of bile and peritonitis (Fig. 20).

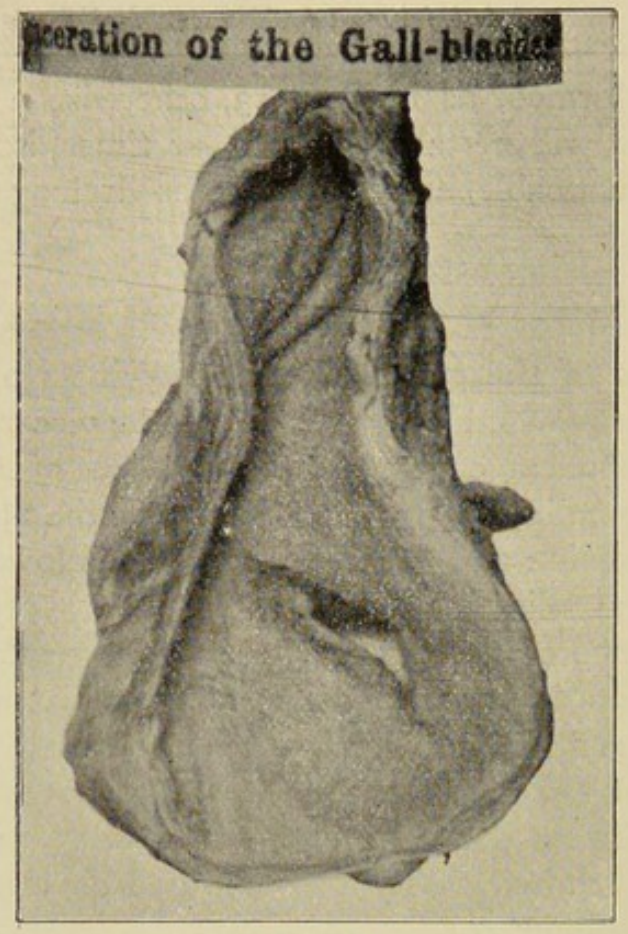

FIG. 18.
(No. 2,267, St. Bartholomew's Museum.)

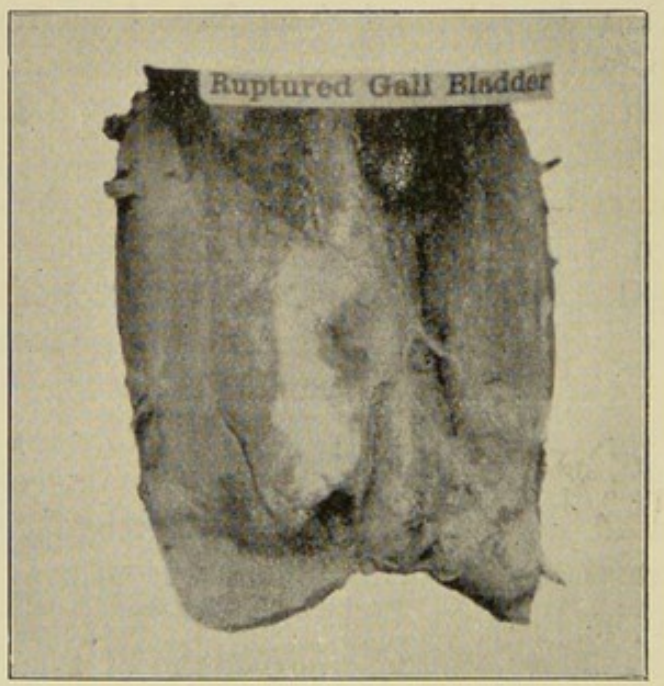

FIG. 19.—RUPTURE OF GALL-BLADDER CAUSED BY A FALL, THE ABDOMEN STRIKING A PIECE OF TIMBER.

Bile was extravasated, but the patient survived five weeks before death occurred from peritonitis. (No. 2,268, St. Bartholomew's Museum.)

No. 1,388, Guy's, is a case of lacerated gall-bladder from a man of twenty-nine, who was kicked in the abdomen, and died on the seventeenth day from peritonitis. The laceration in the gall-bladder measures $\frac{3}{4}$ inch (Fig. 21).

In all the cases where the history is appended, the fact of

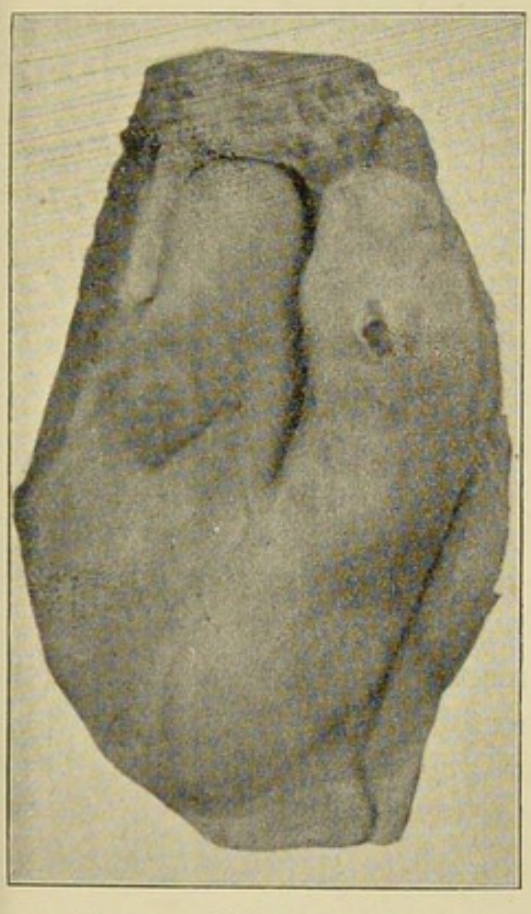

FIG. 20.—WOUND OF GALL-BLADDER.

Taken from a boy of fifteen, who fell from a load of straw on to a pitch-fork. Death from peritonitis on sixth day. (No. 2,268A, St. Bartholomew's Museum.)

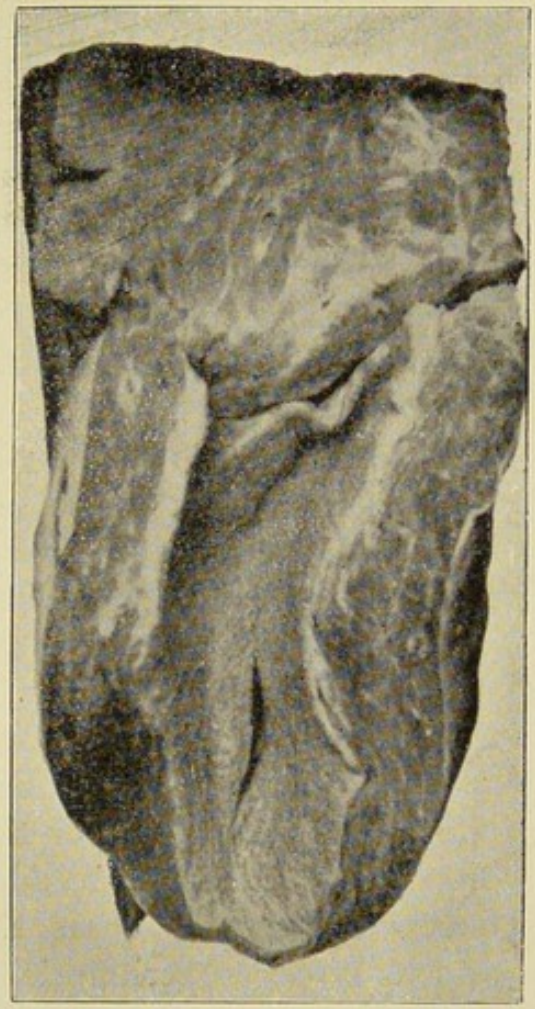

FIG. 21.—LACERATION OF GALL-BLADDER, CAUSED BY A KICK IN THE ABDOMEN.

The specimen was taken from a man of twenty-nine, who survived the accident seventeen days. (No. 1,388, Guy's Museum.)

the long survival after so serious an accident is at once borne home, and the lesson is manifest, that operation would in each case have given good hopes of success.

Rupture of Bile-duct due to Injury.—Mr. Battle has reported the case of a boy, aged six months, who had been run over by a cab. At first there were no definite signs of visceral

injury; by the seventh day, however, he was deeply jaundiced, with symptoms of acute peritonitis.

Abdominal section was done on the eighth day, and a large quantity of almost pure bile evacuated, but no injury to the bile apparatus could be detected. He died on the ninth day, and post-mortem, the liver and gall-bladder were found intact, but the common bile-duct was found completely torn through.

This is apparently the first recorded case of an operation for such an accident, but I found in Guy's Museum, No. 1,417, a specimen from a case of Mr. Bryant's, where there is a laceration of the hepatic duct near its origin, in which death occurred from peritonitis after a week's illness, 2 pints of bile-stained fluid mixed with blood-clots being found in the peritoneal cavity.

Gunshot wounds of the gall-bladder are rare. Courvoisier has mentioned six cases, of which two died within a few hours, a third in six weeks from pyæmia, and a fourth from septicæmia. The case related by Hans Kehr is, therefore, of considerable interest, as immediate laparotomy, with suture of a bullet wound in the gall-bladder of a man aged thirty, was followed by recovery.

It is of far more serious moment when the extravasated bile is diseased, as it for the most part is, where there is distension of the gall-bladder, or any disease of the bile-ducts; for in such cases the bile is infective, and rapidly sets up a diffuse peritonitis, which, unless speedily operated on, ends fatally.

Even in such cases, if the diagnosis be made at once and early operation done, the prognosis is good, as in the case of a commercial traveller aged forty-five, who had suffered from gall-stone seizures for twenty-nine years, and whom I saw with my friend and colleague, Dr. Braithwaite.

After symptoms of inflammation in the hepatic region extending over several weeks, he suddenly became worse and showed signs of general peritonitis. I opened the abdomen in the right linea semilunaris, several pints of bile and pus being evacuated. The abdomen was washed out, and drainage-tubes passed between the liver and diaphragm, into the right

kidney pouch, and downwards towards the pelvis, with the result that the patient recovered, and is now in perfect health. (Case 81 on my list.)

Mr. Lane has also published a case of rupture of the gall-bladder, where the patient recovered after having a considerable amount of bile free in the peritoneal cavity for five weeks. This case confirms the views previously held, that, where surgeons are dealing with the bile-passages, the entrance of a little bile into the peritoneum need not cause anxiety, if only the bile be healthy, or if not, if it be evacuated early.

One of the most remarkable cases of perforation of the gall-bladder, following typhoid ulceration successfully treated by abdominal section, is reported by Dr. Monier Williams and Mr. Marmaduke Shield in the *Lancet* for March 2, 1895. The case occurred in a married woman aged thirty-one, who was operated on on the fifty-first day of the disease, when the gall-bladder was found to be rigid, thickened, and of a dark plum colour, with a sharply circular, sloughy ulcer, the size of a threepenny piece, near its neck, the gall-bladder containing about 1½ ounces of thick offensive pus. The abdomen was washed out, the distended intestines were emptied by puncture, and gauze packing with drainage adopted, the result being a complete cure.

In cases of rupture of the gall-bladder from sudden pressure, induced by straining at stool, vomiting, sneezing, efforts in parturition, or even by blows over the hepatic region, there is in all probability in the greater number of such cases a predisposition to rupture, in the shape of thinning by ulceration or by long-continued distension, otherwise the accident would be much more common.

This was probably so in the case reported by Dr. Willard (Transactions, American Medical Association, 1893), and in the one described by Mr. Lane in the *Lancet* for March, 1894, and certainly was in the following case, which occurred in a middle-aged woman and was reported by Dr. G. P. Biggs in the New York Hospital Reports.

The onset of the fatal seizure was sudden, and accompanied by colicky pains in the upper abdomen, rapidly

followed by signs of acute general peritonitis. She died on the fourth day of her illness.

At the autopsy, the abdomen was found to be greatly distended, and full of a dark brown, bile-stained fluid, having a slightly fæcal odour, the peritoneum being covered with fibrinous exudation.

Just inside the orifice of the common bile-duct a large gall-stone was impacted, and at the junction of the gall-bladder and cystic duct, a minute oblique perforation was found in the floor of an old ulcer. The cystic, hepatic, and common ducts were all much dilated, the bladder admitting a cylinder 1 centimetre in diameter.

The muscular wall of the gall-bladder was hypertrophied, and the mucous membrane thickened from chronic inflammation, while near the outlet there was a superficial ulceration.

Predisposition was also present in a case I saw with Dr. Solly, of Harrogate, of an aged physician, who had himself been aware of a tumour in the gall-bladder for many years, and which occasionally gave him severe pain, though usually it produced no inconvenience. In his final seizure he developed acute peritonitis and rapidly succumbed.

Dr. Solly discovered a perforation in an old ulcer in the gall-bladder, which must have been present for a long time. Numerous gall-stones were also found in the gall-bladder and cystic duct.

Such cases show conclusively, to my mind, that it is folly to permit patients with distended gall-bladders, even though symptoms be only occasionally present, to go unoperated on. I know of several such cases, where patients are living in a fools' paradise owing to such unsound advice.

A careful operation in these cases is almost devoid of risk, but rupture is hazardous in the extreme.

Massage in cases of distended gall-bladder I look on as the height of folly, though it has been advised by those who should know better.

Attempts to force impacted calculi onward by pressure are well calculated to rupture the thinned wall of the gall-bladder or bile-ducts, or to cause perforation through the base of an

ulcer, leading to extravasation of germ-containing fluid into the general peritoneal cavity, and probably to fatal peritonitis.

In the greater number of cases perforation occurs slowly, as in the case of an aged woman I saw with Dr. Chadwick a few days before the patient died, where jaundice had been present for five years, and at the autopsy a large gall-stone was found lying in a cavity outside of, but pressing on, the common duct. The adventitious cavity was shut off from the general cavity of the peritoneum by adhesions of the neighbouring viscera.

Specimen No. 1,596, Middlesex, shows a portion of liver with the gall-bladder. In a sac beneath it are a number of calculi which have escaped through a perforation in the gall-bladder, and are now lying in a cavity formed by peritoneal adhesions.

Specimen No. 2,830, Royal College of Surgeons Museum, shows a cyst between the hepatic and cystic ducts containing a calculus adherent to both, but communicating with neither duct, though it has evidently perforated one of the channels (Fig. 22).

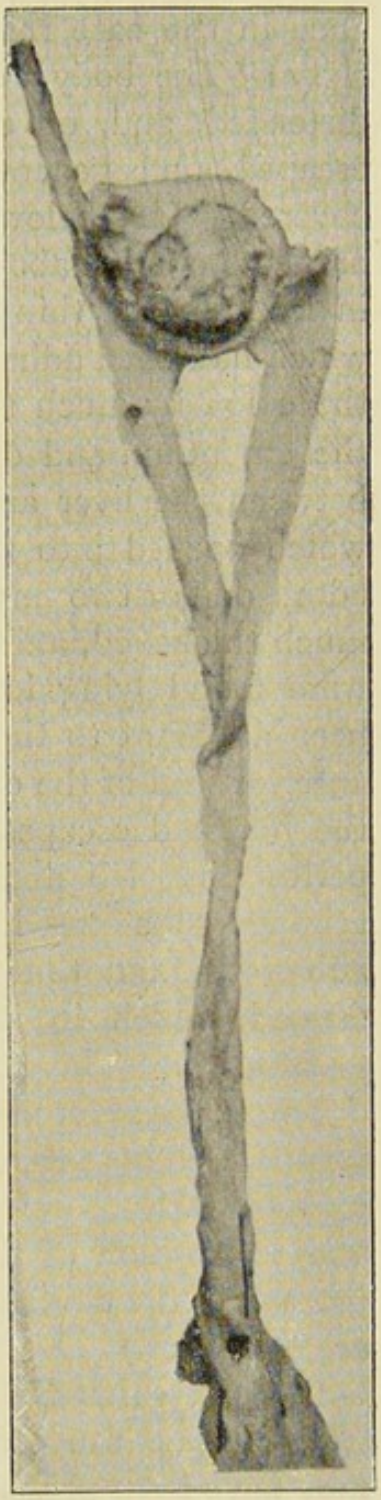

FIG. 22.—ADVENTITIOUS SAC CONTAINING GALL-STONE, SITUATED BETWEEN HEPATIC AND CYSTIC DUCTS.

(No. 2,830, Royal College of Surgeons Museum.)

In some cases, as in one reported in the *Lancet* for 1893 by Mr. C. A. Morton, the primary perforation may lead to the formation of a second cavity bounded by plastic lymph, which may again rupture, and lead to a fatal peritonitis. The following is a brief account of the post-mortem appear-

ance in the case referred to, the patient being a woman of sixty: 'The body was well nourished. The abdomen was distended, and, on opening it, much orange-coloured fluid escaped, and general recent adhesive peritonitis was discovered. Just below the liver was a cavity the size of an orange, bounded above by the under surface of the liver, and in front by the thin margin of the liver and the omentum, which had been adherent to it. Below it was separated from the colon by much thickened tissue. On its inner side lay the omentum, and on its outer side, covered by adhesions, between the liver and adjacent parts, lay the gall-bladder, which opened into the cavity by an aperture which would admit one or two fingers. The wall of the gall-bladder was much thickened, and several stones half an inch in diameter were found lying in it. Where the omentum had before been adherent to the anterior edge of the liver, forming the anterior wall of the cavity, it had become detached, and thus the bile had escaped into the peritoneum, and set up fatal peritonitis. No doubt at one time the gall-bladder containing gall-stones had perforated under these surrounding adhesions, and thus the secondary gall-bladder had been formed, which in its turn had finally ruptured into the peritoneum. The gall-bladder was not dilated.'

The perforation may occur into adjoining parenchymatous organs, and on several occasions I have removed numbers of gall-stones from cavities in the liver produced by ulceration and perforation of the gall-bladder or bile-ducts, and direct passage of the contents into the liver tissue. (Cases 6 and 27 are examples.)

In such cases there are the usual signs of liver abscess following on the ordinary symptoms of gall-stones, which may have been present for years.

If the ulceration and perforation occur from the common duct into the substance of the pancreas, acute pancreatitis may follow; or, without perforation, an infective inflammation may pass from the common bile-duct to the pancreas, as in a case recently reported by Dr. Kennan in the *British Medical Journal* for November 14, 1896, in which a woman of thirty-eight died of collapse after two days' illness, charac-

terized by epigastric pain, vomiting, and abdominal distension. A post-mortem examination revealed acute pancreatitis, with a large number of stones in the gall-bladder and common bile-duct, one of the concretions protruding into the duodenum.

If the ulceration advance towards the adjoining hollow viscera, stomach, duodenum, or colon, adhesions as a rule form, and the perforation is effected quietly. In one case of this kind, which I saw with Dr. Stewart, after a history of cholelithiasis, followed by severe stomach symptoms, the gall-stones were vomited, and complete recovery followed.

In several cases I have seen large gall-stones to ulcerate their way quietly, and to perforate the intestine, only producing serious symptoms from mechanical intestinal obstruction. These will be considered in detail under the heading of Fistula and Intestinal Obstruction.

Rarely gall-stones have perforated into the pelvis of the right kidney, producing symptoms of renal calculus.

Not infrequently the perforation may occur after adhesion to the parietal peritoneum, when the events described under simple empyema, of a superficial abscess discharging gall-stones, may follow.

Specimens in the museums show that, although adhesions may have formed, the process of ulceration into a neighbouring cavity is by no means always free from danger of perforation into the general peritoneal sac.

Specimen No. 864, in the Charing Cross Museum, shows a gall-bladder colic fistula, in which there has been a fatal perforation into the peritoneum.

Specimens No. 1,676, King's College Museum, and No. 2,828, Royal College of Surgeons Museum, show gall-bladder duodenal fistulæ, in which death occurred from perforative peritonitis after the gall-stones had passed into the intestine.

There is also another danger, which should by no means be despised, and that is the fear of absorption, with subsequent septicæmia or pyæmia.

The symptoms of perforation of the bile-passages are those of perforative peritonitis from other causes, but there will usually have been premonitory symptoms pointing to the origin of the disease.

A sudden pain beneath the right ribs, often followed by collapse, and usually succeeded by vomiting, general distension of the abdomen, and a rapid pulse, form the prominent features of the disease.

If the extravasation is extensive, there will be signs of free fluid in the peritoneal cavity.

Jaundice, if not present before the accident, usually comes on from absorption of biliary pigment by the peritoneum, and if the bowels can be moved, the motions will usually be clay-coloured.

If the case be not operated on, death will probably ensue within a few days from toxæmia and paralysis of the bowels, though in some of the cases I have quoted, life was prolonged into the second or third week.

Treatment.—In these cases medical treatment is useless, and to give opium for the relief of pain so disguises the symptoms that a fatal sense of security is given for a time, and when the mistake is discovered, it is too late to operate.

As soon as it is clearly made out that perforation has occurred, or even if it be suspected that such is the case, the abdomen should be opened in the right semilunar line.

If pus and bile be found, they should be rapidly wiped away with gauze or wool sponges, and if the extravasation has gone beyond the local area of disease, the abdomen should be flushed with hot boracic lotion.

The patient may be too ill to bear a prolonged operation, and if so, free drainage, as in the case I have related, will probably do all that is necessary.

In draining, it may be borne in mind that the right kidney pouch forms a distinct peritoneal pocket, and that a drainage-tube applied through a stab opening in the right loin affords a free exit for extravasated fluids coming from the neighbourhood of the gall-bladder. If the whole peritoneal cavity has been soiled, a puncture above the pubes large enough for a tube to be passed into Douglas' pouch may be an advantage.

If the patient be in sufficiently good condition to permit a search for the rupture, and it can be found, it may be closed by fine silk or catgut sutures, but as a rule it will be wise to open and drain the gall-bladder at the same time.

Should marked cholecystitis be found, the question of cholecystectomy may be worth considering; but when the patient is in a critical condition, it is a mistake to attempt too much, and, as a rule, cleansing and free drainage will be all that are necessary or advisable at the time, the removal of the cause being left until the patient is better able to bear a prolonged operation.

Fistula of the Gall-Bladder and Bile-Ducts.

Fistulæ in connection with the bile-passages are by no means uncommon, and their variety is considerable. They result from operation, or from disease, and in the latter case they are due to ulceration resulting from gall-stones or cancer.

The fistulous channel may either be direct or indirect, in the former being caused by an advancing ulcer setting up local peritonitis, and causing adhesion of the gall-bladder or bile-ducts to one of the neighbouring hollow viscera, or to the parietal peritoneum. The extension of the ulcer continuing, a communication is established with the contiguous channel or with the surface.

In the latter (indirect) the perforation occurs first into an adjoining parenchymatous organ or into a localized abscess, and then into the nearest hollow viscus, or on to the surface of the body at some part.

A fistula may also arise from a local abscess forming outside the biliary passages around the primary focus of inflammation, and then bursting into the adjoining cavities, which are thus made to communicate.

Although the establishment of a fistula is at times dangerous, and at others excessively annoying or uncomfortable, in many cases it forms one of Nature's methods of cure, and the surgeon in forming a permanent biliary fistula in otherwise incurable jaundice, or in making an anastomosis between the bile-passages and the intestine for the like purpose, is taking a leaf from Nature's book.

Many of the fistulæ are mere pathological curiosities, quite undiagnosable, and capable only of being discovered post-mortem. Many must form and heal, leaving the patient cured, and thus never be discovered; for, contrary to what one

might suppose, fistulæ between the bile-passages and other hollow viscera in the majority of cases heal spontaneously, leaving only visceral adhesions; so that the fistulæ are comparatively rarely found post-mortem.

It will thus be seen that the elaborate figures given by Courvoisier and Naunyn (Courvoisier, *Beitrage zur Pathologie und Chirurgie Gallenwege*) can only give a very imperfect estimate of the frequency of these fistulæ, which must be constantly overlooked or not recorded.

The authors named examined all the published cases, with the following results:

Fistulæ between the biliary passages themselves			8
,, ,, ,, ,, and the stomach ...			12
,, ,, stomach and the liver	4		
,, ,, ,, ,, gall-bladder ...	8		
,, ,, biliary passage and the duodenum ...			108
,, ,, duodenum and the common bile-duct	15		
,, ,, ,, ,, gall-bladder ...	93		
,, ,, jejenum ,, ,, ,,			1
,, ,, ileum ,, ,, ,,			1
,, ,, biliary passages and the colon ...			50
,, ,, colon and the gall-bladder	49		
,, ,, ,, ,, common bile-duct ...	1		
,, ,, biliary passages and the urinary organs			6
,, ,, biliary passages and thoracic organs			10
,, ,, ,, ,, ,, abdominal walls			184
,, ,, ,, ,, ,, retro-peritoneal tissues ...			4
Total			384

Out of a table of 10,866 autopsies made by Roth, Schröder and Schloth, biliary fistulæ occurred forty-three times:

Between the biliary passages themselves				1
,, gall-bladder and liver				1
,, ,, ,, stomach				1
,, ,, ,, duodenum				19
,, ,, ,, colon				16
,, common bile-duct and the duodenum				5
Total				43

It would be of greater value if I could give statistics of the number of times that fistula follows operation, but this, I

find, is seldom mentioned by operators. I must therefore fall back on my own experience.

My operations extend to 170 cases, 115 of which were cholecystotomies, and all are shown in the tables I have handed round.

I find that in twelve cases there were fistulæ following, but as five occurred in my first ten operations, since which time I have altered my method of procedure, it is fairer to say that seven fistulæ occurred in 160 cases.

Several of the fistulæ were inevitable, as the ducts were strictured; in others they were intentional, as in cancerous obstruction producing jaundice. Where the patients lived, *i.e.*, where the obstruction was due to simple and not malignant disease, they were all cured by further operative means, except my first patient, and she might be, but she says the small mucous fistula gives her so little trouble that it is not worth her loss of time to have it remedied.

Biliary Cutaneous Fistula.—Courvoisier's statistics gathered from reported cases would seem to prove that this is the commonest form of fistula. It may be pathological or post-operative.

Pathological surface fistulæ usually open at the umbilicus, the abscess following the course of the remains of the umbilical vein, as in Case 79, but they may form at any part of the abdominal wall, even near the pubes, or on the left side of the abdomen.

Calculi of various sizes, from a single one 3 inches in diameter reported by Gutteridge (*Lancet*, 1878, p. 851, vol. i.), to multiple small faceted ones, the size of shotcorns, may be discharged in this way, leading to recovery and permanent cure, but until all the calculi are discharged the fistula is liable to remain open.

In operating on these cases, it is advisable to purify the fistulæ as far as possible, and to scrape away all granulations before opening the peritoneal cavity to get at and clear the bile-ducts. By adopting these precautions I have had no untoward results in those cases on which I have operated.

Post-operative fistulæ may be mucous or biliary.

Mucous fistulæ are occasionally seen after the operation of

cholecystotomy, where the obstruction in the cystic duct has not been overcome, or where that duct is the seat of stricture. In Case 1 the patient has had so little inconvenience that she does not think it worth while to undergo any further treatment.

In two other cases of mucous fistula (Cases 22 and 65), dependent on stricture of the cystic duct, I removed the gall-bladder, effecting a complete and permanent cure.

In another case, where a muco-purulent fistula had been discharging at the umbilicus for some months, I followed the channel up to the gall-bladder and found the cystic duct occluded by calculi, which I removed, after which the fistula closed without difficulty.

A mucous fistula, as a matter of fact, causes very little inconvenience, as only about 1 ounce of fluid is discharged daily; but if the opening be allowed to close, the accumulation produces pain, and it is therefore necessary for a patient under these circumstances either to wear a small tube and a pad of absorbent wool, or to submit to operation.

The operation of cholecystotomy will not be followed by fistula if the bile-ducts have been cleared, and if the opening in the gall-bladder be sutured to the aponeurosis and not to the skin. Since I modified the operation of cholecystotomy in this way—which was done in my eleventh operation—I have never had a fistula to follow when the bile-ducts have been cleared.

Biliary fistula following on operation is quite a different matter from mucous fistula, as although in some cases it is compatible with good health, the inconvenience caused by 30 ounces of bile flowing from the fistula daily, produces so much discomfort, that in all the cases which have come under my notice the patients have preferred to accept the risks of operation rather than to retain their disability.

The treatment of biliary fistula should, where possible, be effected by removing the cause; but as in certain cases this is impracticable or impossible, other means have to be considered.

If the ducts be clear, and the fistula be small, the application of the actual cautery to the margin of the fistula will frequently result in its closure. That failing, the method I

adopted in Case 116 may be followed, of opening the abdomen, detaching the gall-bladder and suturing the opening.

Or the less severe method may be first tried, of dissecting the fistula, with its peritoneal covering intact, away from the skin margin, afterwards doubling in the mucous edges, suturing them accurately, and over this applying one or two layers of buried sutures before bringing together the skin.

Where, however, the ducts cannot be cleared, and the gall-bladder is large enough to permit of it, the operation of cholecystenterostomy may be performed.

I believe I was the first to carry this operation out in a case of biliary fistula on January 14, 1888, and the patient is at the present time in excellent health, doing duty as a maternity nurse. (Case 13.)

I have since performed it on four occasions for fistula, each time with success, so that in such cases I feel I can recommend it as a safe and efficient method of treatment.

If the fistula be dependent on gall-stones or fragments in the ducts, the ducts may be syringed through daily with olive-oil, or with a ·5 per cent. solution of sapo animalis, as recommended by Dr. Brockbank; or a solution of turpentine in ether may be used, as in Case No. 23 on my list.

This is easily done by employing a small flexible catheter, which is passed through the fistula as far as it will go without force. To the end of this a syringe is affixed, and the medicament steadily syringed directly on to the obstruction, the syringing being repeated night and morning for a time.

Biliary intestinal fistulæ, as might be expected from the contiguity of the gall-bladder to the duodenum and colon, are the most common, and, as a rule, they are due to ulceration produced by gall-stones. Usually the ulceration proceeds quietly, and produces very few symptoms, until the gall-stone sets up obstruction in its passage down the intestinal canal.

But the process is not always accomplished without symptoms, such as pain over the liver, more or less jaundice, and fever of an irregular type, to be subsequently followed by signs of more or less complete obstruction.

Hæmorrhage into the stomach or intestines may occur in these cases.

If the fistula is between the gall-bladder and 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 obstruction than when the fistula is between the gall-bladder and colon, for in the latter case the passage to the anus is 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, ulceration and perforation of the duct are apt to occur, the concretion thus escaping into the duodenum by an enlargement of the ostium of the common bile-duct from ulceration or sloughing.

Roth, who has paid special attention to this condition, found it five times in twenty-five cases of biliary fistula.

These gall-stones are usually smaller than those causing gall-bladder intestinal fistula, are seldom larger than filberts, and do not often cause intestinal trouble.

Nearly all the museums have in them examples of gall-bladder duodenal fistula; I therefore select specimens from the College Museum in illustration.

Specimens Nos. 2,827 and 2,828 are good examples.

No. 2,826 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 (Fig. 23).

No. 1,399, Guy's, a specimen of Dr. Hale White's, shows a gall-bladder duodenal fistula 1 inch from the pylorus, large enough to admit the finger, and 33 inches above the ileo-cæcal valve is a large gall-stone impacted in the ileum.

Nos. 2,261 and 2,262, St. Bartholomew's, show gall-bladder duodenal fistulæ.

No. 1,676, King's College, shows a gall-bladder duodenal fistula. Death occurred from peritonitis, though the gall-stone had passed 'per anum.'

No. 1,595, Middlesex, shows a gall-bladder duodenal fistula, through which gall-stones passed. Death occurred from intestinal obstruction.

Gall-bladder colic fistulæ are less common in the museums;

I suspect because they do not frequently cause death. There are, however, a sufficient number of examples to show that even this method of discharging gall-stones is not altogether safe.

Specimen No. 2,809A, Royal College of Surgeons, is an example of gall-bladder colic fistula caused by carcinoma (Fig. 16, p. 52).

No. 1,589, Middlesex, shows a gall-bladder colic fistula from a woman of sixty. Death occurred from cancer of the uterus,

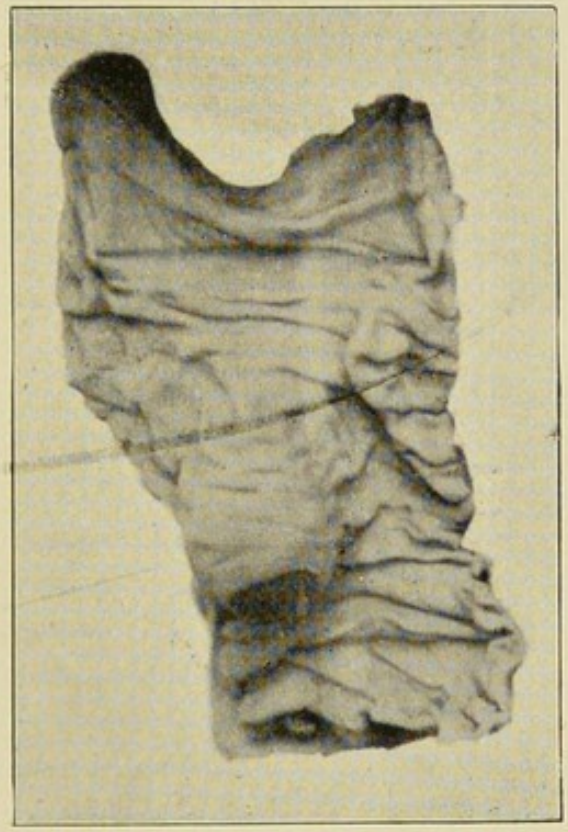

FIG. 23.—GALL-STONE IN ACT OF EXTRUSION INTO DUODENUM, THE EDGES OF THE OPENING BEING ULCERATED.

(No. 2,826, Royal College of Surgeons Museum.)

though five months before she had violent abdominal pain with retching, indicating the time the fistula formed (Fig. 24).

No. 864, Charing Cross, shows a gall-bladder colic fistula, with secondary perforation, and death from peritonitis.

Biliary-gastric fistula is less common than might be thought, for the pylorus is not infrequently adherent to the gall-bladder.

I have only one case to advance from my own experience, and in that instance the vomiting of gall-stones made the

diagnosis probable, though the complete recovery of the patient, a woman of fifty, rendered it impossible to be absolutely certain that the surmise was correct.

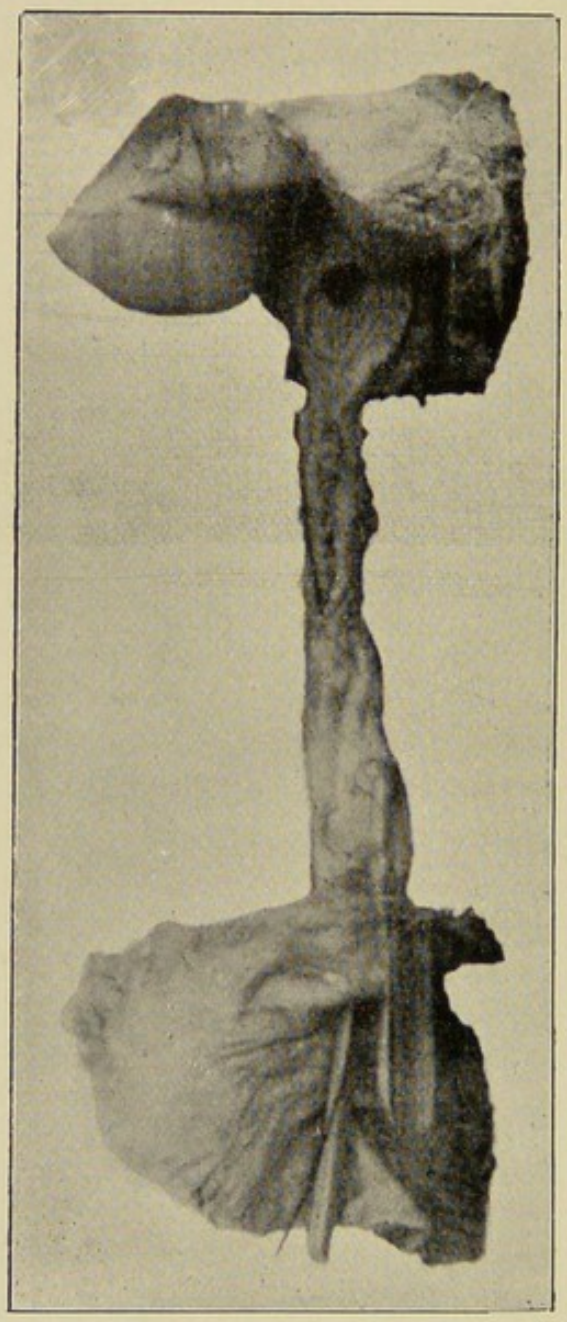

FIG. 24.—A PORTION OF LIVER WITH GALL-BLADDER, AND A PIECE OF THE TRANSVERSE COLON.

The gall-bladder is much elongated and narrowed, its fundus is adherent to the transverse colon, and communicates with it by a circular orifice. (No. 1,589, Middlesex Museum.)

The Middlesex Museum has a specimen of gall-bladder stomach fistula. (No. 1,595.)

Murchison was of opinion that all vomited gall-stones must have entered the stomach through a fistula.

In one case, Jeaffreson (*British Medical Journal*, May 30, 1868) found such a fistula post-mortem, a gall-stone having been vomited some time before. Mr. Page's case, previously referred to, is an example.

No. 1,706[1], King's College, is a specimen from a case

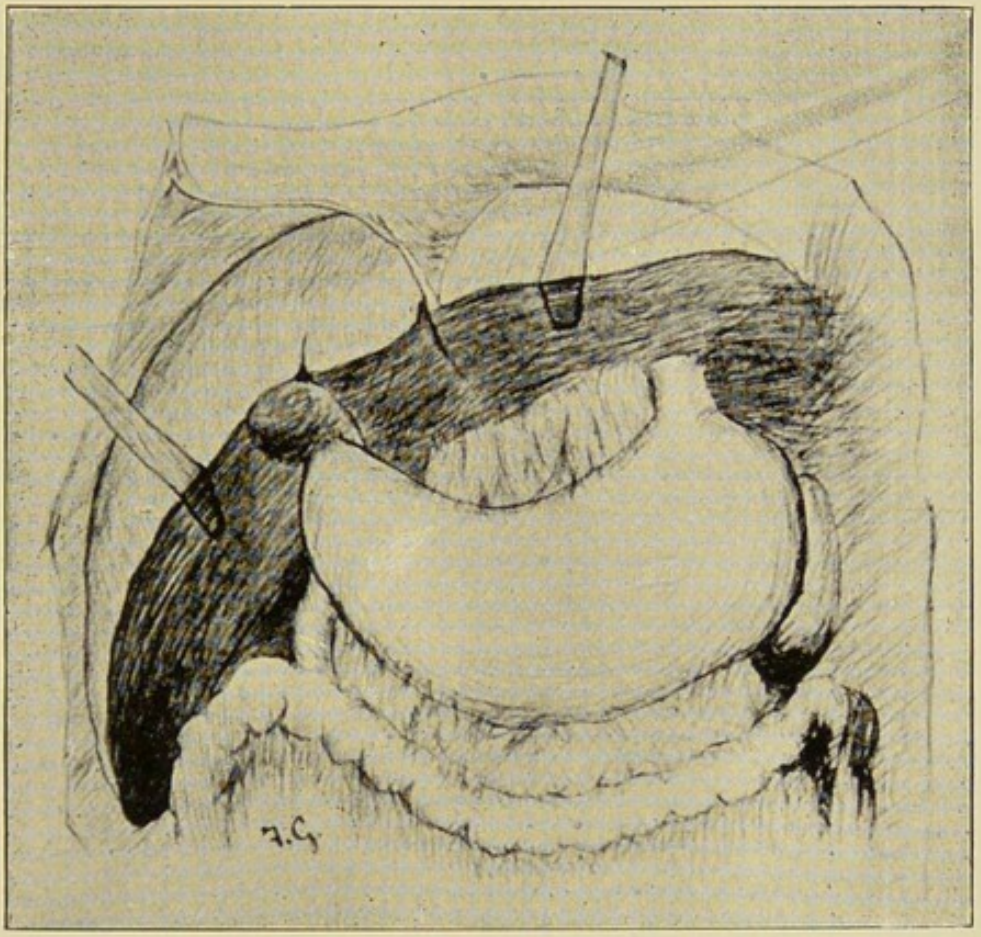

FIG. 25.—ADHESION OF GALL-BLADDER TO STOMACH LEADING TO DILATATION OF STOMACH AND SPASMODIC PAIN.

which died seven to eight weeks after gall-stones were removed from the pleural cavity by Professor Rose, but no communication was found after death between the gall-bladder and pleura.

Of the rarer forms—biliary urinary, biliary vaginal, biliary thoracic, biliary pulmonary, biliary pericardial, biliary mediastinal, biliary pleural, biliary retro-peritoneal, biliary portal, hepato-gastric—I have no experience, and can only refer to cases collected by Courvoisier, Naunyn, Murchison, etc.

CHAPTER III.

INTESTINAL OBSTRUCTION.

INTESTINAL obstruction from gall-stones is such a distinct complication of cholelithiasis, calling for special treatment, that I think it will not be beyond my province to consider it; and as the chief variety of obstruction is necessarily associated with fistula, it seems convenient to consider it here.

So much has been written about obstruction from gall-stones, that at first sight it might seem to be a somewhat common ailment. Such, however, is not the case, as may be gathered from the fact that on inquiring of the registrars and pathologists, I found only four such cases had been treated during a period of twelve months in some of the largest hospitals in the kingdom, representing eighty thousand in-patients, and several hundred thousand out-patients attended to during the same time.

Again, only one case, according to Dr. Brockbank, had occurred in the Manchester Royal Infirmary, between 1883 and 1896, during which time fifty thousand in-patients had been treated.

There are clearly four classes of obstruction of the intestines depending primarily on gall-stones, though by intestinal obstructions from gall-stones is usually understood the impaction of a large concretion in some part of the intestinal tract, producing a mechanical block.

The varieties are:

First. That due to local peritonitis in the gall-bladder region, leading to paralysis of the bowel.

The symptoms may be so severe as to resemble strangulation by a band, or acute intussusception. The diagnosis

will not, as a rule, be difficult, as the history of the occurrence of previous attacks of spasms, though not of necessity followed by jaundice; the similarity to these of the commencement of the attack in question; the severe and persistent pain, at first localized to the right side of the abdomen; the absence of distension at the commencement, and then the occurrence of distension on the right side only, becoming general later; the lateness of the onset of fæcal vomiting, and only after continued retching; the existence of collapse at an early stage owing to the severity of the pain, which is usually relieved by a morphia injection; the usual absence of visible peristalsis; and, lastly, the onset of jaundice, if the concretions have reached the common duct, afford so much guidance that error will not often occur, especially if the patient be a woman of middle or old age. But that difficulties may arise is shown by the cases about to be mentioned.

Although I have seen many cases of this class, I will only give notes of two of my own and of one reported in the *Lancet* for August 22, 1896, by Mr. A. C. Roper.

Case 1.—Early last year I received a telegram from Dr. H., asking me if I could receive a patient, Mrs. ——, æt. 60, at a surgical home, for immediate operation for acute intestinal obstruction, fæcal vomiting having been present for three days, and medical treatment having failed to relieve.

On arrival the patient was too exhausted and ill to bear operation, and morphia was administered to relieve her distress and combat the collapse due to the intense pain.

Rectal feeding was at once begun in order to maintain the strength, and ext. bellad. was given every four hours in $\frac{1}{4}$-grain doses. The patient forthwith began to improve, and a clear history of cholelithiasis was obtained, the present attack, the patient said, differing in no respect, except in severity, from those she had frequently had on former occasions. There was marked tenderness over the gall-bladder, particularly at a point one-third of the distance in a straight line between the ninth costal cartilage and the umbilicus, together with some swelling in the right hypochondrium, slight tympanitic distension of the abdomen

generally, some jaundice, and the history of a sudden onset followed by two or three slight ague-like attacks. Flatus passed the same night, and continued to pass at intervals.

After two days the bowels were freely relieved after a large enema had been administered. No large gall-stone was discovered, but several small concretions which had evidently passed through the common duct. She returned home in the third week, and has remained well.

Case 2.—Mrs. R., æt. 56, was admitted on July 18, 1893, into the Leeds Infirmary with symptoms of acute intestinal obstruction of three days', and fæcal vomiting of twenty-four hours' duration. The patient was jaundiced and was in very great pain, the pain having begun over the gall-bladder, radiating thence over the abdomen, and through to the right scapular region. She gave the history of having had numerous gall-stone attacks during the previous fifteen years, but she had never been so severely affected as on the present occasion.

A morphia injection, followed by ¼-grain doses of ext. bellad. every four hours, and rectal feeding, soon gave relief to the urgent symptoms, and the bowels were moved on the third day, after which recovery was uninterrupted. On October 21, 1893, the patient having completely recovered from the obstruction, but the spasmodic pain followed by jaundice having recurred, I opened the abdomen and found numerous adhesions of the colon and duodenum to the gall-bladder and bile-ducts.

Cholecystotomy was performed, and six stones were removed, others in the common duct being crushed between the finger and thumb.

The patient was discharged cured in a month, and has been well since. (Case 78 on the list.)

Case 3.—A woman, aged 47, was admitted into the Devon and Exeter Hospital on May 16, 1895, under the care of Mr. A. C. Roper. She had had no previous serious illness or similar attack. The patient had been suffering great pain in her abdomen, accompanied by vomiting, for three days, and had taken various aperients, resulting in one action of the bowels the previous morning, which, however, did not

give her any relief. An enema of seven pints administered on the night preceding her admission to hospital was returned unstained. Her temperature was 99°, and the pulse 100. She vomited bile and mucus.

Examination of the abdomen showed a visible swelling, freely movable, somewhat tender, elastic, and distinctly resonant to percussion, situated on the right side of the abdomen, extending from just below and two inches to the right of the umbilicus up to the margin of the ninth costal cartilage, from which point resistance extended across the abdomen along the line of the transverse colon. The swelling appeared to be like a sausage in shape. A diagnosis of intussusception was arrived at, and under chloroform Mr. Roper made an incision in the middle line. On opening the peritoneum he found a red, inflamed, sausage-shaped tumour which proved to be the gall-bladder greatly distended and elongated, and adherent on its posterior surface to the intestines. Excepting collapse of the large bowel on the distal side of the tumour, nothing abnormal was discovered in the intestines. The gall-bladder was very tense, and no stones could be found in it. It was stitched to the wound and drained. A number of gall-stones were removed seven weeks later, and the patient made a good recovery.

Mr. Lane's case, described under Phlegmonous Cholecystitis, is a good example of this form of obstruction from inflammation starting in the gall-bladder region, though in his case no gall-stones were discovered at the time of operation.

These cases will, as a rule, yield to general and medical treatment, and it will only occasionally be necessary, as in Mr. Roper's and Mr. Lane's cases, to resort to operation during the seizure if the symptoms are not subsiding, though subsequent surgical treatment may be required.

The second variety, volvulus of the small intestine, dependent on the violence of the colic caused by an attack of gall-stones, or on the contortions induced by the passage of a large concretion through the small intestine, is probably uncommon.

The following are abbreviated notes of two cases that have come under my personal observation:

Case 1.—Acute intestinal obstruction in a woman of sixty-eight; operated on November 12, 1890, by laparotomy, on the eighth day of the obstruction, a volvulus of the small intestine being discovered and untwisted. Bowels moved by enema on the sixteenth day after onset of obstruction, and eighth day after operation, and a large gall-stone, 3 inches in circumference and 1⅜ inches long, was passed, this being manifestly the cause of the obstruction, and secondarily of the volvulus. The patient returned home on the twenty-sixth day, and remained quite well when heard of a year subsequently.

Case 2.—On March 13, 1894, I received a telegram asking me to go prepared to operate on a case of acute intestinal obstruction. I found a Mrs. O., æt. 62, suffering from acute obstruction of six, and fæcal vomiting of two, days' duration, the onset having started like a gall-stone attack, with pain over the gall-bladder, and later in the umbilical region. She gave a history of having suffered from attacks of gall-stones for several years, some of which had been followed by jaundice; and from the mode of onset of the present seizure, and the slight jaundice following it, she was quite sure the attack had been one of her old seizures at the commencement. From the persistence of the fæcal vomiting, the presence of visible intestinal peristalsis, and the pinched and anxious countenance, with the absence of relief by ordinary medical means, operation was decided upon. Laparotomy was performed, and volvulus of the small intestine being found, the loop of gut, which was much congested, was untwisted, and the abdomen closed. Flatus passed the same day, and the bowels were opened the next. The wound healed by first intention, and recovery was uninterrupted.

Diagnosis. — In this class of cases (volvulus) a positive diagnosis is probably, for the most part, out of the question, except after the abdomen is opened, as volvulus of the small intestine is an extremely rare event, and we know that a large gall-stone may quietly ulcerate its way into the gut without any preliminary warning, the symptoms only arising when the concretion is passing through the small bowel; but in both cases related, in addition to the signs of acute obstruc-

tion, there was a well-marked localized swelling near the umbilicus, becoming hard during the paroxysms, pointing to the site of the obstruction; and in the second case there was not only the previous history of cholelithiasis, but the characteristic onset of a gall-stone attack, followed by acute symptoms.

Treatment.—In this form, operation holds out the only hope of success, as, the obstruction being mechanical, nothing short of remedying the cause can be of use.

The fourth class is characterized by obstruction coming on after the original cause has disappeared, and depends on adhesions left by local peritonitis due to gall-stone attacks (as in Case 160), or on narrowing, caused by the healing of a fistulous opening, through which a gall-stone has made its way into the intestinal tract.

Dr. Brockbank refers to a case in the Transactions of the Pathological Society of London, 1852, in which there was chronic inflammation and thickening of the ileum and cæcum, with destruction of the ileo-cæcal valve, these being dependent on gall-stones found in the thickened and ulcerated bowel.

The bowel was dilated above the obstruction and much contracted below.

The patient suffered from chronic diarrhœa for three years, which alternated with attacks of obstruction.

The third class is the most important variety of obstruction dependent on gall-stones, and is the one furnishing not only the greatest number of cases, but a considerable number of museum specimens. It is dependent on the mechanical obstruction and damage to the bowel produced by the passage of a large concretion through the intestine.

In a paper read before the Royal Medical and Chirurgical Society in 1894, I related notes of cases illustrating this condition, but time will not permit me to do more than refer briefly to some of the recent cases.

On September 13, 1894, I received a telegram from Dr. Tempest Anderson and Dr. Raimes, of York, to go prepared to operate on a case of acute intestinal obstruction, but on arrival word was brought to the station that the patient was

in a state of collapse, and might be dead on our reaching the house.

Fortunately, however, we went, and as a result of a morphia injection administered by Dr. Raimes before our arrival, the pulse had recovered itself, and the patient was a little better. She was a lady of fifty, and gave a characteristic history of gall-stone attacks without jaundice for over ten years, but during the past year she had been much better, until Saturday, September 8, when she was seized with violent pain in the centre of the abdomen of a colicky nature, which was slightly relieved by opium; the pain, however, soon recurred, and was accompanied by vomiting, which became fæcal on Monday, the 10th.

Despite morphia and other means, the symptoms persisted, and on Wednesday, the 12th, chloroform was administered, and abdominal massage with abdominal succussion was employed, but without relief.

When I saw her at 10.30 on the evening of Thursday, the 13th, her pulse was rapid and intermittent, and she looked extremely ill, though she was temporarily relieved by the morphia which had been given a little time before our arrival.

There was no distension of the large bowel, but visible coils of small intestine pointed to some obstruction in the lesser gut, and we all agreed that operation was our only course. At 1 a.m. on September 14, the abdomen was opened by a 1½-inch incision below the umbilicus, and almost immediately a hard lump was felt inside a coil of small intestine at the bottom of Douglas's pouch. This loop was brought through the abdominal incision, and surrounded by gauze wrung out of carbolic lotion.

After emptying the gut by pressure, Dr. Anderson grasped the proximal and distal ends between his fingers and thumbs. I then incised the bowel, and the stone was extruded, the opening in the gut being closed by a continuous catgut suture for mucous membrane, and a continuous silk suture for the serous coat. The surface of the bowel which had been exposed was then bathed with boracic lotion and returned, and the abdominal incision closed in the usual way.

From beginning to end, the operation occupied but twenty minutes, and the patient was put into bed in much better condition than she was before the operation. The wound healed by first intention, and there was nothing to chronicle in the after-progress, the patient being now quite well. The stone weighed $1\frac{1}{4}$ ounces when dry, and measured 3 inches in circumference in one direction, and $4\frac{1}{2}$ inches in circumference lengthwise.

Mr. Jonathan Hutchinson junior, in 1895, had a successful case of enterotomy for acute intestinal obstruction dependent on a gall-stone impacted in the jejunum, the patient—a woman of sixty—being now well. She had been subject to biliary colic for several years. Her symptoms were very acute, and had persisted for three days. The case was briefly noted in the Pathological Transactions for 1895, but has not been elsewhere reported.

Mr. Lund reported a case in the *Lancet* for July 11, 1896, in which he had successfully removed a large concretion by enterotomy. The interesting points in this case are that there never had been any previous history of jaundice or colic, nor recollection of feeling of uneasiness in the region of the gall-bladder. The obstruction was caused by a gall-stone fixed in the ileum, and lying near the brim of the pelvis. The measurements of the gall-stone, which was the shape of the gall-bladder, were: Long diameter, $1\frac{5}{8}$ inches; transverse diameter, 1 inch; longitudinal circumference, $4\frac{1}{2}$ inches; transverse, $3\frac{1}{4}$ inches.

Dr. Everley Taylor reported a successful operation in the *Lancet*, and the very large gall-stone removed is in the Hunterian Museum, No, 2,436A (Fig. 26).

It is astonishing how few unsuccessful cases are reported, yet we know that the mortality of these operations has been considerable. The case by Dr. Kinneir, of Horsham, reported in the *British Medical Journal* for March 9, 1895, is therefore worth noting as an exception.

Mrs. B., aged fifty-seven, was taken with sudden abdominal pain, followed by sickness, on January 14. On the following morning she passed two loose motions. The sickness continued, and stercoraceous vomiting commenced on

January 17. Dr. Kinneir was called in to see the patient on January 20 by the family medical attendant, and performed laparotomy on January 21. He found a large gall-stone impacted in the upper part of the ileum, which he removed by enterotomy. After the operation the sickness ceased for some hours; the patient was conscious, expressed relief, and took some nourishment. About six hours later she vomited, but not fæcal matter. This continued at intervals during January 22, and on the morning of January 23 the vomit

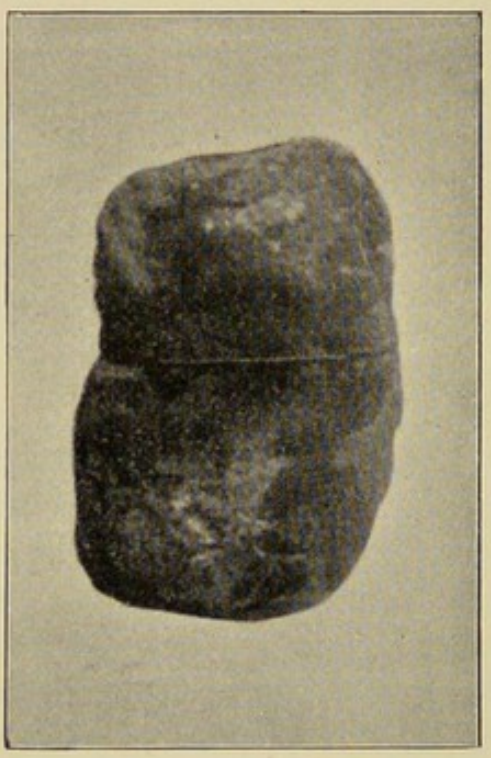

FIG. 26.—LARGE GALL-STONE PRODUCING ACUTE INTESTINAL OBSTRUCTION, SUCCESSFULLY REMOVED BY ABDOMINAL SECTION.

(No. 2,436A, Royal College of Surgeons Museum.)

became again stercoraceous and very offensive. She died on the afternoon of that day. There was no swelling of the abdomen, before or after the operation, and very little pain; the temperature was normal throughout.

Very little urine was passed, and constipation was complete from January 15, in spite of medical treatment. She passed flatus frequently before she died. After the operation she was fed on soda-water, some brandy, and nutrient suppositories. Morphine was injected hypodermically. The gall-stone was covered with a layer of hard fæcal matter.

It measured 1¼ inches in diameter; its weight was 2¾ drachms. On section it presented the usual striated centre, getting darker towards the circumference.

Post-mortem Examination.—The median incision had begun to unite; there was no trace of peritonitis, and no serum or fluid in the cavity. The wound in the intestine was quite unchanged; the small intestine nearly down to the cæcum was distended. There was no other sign of obstruction from the duodenum to the anus. The mesentery, at the seat of the obstruction, and the intestine itself, were of a dark green colour.

The following, among other cases which I could relate, will serve to illustrate the passage of gall-stones without operation:

On August 26, 1895, I was asked by Dr. Lever, of Harrogate, to see a lady of seventy-three, suffering from acute intestinal obstruction of three days, with fæcal vomiting of twenty-four hours' duration. As there was a previous history of gall-stone attacks years before, and as the pain of the present attack started over the hepatic region, we decided to wait and treat the case medically, with the result that a large gall-stone was passed naturally after two days, and the patient made a good recovery.

On April 27, 1896, I received the following notes of a case from a former Leeds house-surgeon, Dr. Wilkinson, of Anerley Hill:

My patient is a lady of sixty-three, and the facts are, briefly: an attack of biliary colic, followed by symptoms of acute intestinal obstruction, stercoraceous vomiting, etc. Obstruction lasted three weeks, giving way finally under rest, opium, and copious enemata; and three weeks later a gall-stone was passed *per vias naturales*, about the size of a pigeon's egg, and weighing 5 drachms 41½ grains. There was a well-marked facet on the stone, and the patient had only the faintest tinge of jaundice.

Dr. Woodhead, of Halifax, has given me the notes of a similar case, and Mr. Littlewood has told me of a case which came under the care of the late Mr. McGill, in which the calculi (Fig. 27), four in number, were passed after causing acute obstruction.

In making a study of the reported cases, and especially of museum specimens, one cannot help feeling astonished at finding fatal obstruction depending on quite small concretions, and the comparatively easy passage of very large gall-stones.

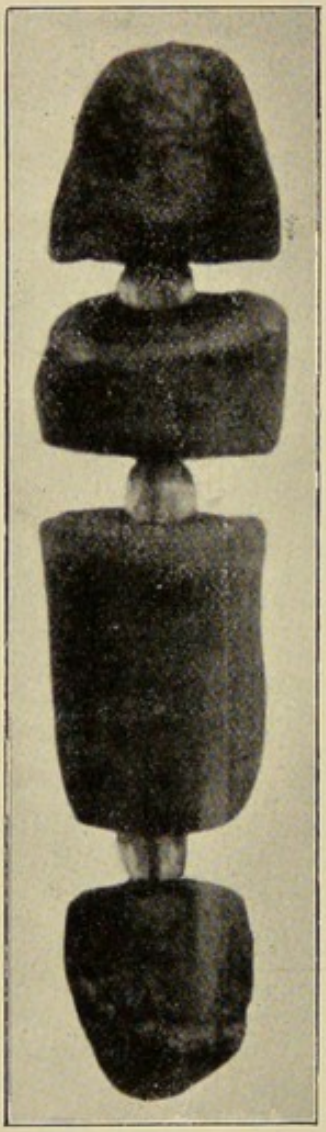

FIG. 27.—LARGE GALL-STONES PRODUCING ACUTE INTESTINAL OBSTRUCTION, PASSED 'PER ANUM,' WITH RECOVERY OF PATIENT.

(No. 317A, Leeds Museum.)

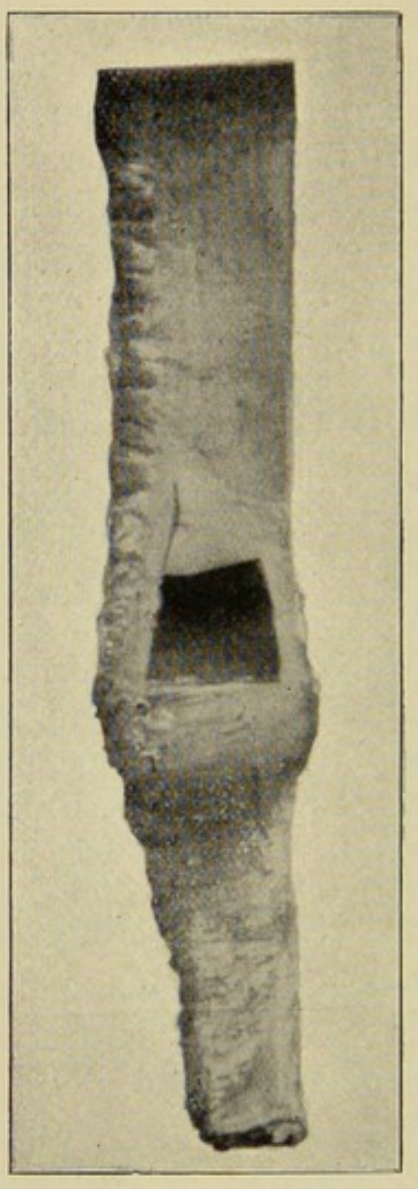

FIG. 28.—LARGE GALL-STONE IMPACTED IN ILEUM, AND PRODUCING FATAL OBSTRUCTION.

(No. 1,493, Middlesex Museum.)

For instance, side by side in Guy's Museum are specimens Nos. 1,456, 1,457, 1,458, and 1,459, showing by no means large calculi—one, in fact, only weighing 55 grains—all of which, nevertheless, caused fatal obstruction, and specimens

Nos. 1,449, 1,450, and 1,451, showing large stones safely passed *per anum*, though in one case the stone was $3\frac{3}{4}$ inches in circumference, and in another 3 inches long and $1\frac{1}{4}$ inches in diameter.

A case of Dr. J. Blackburn's, $3\frac{3}{8}$ inches long by $1\frac{1}{2}$ inches broad, actually produced no symptoms except when at the anus. The gall-stone is in the Hunterian Museum, No. 143A, and I am thus able to show it here.

In the Hunterian Museum, No. 2,436, is shown a beautiful specimen of a gall-stone weighing 400 grains, and measuring 2 inches by $1\frac{1}{4}$ inches, taken from a woman of fifty-two. The fistula between the gall-bladder and duodenum through which it had passed into the bowel is also shown.

In the Middlesex Museum is one of the most perfect specimens of the kind to be found (Nos. 1,493 and 1,595). No. 1,493 shows a portion of the middle of the ileum (Fig. 28). Impacted in it is a large, almost spherical gall-stone, nearly 4 inches in circumference. It has been sawn in half, and the upper fragment removed. The mucous membrane of the intestine corresponding to this has been destroyed by ulceration. The intestine above the obstruction is dilated. Its peritoneal surface is partly covered with lymph. The gall-stone had passed into the duodenum, through an ulcerated opening between it and the gall-bladder.

The patient was a woman aged forty-six, who died in the hospital, January 31, 1856. Twelve days before her admission, on January 29, she was seized with bilious vomiting, to which she was very liable. This lasted two days, when she was attacked by sudden acute pain in the right iliac region, and from this time she had no motion of the bowels, with the exception of some scybala brought away by an enema, till her death. The vomiting continued, and became stercoraceous.

No. 1,595, from the same patient, shows a portion of a liver, with the gall-bladder, stomach, and duodenum.

The fundus of the gall-bladder is adherent to the first part of the duodenum, and a fistulous opening exists between them, through which a glass rod is passed.

The large gall-stone had escaped through the opening.

Schuller (Strasburg, 1891), in reviewing 139 published cases, found that the subjects were women in 74·3 per cent., and out of these, 75 per cent. of the cases occurred in women over 50, though instances were found from 18 to 94.

Lobstein of Heidelberg (*Annals of Surgery*, January, 1896) gives the most common age as between 40 and 60.

It is a curious fact that, although the calculi usually produce intestinal trouble within a few days of reaching the intestine, in some cases they may remain in the bowel for long periods, *e.g.*, in a case of Mr. Eve's (Clinical Society's Transactions, 1895), ten years; and in one of Mr. Smith's (*Lancet*, December 3, 1887), probably fifteen years.

In Courvoisier's elaborate statistics, out of 53 cases examined, he gives the site of obstruction as 21·4 per cent. in the duodenum and jejunum, 65·4 per cent. in the ileum, 10 per cent. at the ileo-cæcal valve, and 2·4 per cent. in the sigmoid flexure.

Museum specimens amply demonstrate that the gall-stones producing obstruction of the intestine, in nearly every case enter the bowel through a gall-bladder duodenal fistula, as in the specimens shown.

They rarely enter through the colon; in fact, I can only find two specimens of the latter in the London museums.

Specimen No. 864, Charing Cross, is one.

The disease is a peculiarly fatal one. Out of 280 cases collected by Schuller, Dufort, and Courvoisier, 156 died, or 52 per cent.

Kermisson and Rochard (*Archives Générales de Médecine*, February, 1892), out of 105 collected cases, gave the mortality as 50 per cent.

The cases that recovered lasted on the average 8 days, those that died 10 days, but the duration of obstruction may vary from 1 to 28 days.

A case reported by Sargent in the *British Medical Journal*, 1879, actually died, apparently from the intensity of the pain, after symptoms lasting only half an hour.

Lobstein (*Annals of Surgery*, January, 1896), collected 92 cases. Of the 61 not operated on, 32 recovered, the remaining 29 died of peritonitis or exhaustion; of the 31

operated on, 12 recovered, but, as many of the 19 which died were moribund when operated on, their death cannot be charged to operation.

As more than one large concretion may be present in the gut at the same time, in a few cases the symptoms of obstruction have been known to recur once, twice, or three times after the first concretion has been parted with.

Dr. Maclagan (Clinical Society's Transactions, vol. xxi., p. 87) has described two cases of this kind, and Mr. Clutton (in the same volume, p. 79) has described another, in which he operated successfully within twenty-four hours of the onset of the second seizure and manipulated the stone through the ileo-cæcal valve.

The symptoms are those of acute intestinal obstruction from other causes, with early fæcal vomiting and severe abdominal pain. The higher in the gut the impaction, the more violent as a rule will be the symptoms. The obstruction can only very rarely be felt through the abdominal walls.

Although in one of my cases I was able to make a probable diagnosis from the history of previous gall-stone attacks extending over several years, yet in many cases there is absolutely no previous history to guide one, and it is quite impossible to say whether or not the attack is one dependent on the cause in question, or on a volvulus or band, or internal hernia, which, if left, must inevitably lead to death, and that speedily. The age and sex, together with the history of chronic dyspepsia and pain in the hepatic region, are, however, well worth bearing in mind, as well as the early and persistent vomiting and visible peristalsis limited to the small intestines.

Treatment.—If the diagnosis could always be made with certainty, I think this is a condition in which medical and expectant treatment might be fairly given a trial, since we have ample evidence of large gall-stones having safely passed without other treatment.

But we must not forget that 52 per cent. of cases treated on medical and expectant lines are fatal, and although surgery has not yet shown a much greater percentage of recoveries, it is because surgical means are frequently only

resorted to when the case is hopeless, and after all other means have been tried.

When it is borne in mind that there are no symptoms peculiar to this form of obstruction, and that the course pursued by an obstruction by a band or by an internal hernia may be exactly the same as in gall-stone obstruction, the surgeon who waits beyond the period when an operation may be undertaken with every hope of success is incurring a very serious responsibility.

With regard to the method of treatment after the abdomen is opened and the cause found: if the gall-stone can be easily crushed through the intestinal coats, without too much force being required, so much the better; but that failing, enterotomy and removal of the stone should be performed, as it can be done very quickly and with very little damage to the bowel.

Should the patient be too ill to bear a search being made for the obstruction, enterostomy, or perhaps short-circuiting, might be performed, in order to give temporary relief, the cause of the obstruction being afterwards removed, if not effected naturally.

As to *when* operation should be done, that is part of a general question, which each surgeon will have to answer for himself in every individual case, as no definite rule can possibly be formulated which will apply to all cases. The surgeon will, as a rule, not be called in before decided symptoms of intestinal obstruction have manifested themselves, and until medical means have been fully tried. In such cases it would seem to me to be idle waste of time to delay surgical intervention until the patient is so exhausted that operation is only undertaken as a *dernier ressort*, when the subject is almost moribund. If, however, the case be seen at an earlier stage, morphia will have to be given to relieve the pain, and I have usually recommended ext. belladonnæ in $\frac{1}{4}$ grain doses every four hours, the stopping of all food by the mouth, and the administration of one or more large syphon enemas, given slowly with the buttocks elevated. If relief does not speedily follow, and the diagnosis is not clear, chloroform anæsthesia may assist in two ways: in the

first place, it enables a thorough examination of the abdomen, and at times a diagnosis of the cause, to be made; and, secondly, the manipulation, if made methodically, may reduce a hernia or volvulus, or may possibly help onwards an obstruction. This failing, and the symptoms persisting, I should operate, and at this comparatively early stage I feel sure with every prospect of success.

CHAPTER IV.

TUMOURS OF THE GALL-BLADDER AND BILE-DUCTS.

If by tumour be understood new growth, then tumours of the gall-bladder and bile-ducts are not common; but if we accept the usual interpretation of the term, and include all enlargements as tumours, we shall find them by no means rare.

I propose to consider the subject under the following classification, which appears to me to include all the chief varieties:

I. TUMOURS OF THE GALL-BLADDER.

(*A*)
- (*a*) Distension with bile.
- (*b*) ,, ,, concretions.
- (*c*) ,, ,, pus (empyema).
- (*d*) ,, ,, mucus (hydrops).

(*B*) *New growths.*
- (*a*) Malignant.
- (*b*) Simple.

II. TUMOURS OF THE BILE-DUCTS.

(*A*) Distension.

(*B*) *New growths.*
- (*a*) Malignant.
- (*b*) Simple.

I. TUMOURS OF THE GALL-BLADDER.

Distension of the Gall-bladder.

A tumour of the gall-bladder through distension with bile must be a rare phenomenon, though it is sometimes described

as an accompaniment of a gall-stone attack, where the concretion is impacted in the common duct; even in such a case it must be a symptom of short duration, since, if the impaction be complete, the bile speedily becomes absorbed, and gives place to distension by mucus.

A perceptible tumour formed by distension with gall-stones is also rare, unless it happens that some have become impacted in the cystic duct, when a gradual enlargement

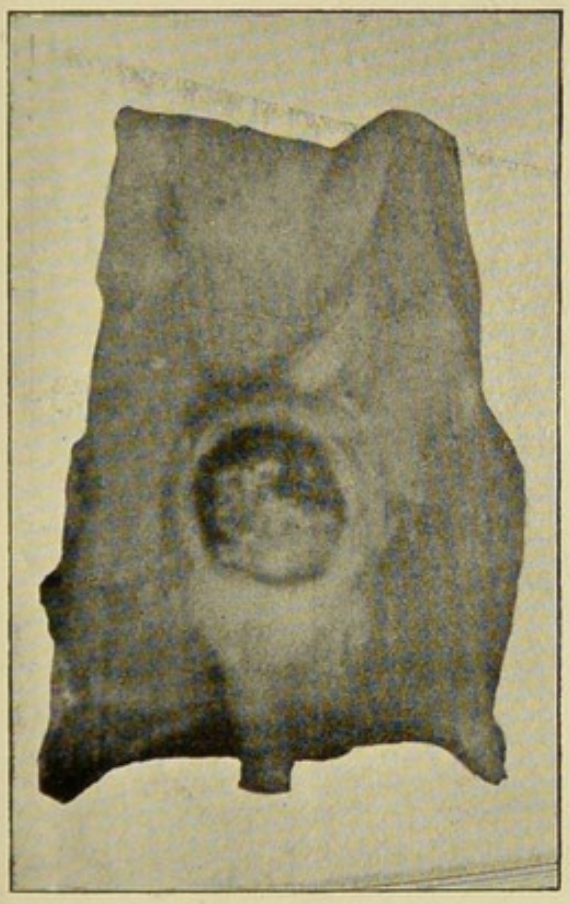

FIG. 29.—LARGE SINGLE CALCULUS FILLING THE GALL-BLADDER.

(No. 2,819, Hunterian Museum.)

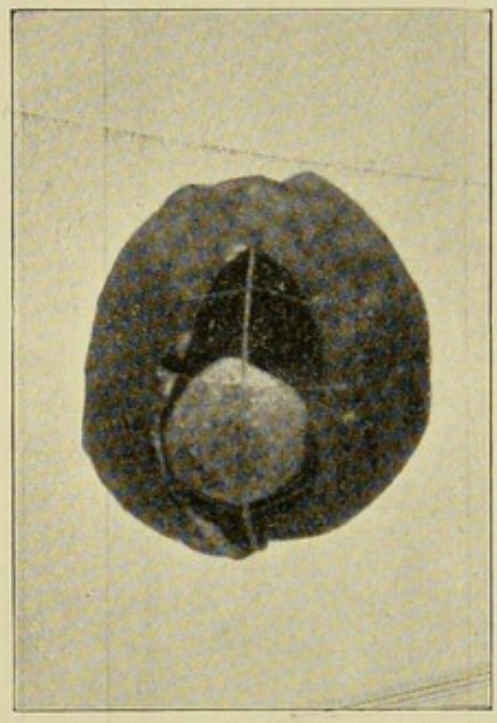

FIG. 30.—CALCIFICATION OF GALL-BLADDER.

(No. 2,808A, Royal College of Surgeons Museum.)

from the retained mucus will follow. I have removed as many as 750 gall-stones from a gall-bladder during an operation, and yet that gall-bladder could not be felt as a distinct tumour. Occasionally a large single gall-stone may form a hard perceptible swelling below the liver, but such is very rare (Fig. 29).

Calcified gall-bladder, which is due to cholelithic catarrh, may lead to the formation of a hard, rounded, painless

tumour, and this is evidently not very uncommon, if we may judge of its frequency by specimens in the museums (Fig. 30).

Specimens Nos. 2,808 and 2,808A in the Royal College of

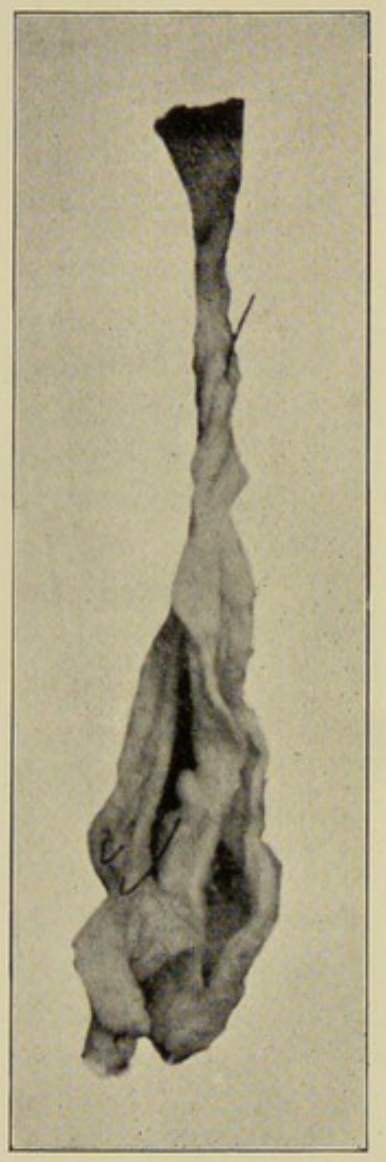

FIG. 31. — CONTRACTED GALL-BLADDER WITH HYPERTROPHY OF WALLS, DUE TO GALL-STONE IRRITATION.

(No. 2,807, Royal College of Surgeons Museum.)

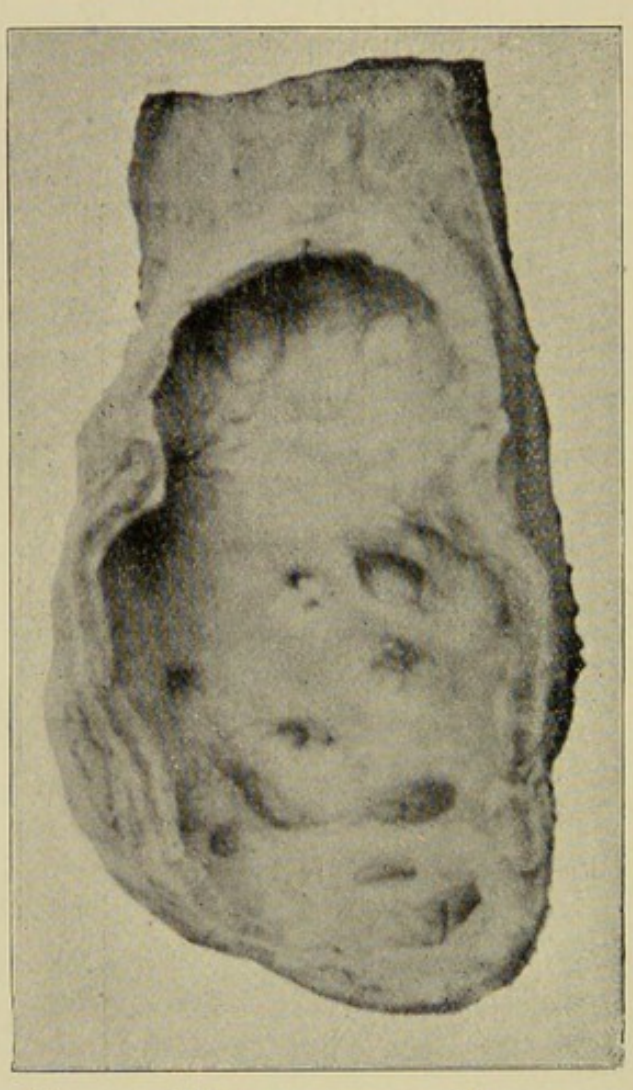

FIG. 32.—HYPERTROPHY AND DILATATION OF GALL-BLADDER, WITH POUCHES FORMED BY THE MUCOUS MEMBRANE BULGING BETWEEN THE MUSCULAR FASCICULI.

(No. 2,804, Royal College of Surgeons Museum.)

Surgeons Museum are good examples, as also are No. 1,402 in Guy's, and No. 1,590 in the Middlesex Museums.

The last specimen is interesting in that it was removed from a woman of nearly seventy, and contained bile and one concretion.

Hydrops and **dropsy of the gall-bladder** are terms used to denote distension of the gall-bladder by mucus. It may result from any obstruction in the cystic or common ducts, whether due to gall-stones, stricture, or growth in the ducts, or to cancer of the head of the pancreas, provided that the gall-bladder has not atrophied as the result of previous gall-stone irritation. It is due to the gradual accumulation of the natural secretion of the mucous lining, and may attain such a size as to be mistaken for an ovarian cyst, as in cases reported by Mr. Lawson Tait and by Professor Kocher, though it is uncommon to find the tumour of greater size than 15 to 20 ounces capacity. Not only may the cavity be dilated, but its walls may be enormously hypertrophied, so as to form a distinct tumour, as in specimens Nos. 2,804 and 2,807 in the Hunterian Museum (Figs. 31 and 32).

As an extremely rare event, the walls of the gall-bladder may form an adipose tumour, as in a specimen from Guy's Museum, No. 1,403, the walls of the gall-bladder, infiltrated with fat, being $\frac{1}{3}$ inch thick. It was removed from a man of sixty-six suffering from kidney disease and cirrhosis of the liver.

Specimen No. 1,416, Guy's Museum, shows a distended gall-bladder containing colourless mucus, and at the post-mortem no obstacle was found in the ducts. The patient died from pyæmia after acute necrosis.

Specimen No. 1,587, Middlesex, shows an enormously dilated gall-bladder, the result of impaction of a gall-stone at the neck of the gall-bladder.

Specimen No. 2,814, Royal College of Surgeons Museum, shows a large gall-bladder with a gall-stone impacted in the cystic duct (Fig. 33).

If the obstruction be associated with inflammation, the contents of the gall-bladder may become purulent, and an empyema of the gall-bladder result, the symptoms and complications of which I have already considered.

Signs.—Enlargements of the gall-bladder may vary from a tumour just perceptible to the touch, to one of such a size as almost to fill the abdomen, though one of greater size than a large pear is exceptional. The same tumour may

also vary in size at different times, this variation being frequently found in gall-stone obstruction.

The symptoms of tumour of the gall-bladder depend for the most part on the cause, and in consequence vary considerably, at times being slight and unimportant, at others both urgent and serious.

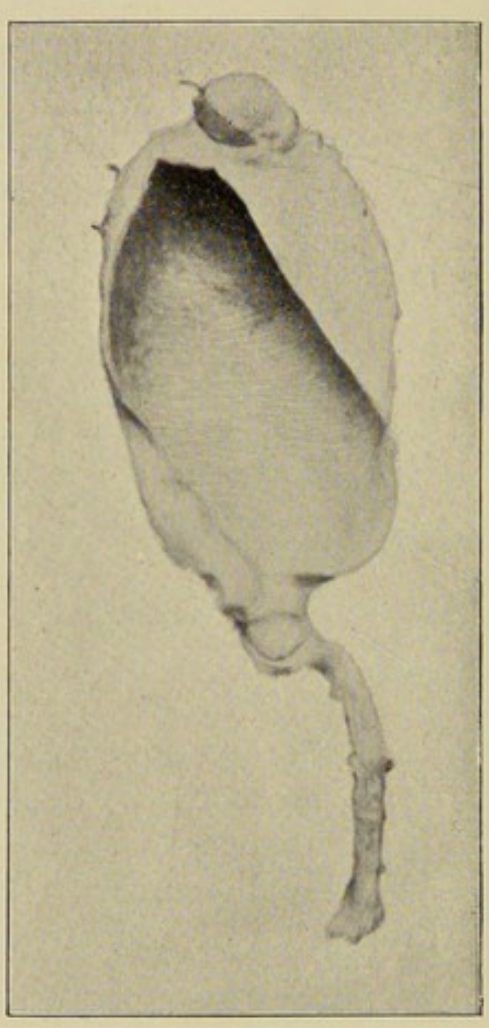

FIG. 33.—DISTENDED GALL-BLADDER AND POUCH AT FUNDUS, CAUSED BY CALCULUS OBSTRUCTING CYSTIC DUCT.

(No. 2,814, Royal College of Surgeons Museum.)

The gall-bladder, as a rule, enlarges downward and forward in a line which, drawn from the ninth or tenth costal cartilage, crosses the linea alba a little below the umbilicus, but the position of the tumour varies with the size of the liver. When that organ is of normal size, the neck of the gall-bladder is opposite the ninth costal cartilage, whereas when the liver is enlarged, the gall-bladder will be pushed down,

so that the neck of the tumour may be opposite to, or even below, the umbilicus. If uncomplicated, it will have a smooth, rounded, and pear-shaped outline, the larger end being below, quite free, and movable from side to side, the upper end being fixed and passing under the lower margin of the liver at the fissure of the gall-bladder.

A distinct sulcus between the liver and gall-bladder is nearly always perceptible to the touch, if the warmed flat hand be laid over the right side of the abdomen, and the patient be told to take a deep breath, when the tumour and the liver will descend together and pass under the fingers.

Bimanual palpation will frequently throw additional light on the case, the right hand being placed in front of the abdomen, and the left over the right loin, making gentle pressure forwards.

In other cases, additional information may be obtained by placing the patient in the genu-pectoral position, and passing the flat hands round the abdomen from behind, when a tumour of the gall-bladder will rest distinctly on the hand, and on deep inspiration it can be felt to move just beneath the abdominal walls, the upper surface of the liver also being in this way capable of palpation.

The swelling is, as a rule, far too tense and hard for fluctuation to be elicited, though at times this sign may be obtained when the swelling is less tense.

In some of the larger swellings, a thrill, almost like the hydatid fremitus, may be felt on gently flicking the tumour with the finger-nail. Percussion by no means always elicits dulness coextensive with the tumour, especially if the surrounding intestines be distended; so that dulness on percussion is a very variable sign, and palpation will be found more reliable.

Inspection of the abdomen with the patient recumbent will at times show the tumour descending on respiration, but this sign is usually only to be observed in thin patients, and in cases uncomplicated with inflammation. When there is inflammation and matting of the adjoining viscera, a fixed swelling may be seen over the right hypochondrium, with dulness on percussion and marked tenderness.

Tenderness on palpation is a variable symptom, depending on the presence or absence of local peritonitis, it being as a rule absent in uncomplicated enlargements of the gall-bladder.

Jaundice may complicate tumours of the gall-bladder, both being dependent on the same cause—a blocking of the common bile-duct. Although not absolutely pathognomonic of malignant disease, the combination should always raise a suspicion of cancer of the head of the pancreas or of the liver or bile-ducts, especially if it be associated with great loss of flesh and strength and with absence of characteristic gall-stone pain.

I have observed, in a considerable number of cases, distension of the gall-bladder with jaundice to be associated with malignant disease, but much less often the combination of tumour, jaundice and gall-stones. The explanation of this apparent anomaly is that the gall-bladder frequently becomes diminished in size and adherent, as the result of gall-stone irritation, so that when the common duct becomes blocked by a calculus, jaundice occurs without distension of the gall-bladder, as it is unable to expand.

If, however, the common duct becomes blocked by gall-stones before the gall-bladder has contracted and formed adhesions, there may be the combination of jaundice and tumour.

If the common duct be blocked by tumour, the gall-bladder, not having been subjected to irritation, and therefore not having become contracted, will at once distend.

Thus, in malignant disease of the head of the pancreas, we find the usual combination of jaundice with tumour of the gall-bladder.

Gall-bladder tumours usually contain mucus, occasionally pus, rarely bile.

In all cases when the cystic duct is obstructed, and inflammation has not followed, mucus alone is present, though when inflammation coexists, pus or muco-pus may be found.

In obstruction of the common duct by gall-stones, the gall-bladder, though usually contracted, may be found

distended by bile at first and mucus later; though, as a rule, the swelling subsides more or less rapidly and no tumour persists, the gall-bladder shrinking. When the obstruction becomes absolute, as in malignant diseases of the head of the pancreas, the tumour formed is persistent, and although the block is in the common duct, bile soon ceases to reach the gall-bladder, and the tumour is always found to contain mucus. This occurs on account of the backward pressure preventing the excretion of bile, which, though formed by the liver cells, is immediately taken up by the lymphatics.

Diagnosis.—Tumours of the gall-bladder may have to be diagnosed from:

1. Movable right kidney.
2. Tumour of the right kidney or of the supra-renal capsule.
3. Tumour of intestine or fæcal impaction.
4. Tumour of liver.
5. Pyloric tumour.
6. Abnormal projection of liver.

The diagnosis of enlargement of the gall-bladder from movable right kidney is, as a rule, easy in thin persons; but in those who are stout, or have tense or strong muscular abdominal walls, difficulties may and do arise, which can, however, usually be overcome by examination under an anæsthetic.

They resemble one another in that each forms a moderate-sized, distinctly-defined, rounded and movable tumour on the right side of the abdomen, which is found to descend on inspiration.

The previous history may throw light on the case, especially if there have been definite cholelithic attacks or the presence of jaundice.

By inspection of the abdomen a gall-bladder tumour is often apparent, moving rhythmically with the respiratory movements when the patient is recumbent; but a floating kidney can rarely be so detected.

The general outline of the tumour as detected by palpation may afford valuable assistance; thus in distension of the gall-bladder the tumour formed is pear-shaped, with the apex

towards the fissure of the gall-bladder, and its long axis in a line from about the tip of the ninth costal cartilage downwards, forwards, and inwards towards a point a little below the umbilicus. In floating kidney, especially in patients with lax abdominal walls, the tumour may be grasped and its characteristic shape made evident.

Should adhesive peritonitis accompany the gall-bladder condition, there will be tenderness and pain on pressure over the tumour, especially near its apex. These signs are rarely, if ever, present in floating kidney.

The gall-bladder tumour can usually be moved to a limited extent inwards and outwards by manipulation, but under no circumstance can it be depressed into the pelvis. On relieving it of pressure it tends to resume its old position under the liver.

Floating kidney has a generally wider movement, can be depressed into the pelvis, and when relieved of pressure tends to pass towards the right loin, especially when the patient is recumbent.

A valuable diagnostic sign is the sulcus often felt between the lower margin of the liver and the gall-bladder tumour; this can usually be felt when the warm flat hand is placed over the upper part of the swelling and the patient is asked to breathe deeply.

In the case of renal tumour, as well as in movable kidney, by distending the intestine with gas the kidney will be pressed back into the loin, but the gall-bladder will be pushed up towards the liver and made more prominent. The last test is usually also sufficient to enable a diagnosis to be made between a distended gall-bladder and a tumour of the right supra-renal body; but this is not always reliable, as in a case I saw with Dr. Kebbel, of Flaxton, Ziemmsson's test pushed the swelling upwards, and on performing abdominal section a sarcoma of the supra-renal capsule was found and removed, the explanation being that the colon was fixed below the growth and pushed it up when the bowel was distended with gas.

In tumour of the intestine or of the pylorus, the associated stomach or bowel symptoms are usually sufficient to enable

a diagnosis to be made, but when in doubt, distension of the stomach or bowel with gas will help to clear it up, or examination under an anæsthetic will afford assistance.

Tumour of the liver itself, either cancer or hydatid disease, may be almost indistinguishable from one of the gall-bladder, though the presence of nodules in the liver, with the history and other symptoms of malignant disease, will usually be sufficiently distinctive in cancer, while the less localized and more generally fluctuating swelling, together with the longer history and absence of pain, will distinguish hydatid tumour.

It should not be forgotten that the right lobe of the liver may have an abnormal projection, either in the site of the gall-bladder or to the right of that position, which may at first be mistaken for an enlarged gall-bladder; but the absence of symptoms, together with careful bimanual palpation, will usually enable a correct diagnosis to be made, and, as Professor Riedel has pointed out, the gall-bladder may frequently be felt apart from the swelling, or at the top of it.

Puncture with an exploring syringe would, of course, give valuable information, but this should not be lightly undertaken as it is not devoid of risk, death having occurred on more than one occasion as a direct result of this apparently slight operative procedure.

If it is decided to employ an exploring needle, the aspirator should always be used, in order that the tense cyst may be completely emptied, otherwise leakage from the puncture is almost certain to occur. After the abdomen has been opened I have seen a puncture of the tumour by a small exploratory syringe pour out fluid in a forcible stream, showing what would have occurred had the puncture been made through an unopened abdomen.

In case of doubt, especially where the symptoms demand interference, exploration of the tumour through a small abdominal incision can be undertaken with very little risk, and at the same time further treatment where called for can be carried out.

Of the tumours dependent on new growth, cancer of the gall-bladder is the most important, innocent growth, except of inflammatory origin, being extremely rare; unless it be true,

as Zenker (Musser's quotation) suggests, that an adenoma first develops in the gall-bladder and subsequently becomes transformed into an adeno-carcinoma. Dr. Rolleston (*Med. Chron.*, January, 1896) has reported a case in which this sequence apparently occurred in the bile duct of a woman from whom a papilloma was removed, the growth being in immediate contact with a gall-stone. After some months she returned with a growth in the same region, presumably malignant.

Cancer of the gall-bladder is by no means frequent, and as a primary affection is somewhat rare.

Musser collected all the reported cases in the *Boston Medical and Surgical Journal*, December 15, 1889, and Dr. Rolleston published an extremely interesting paper on the subject in the *Medical Chronicle* for January, 1896. It is usually secondary to gall-stones or to cancer of adjoining organs, and in the latter case is not amenable to surgical treatment.

Dr. Goodhart (New Sydenham Soc., Fasc. V., 'Disease of Liver') says the nature of the growth may be either columnar-celled epithelioma or ordinary carcinoma.

Malignant tumour of the gall-bladder may probably assume one of four varieties :

(*a*) Columnar-celled carcinoma originating in the mucous glands (the common form).

(*b*) Spheroidal-celled carcinoma starting in the surface epithelium.

(*c*) Sarcoma starting in the connective-tissue, and

(*d*) Squamous epithelioma.

The disease may occur as a uniform thickening of the walls of the gall-bladder, and in the centre of the mass is often found a cavity containing gall-stones, as in specimen No. 2,264, St. Bartholomew's Museum.

This character is not uniform, as I have found a malignant tumour of the gall-bladder to be filled with soft growth like putty.

Specimen No. 2,265 in St. Bartholomew's Museum shows a soft carcinoma in the gall-bladder budding from the mucous membrane in a polypoid form (Fig. 34).

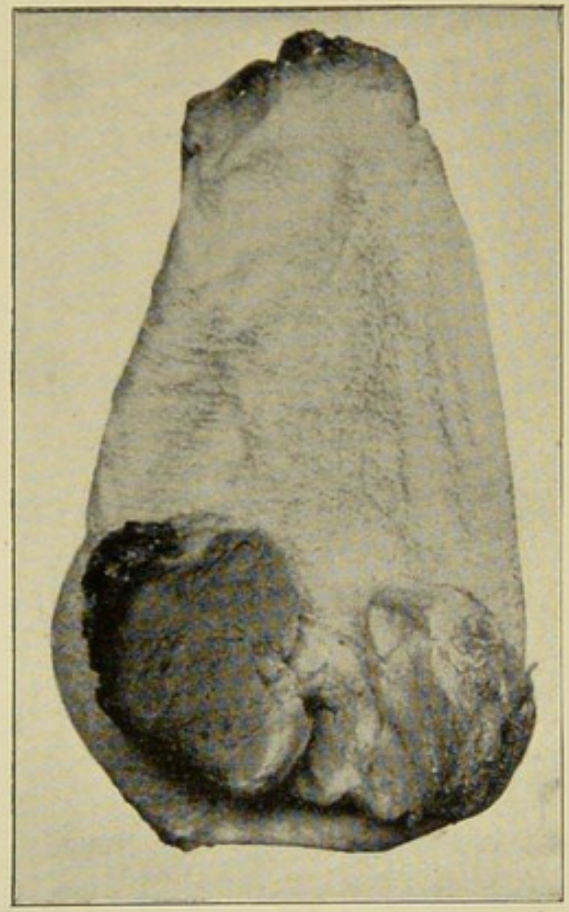

FIG. 34. —CARCINOMA OF GALL-BLADDER.
(No. 2,265, St. Bartholomew's Museum.)

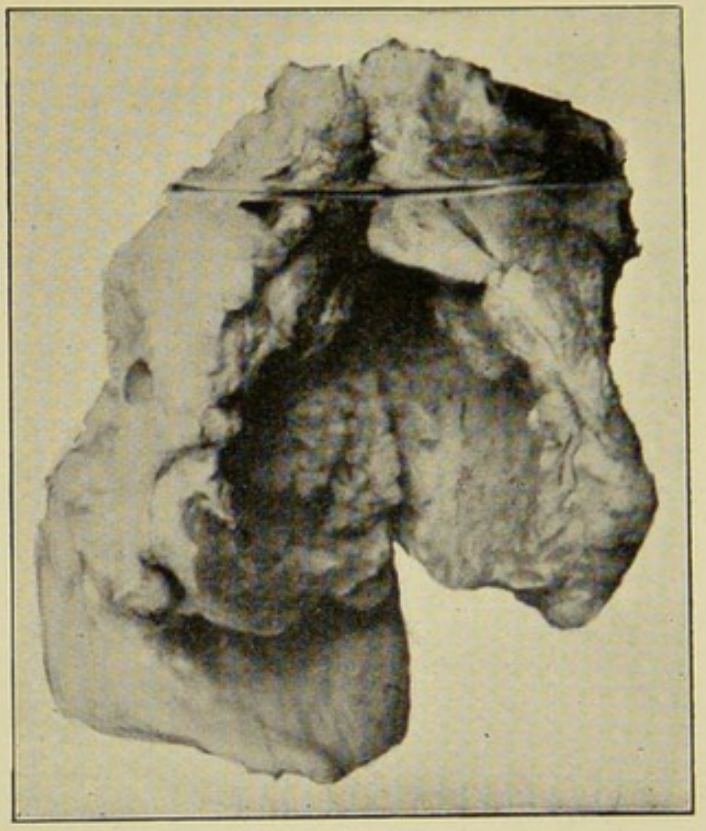

FIG. 35.—CANCER OF GALL-BLADDER INVADING LIVER.
(No. E 308, Leeds Museum.)

No. 2,266A, St. Bartholomew's, also shows an epitheliomatous papillary growth in the gall-bladder, and secondary cancerous growths in the liver.

No. E 308, Leeds Museum, shows a similar condition (Fig. 35).

No. 2,264, St. Bartholomew's, shows a gall-bladder converted into a mass of medullary cancer, in the centre of which are four faceted gall-stones. The pylorus is adherent. It was taken from a woman of fifty-nine, who suffered from a dilated stomach, but had no serious symptoms until a month before death. She was never jaundiced.

The very frequent association of cancer of the gall-bladder with gall-stones is an undoubted fact, and in all probability there is a connection between the two diseases.

Zenker (*Deutsch. Arch. f. Klin. Med.*, 1889) found gall-stones in 85 per cent. of cancers of the gall-bladder, and Musser, from an analysis of 100 cases, gives the proportion associated with gall-stones as 69 per cent., which may, however, be an under-estimate, as it is well known that gall-stones may produce serious irritation, and then pass into the alimentary canal, so that their effects may remain, although the cause may not be discovered.

Case 12 is an illustration of this, where, following on the symptoms of gall-stones of several years' duration, came a distended gall-bladder, for which I operated, the case being one of cancer of the bile-duct, all the gall-stones having been passed.

Courvoisier found gall-stones present in 74 out of 84 cases of primary cancer of the gall-bladder; Brodowski (Naunyn, p. 153) in 100 per cent.; Jayle (Soc. Anat., 1893) in 23 out of 30; Bertrand in 14 out of 15; and Siegert in 95 per cent. of primary, but only in 15 or 16 per cent. of secondary carcinoma of the gall-bladder.

According to Schroeder, 14 per cent. of all cases of gall-stone patients suffer at some time from cancer of the biliary passages, and Naunyn is of opinion that half the cases of chronic jaundice diagnosed as cholelithiasis are complicated with cancer or are due to cancer alone. This latter statement is of extreme importance, since operation in the presence of cancer and chronic jaundice is very fatal.

The two theories which have been current, to explain the co-existence of gall-stone with cancer of the liver, are: first, the 'irritation' theory, that gall-stones are formed first, and by acting as foreign bodies, set up irritation, which leads to malignant growth; and, second, the 'concentration' theory, that gall-stones arise as a secondary result, from stagnation of bile in the ducts, caused by their obstruction from malignant growth.

Mr. C. Beadles, in a paper before the Pathological Society of London (*Lancet*, March 9, 1895) stated that out of 100 post-mortem examinations at the Cancer Hospital, 4 were cases of primary carcinoma of the liver, and all had calculi in the gall-bladder; 36 had secondary carcinomatous growths in the liver, but there were no gall-stones present in any of them. Of 9 cases of primary carcinoma of the liver at Colney Hatch, 5 were males and 4 females, and gall-stones were present in 7, being absent in 1 male and 1 female. These facts support the theory of irritation.

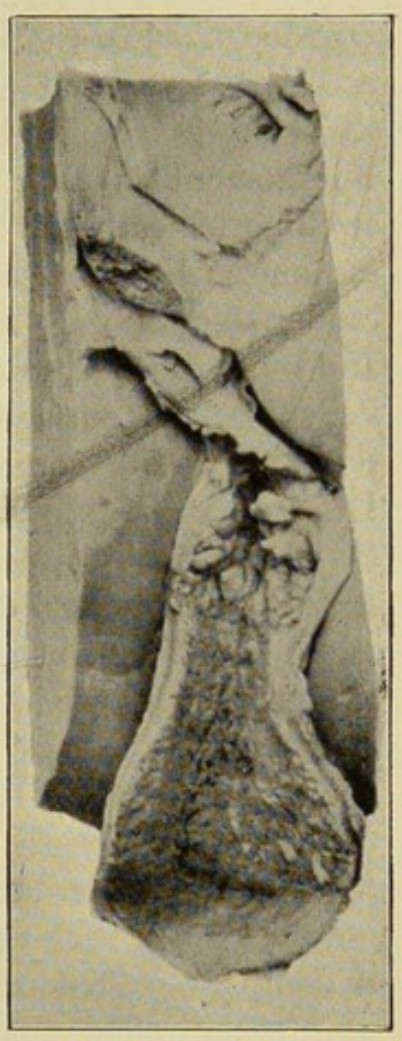

FIG. 36.—PAPILLOMATA OF THE GALL-BLADDER.
(No. 1,404, Guy's Museum.)

Simple growths in the gall-bladder are not of great clinical importance, except as precursors of malignant disease. I have found the following specimens in the museums:

No. 2,812, Royal College of Surgeons, shows villi and papillæ on the mucous surface of the gall-bladder associated with gall-stones.

No. 1,404, Guy's, shows papillomata in the gall-bladder from a woman of fifty-nine, who died of phthisis. They are sessile towards the fundus, and pedunculated towards the neck of the bladder (Fig. 36).

No. 1,405, Guy's, shows a gall-bladder in which the mucous membrane is covered with warty growths.

Symptoms and Signs of Cancer.—If the growth be primary, there will be the history of a more or less rapidly growing tumour developing under the right costal margin, accompanied at first by a sense of discomfort, shortly changing to pain, which is often worse at night, and which, though at first localized to the right hypochondrium and epigastrium, usually before great advance has been made, extends round the side to the right infra-scapular region. When the enlargement is first noticed it is felt as an egg-shaped swelling beneath the liver, descending on inspiration. The tumour is hard to the touch, and very slightly or not at all tender to pressure. At a later stage it becomes more fixed and more diffused, and nodules may develop and be felt on its superficial surface. As the growth extends, it invades the liver, and sometimes the duodenum and stomach. Dissemination is rare. When it occurs, nodules may be found in the liver, and generally over the peritoneum. In such cases ascites develops. The lymph glands in the hilum of the liver usually become affected.

According to the invasion or not of the hepatic or common bile-ducts, so will be the presence or absence of jaundice; but in nearly half of the cases some degree of icterus will be found as the disease advances, owing to the presence of catarrh of the bile-ducts.

Interference with the action of the bowels, even to partial or complete obstruction, at times occurs. General failure of health, continued wasting with loss of strength, ascites and marked cachexia, characterize the later stages.

Perforation may occur and hasten the end by the onset of general peritonitis. If gall-stones be present there will be the usual antecedent history of cholelithiasis. Where gall-stones with jaundice complicate cancer of the gall-bladder, exacerbations of pain will usually be accompanied by rigors and fever, 'ague-like attacks' with an intensification of the icterus, and in such cases, petechiæ in the skin with hæmorrhage from the nose and rectum usually supervene.

Diagnosis.—Cancer of the gall-bladder may usually be

diagnosed by the progressive character of the disease, and by the presence of the characteristic hard tumour; but it is by no means always easy to diagnose cancer from a tumour formed by matted intestines, due to local peritonitis in the neighbourhood of the gall-bladder.

In a doubtful case of this kind, in a woman of fifty, I opened the abdomen and found what appeared to be a malignant tumour of the gall-bladder, which was punctured in several places with an exploring syringe. Finding it firm and hard, I concluded it was malignant, and, as it was too extensive for removal, I closed the abdomen, thinking nothing more could be done.

The patient, however, forthwith recovered, and is now well, with no remnant of her tumour. It is, of course, impossible to say that this was not cancer, but in all probability it was an inflammatory swelling associated with gall-stones.

In another case of tumour, where there was a suspicion of malignancy, I opened an abscess of the liver containing thirty gall-stones, giving marked relief, though only for a time, as death supervened four months later, when malignant disease was found. When in doubt, exploration is probably the best method of settling it, as at the same time treatment may be carried out, as in Cases 56 and 57.

That cancer of the right suprarenal body may afford a difficulty in diagnosis is shown by the case referred to in the chapter on tumours of the gall-bladder. The same difficulty applies to cancer of the pylorus, which, however, is accompanied for the most part by characteristic stomach symptoms.

Treatment. — The alleviation of symptoms, especially of pain by sedatives, is practically all that can be done, except in those rare cases where the disease is limited to the gall-bladder, when cholecystectomy may be performed.

In only one case, out of several on which I have operated, have I found the disease sufficiently limited to permit of excision, and even in that instance I had to perform partial hepatectomy.

The patient, a woman of fifty-four, gave the history of having had an enlarged gall-bladder for twelve years, which

had given no trouble until three years before, from which time she had had gall-stone attacks. Four months before seeing me she began to fail in health, and when I saw her the gall-bladder reached the right groin, and the right lobe of the liver the level of the umbilicus.

I operated on November 23, 1895, and on opening the gall-bladder found the walls infiltrated with growth, and the contents putty-like in consistence. The entrance to the cystic duct was occluded by a growth the size of a walnut,

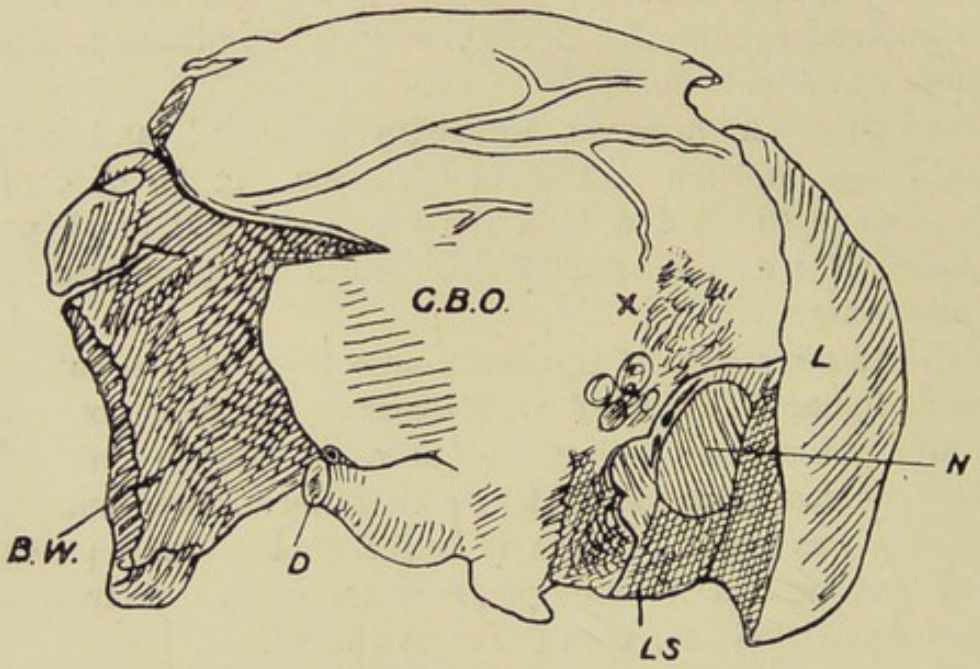

FIG. 37.—EXCISION OF A PORTION OF LIVER FOR TUMOUR (MAYO ROBSON) (REDUCED ONE-THIRD.)

G.B.O., Outer surface of gall-bladder; near × the growth is infiltrating the wall, shown in shaded portion; B.W., thickened and infiltrated wall of gall-bladder, laid open; L, liver; LS, liver laid open to show—N, secondary malignant nodule in liver; D, cystic duct. (*Trans. Roy. Med. and Chir. Soc.*, vol. lxxix.)

and beyond this a gall-stone could be felt in the cystic duct. As there was a nodule of growth on the under surface of the liver close to the one in the neck of the gall-bladder, I drew the whole mass forward, and encircled it with an elastic ligature, which was passed below the gall-stone so as to get well beyond the growths, retraction being prevented by two knitting-needles pushed through the projecting liver.

The projecting portion was then cut away; it included liver, gall-bladder, and part of the cystic duct, and weighed

half a pound. Recovery was uninterrupted, and the temperature never reached 100°. The growth, on examination by Mr. J. W. Haigh, was reported to be epithelioma. The case is fully reported in the seventy-ninth volume of the Trans. Roy. Med. and Chir. Soc. (Figs. 37 and 38).

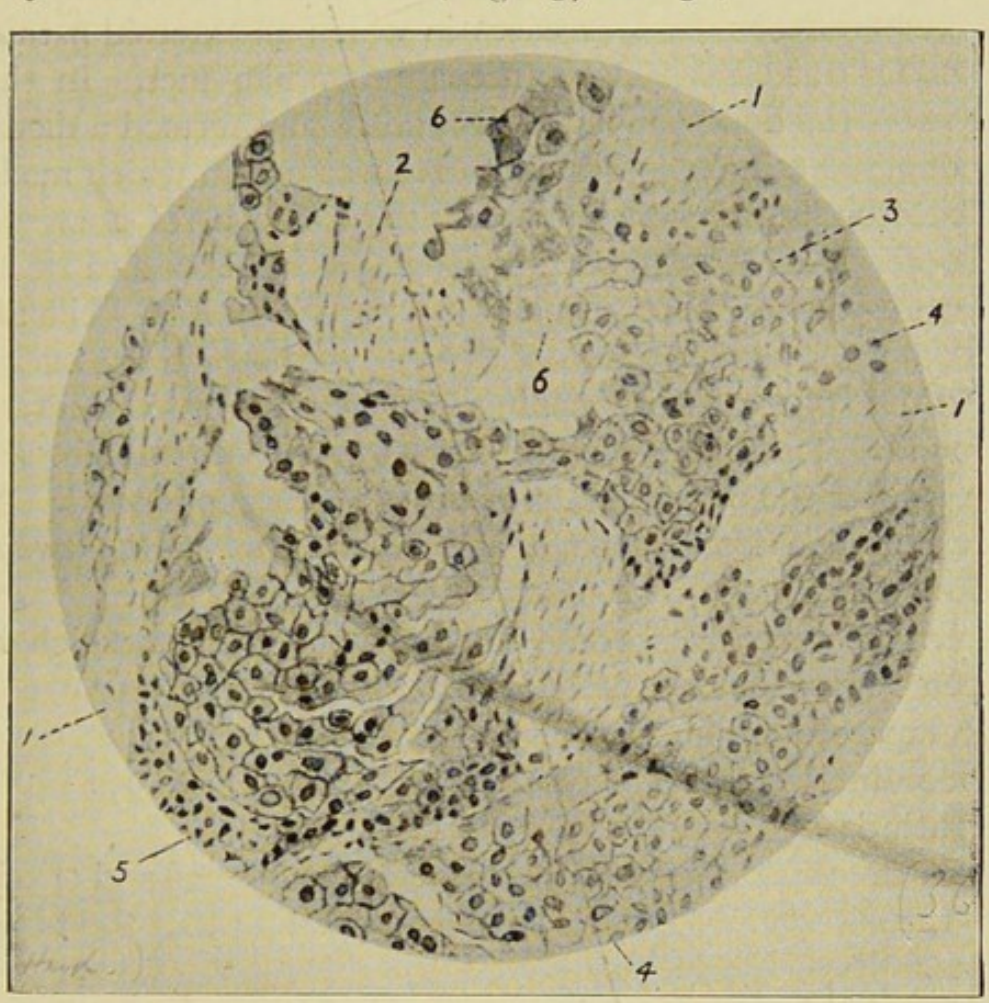

FIG. 38.—MICROSCOPIC SECTION OF THE NEW GROWTH. (HARTNACK OBJ., NO. 4, OC. 3 = × 120. DRAWN BY J. W. HAIGH.)

1, 1, 1, Connective tissue of alveolar walls; 2, connective-tissue nuclei; 3, epithelial cells, somewhat squamous in appearance; 4, 4, nuclei of ditto; 5, smaller rapidly-growing cells of basement layer; 6, 6, degenerated epithelial cells in which the nuclei have disappeared.

Specimen No. 2,265, Bartholomew's, is a case which would easily have been excised if it could have been diagnosed (Fig. 34).

II. TUMOURS OF THE BILE-DUCTS.

Tumours of the bile-ducts, *per se*, only occasionally form a projection so large as to be distinguished through the abdominal walls. Tumour, however, in such cases, is, as a

rule, present sooner or later on account of the obstruction in the ducts and secondary distension of the gall-bladder. The common duct has been found dilated to such a size as to form a cystic tumour, presenting all the characteristics of a distended gall-bladder, the gall-bladder itself being atrophied.

Terrier describes four cases in which an external fistulous opening was established in the common bile-duct. In three of these the duct was much distended, and formed a distinct abdominal tumour. The first case was one in which median laparotomy was performed for the removal of a swelling diagnosed as a cyst of the pancreas. The nature of this swelling having been revealed by the discharge of bile after puncture, a small portion of the wall of the cyst was excised, and the edges of this opening were attached to the external wound. The biliary fistula thus formed bled freely for some days after the operation, and subsequently suppurated. The patient died from anæmia and exhaustion on the twenty-ninth day.

In the second case, the much-distended duct, which had been regarded as a hydatid cyst of the liver, was exposed by laparotomy, incised, and attached to the wound in the abdominal wall. The patient died from collapse on the eighth day.

In the third case, the dilated duct was opened and stitched to the external wound, under the supposition that the tumour was a distended gall-bladder.

In the fourth case, it is not clearly stated whether the duct was distended or not, though it probably was. In this instance, the hepatic portion of the divided duct was fixed to the surface of the abdominal wall after removal of the gall-bladder, the cystic duct, and a small portion of the liver for cancer. The patient did well for some time after the operation, but died six weeks later from cachexia.

In his comments on these records, Terrier points out that in two of these cases the distension of the bile-duct, though clearly due to obstruction, was not associated with lithiasis. In the third case, the duct was found to be completely obstructed at its intestinal orifice by a small calculus. In each instance of distended bile-duct, the gall-bladder was

much shrunken, and its walls were sclerosed and surrounded by cicatricial tissue.

In two cases of this kind (Cases 150 and 121), I performed in the one choledochostomy after cholelithotrity, the patient making an excellent recovery; in the other choledochenterostomy, after cholecystectomy, the patient also doing well. Both patients are now in good health.

The first patient was a man of twenty-five, who had suffered severely from gall-stone symptoms associated with a tumour, supposed to be a dilated gall-bladder. Much to my astonishment, I found a small gall-bladder, external to the cystic tumour, which proved to be a dilated cystic and common duct, at the lower end of which was a gall-stone the size of a pigeon's egg, which broke into fragments as I was about to incise the duct to remove it. I opened the dilated duct and stitched it to the aponeurosis, performing choledochostomy in the same manner as cholecystotomy.

The second case was a woman of fifty-five, from whom I removed a very thick gall-bladder, which had the appearance of malignant disease; the cystic duct was greatly dilated, and formed part of the tumour, and I had no difficulty in introducing a Murphy's button and connecting it to the intestine.

Although hitherto the results of choledochostomy have not always been favourable, probably in consequence of the fact that extreme distension of the bile-duct is often accompanied by infection of the biliary passages, it would be well to reserve our opinion as to the prospects of the operation, until we have more experience of it. Very little information can as yet be obtained on this subject, cases of distension of the common bile-duct being very rare, and those in which surgery has intervened still more exceptional.

An interesting case is reported by Mr. W. P. Swain in the *Lancet* for March 23, 1895, in which he connected a dilated bile-duct to the jejunum by one of Murphy's buttons. The size of the tumour, which occurred in a girl of seventeen, and which was associated with gall-stones, may be gathered from the fact of over 7 pints of fluid having been withdrawn from it at the time of operation.

Three months after, the patient was progressing satisfactorily, except for an occasional rise of temperature, and for the fact that the button had not been passed.

Specimen No. 1,419, Guy's Museum, shows a dilatation of the common bile-duct. There is a thick walled cyst 6 inches across, representing the common bile-duct; the portion of

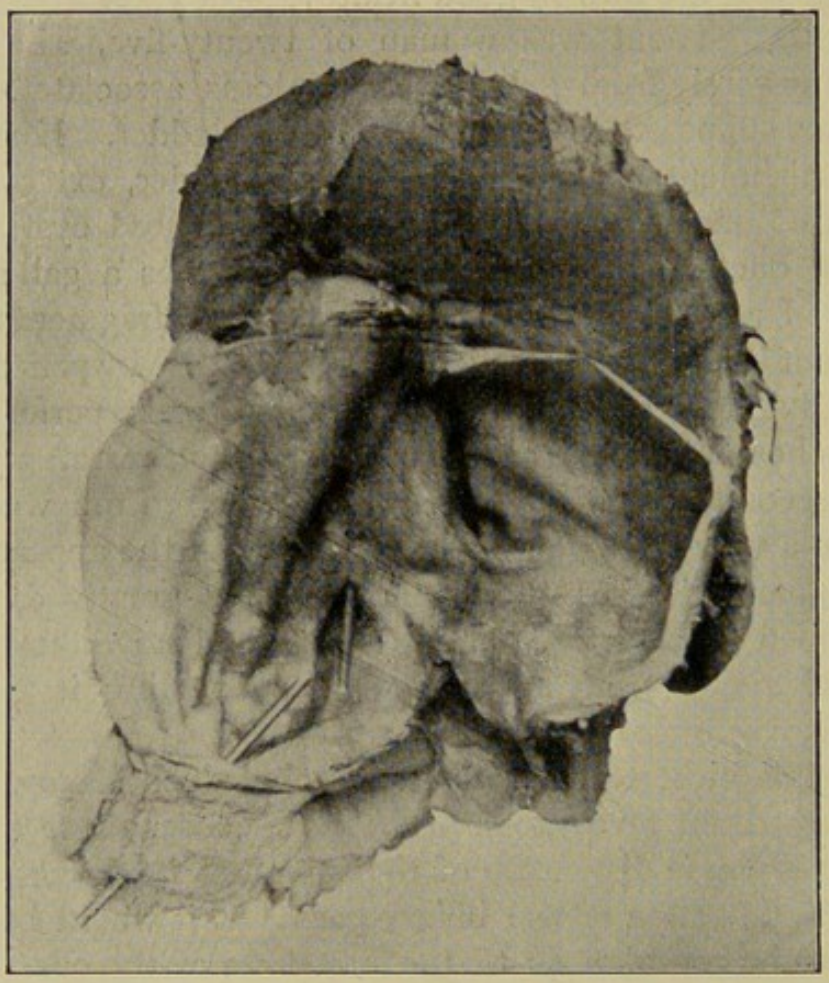

FIG. 39.—DILATED COMMON BILE-DUCT, FORMING A THICK-WALLED CYST SIX INCHES IN DIAMETER.

The terminal ¾ inch of the duct was less than the normal calibre, with a valvular fold completely obstructing the lumen. It was twice aspirated of 3½ pints of bile, and finally choledochostomy was performed, but the patient died two days after. (No. 1,419, Guy's Museum.)

duct below this is less than the normal calibre, and has a valvular fold, which completely obstructs the lumen. The tumour was aspirated twice, 3½ pints of bile being withdrawn on each occasion without relief, when choledochostomy was performed, and death ensued two days after (Fig. 39).

Dr. Arnison informed me of a case which was under his

care in 1891, where he operated on what was apparently a pancreatic cyst, which he drained. The patient was extremely ill at the time, and only lived a few days. At the autopsy the operation was found to have been a chole-

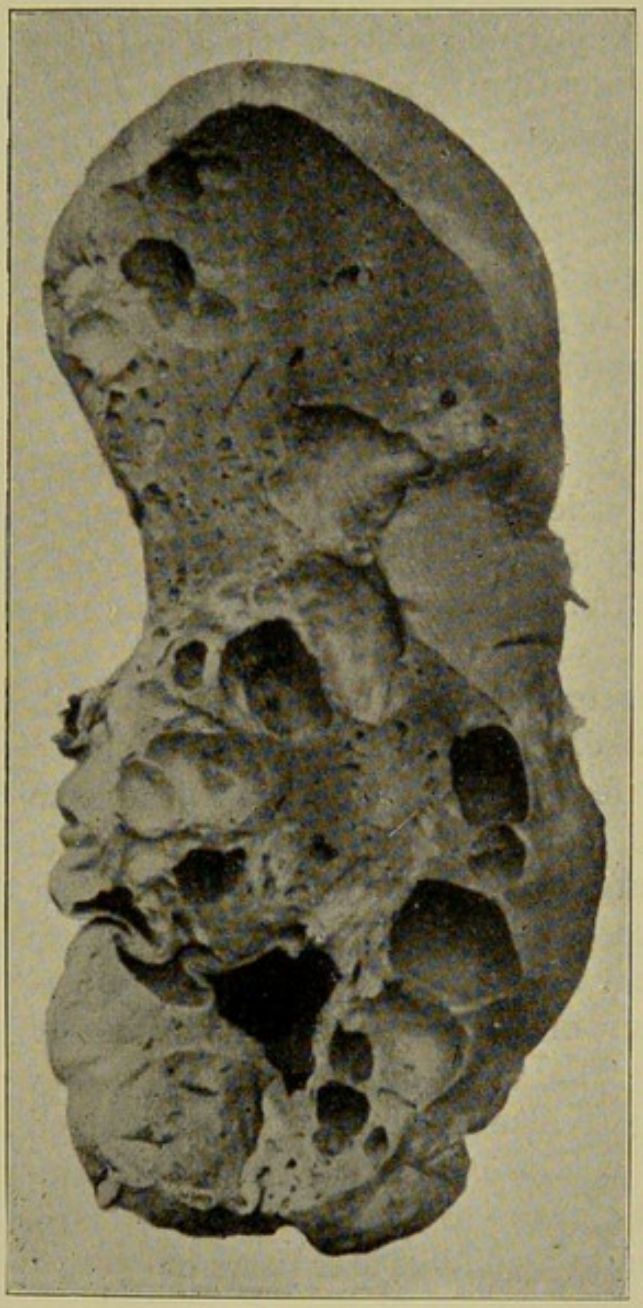

FIG. 40.—CYSTS IN LIVER, FORMED BY DILATED HEPATIC DUCTS.
(No. 2,758c, Royal College of Surgeons Museum.)

dochostomy, and the tumour to have been a dilated common bile-duct.

In the Hunterian Museum is a large tumour (Fig. 40) of the liver constituted by dilated hepatic ducts, which form a series

of cysts within the substance of the liver itself. There was no obstruction in the main bile channel.

The *new growths* found in the bile-ducts may be simple or malignant; of the malignant, we must take into consideration the two classes, primary and secondary, the former arising most frequently as the result of gall-stone irritation, the latter by extension from neighbouring organs.

Primary malignant growths may be:

(*a*) Cylindrical-celled carcinoma.
(*b*) Spheroidal-celled carcinoma.
(*c*) Sarcoma.
(*d*) Squamous epithelioma.

In the Hunterian Museum, specimen No. 2,809, is a melanotic sarcoma of the gall-bladder.

I am able to show a specimen of epithelioma of the cystic duct, which I successfully removed by operation (Case 127), also an example of cylindrical-celled carcinoma for which I performed cholecystotomy with temporary relief (Case 12).

Musser collected eighteen cases of cancer of the bile-ducts, and found cylindrical-celled carcinoma in all.

Rolleston refers to eleven cases in his paper in the *Medical Chronicle*, and out of these, nine consisted of cylindrical epithelioma and one of encephaloid carcinoma. Out of these eleven cases only four were associated with gall-stones. He thinks that calculi are less frequently associated with primary cancer of the bile-ducts than with cancer of the gall-bladder. The same arguments apply, however, as in cancer of the gall-bladder, where I fully discussed the matter.

Drs. Wilks and Moxon ('Pathological Anatomy,' p. 485) describe what appears to have been an extreme example of a duct papilloma in a child of four years of age. The common bile-duct was dilated so as to form a cyst as large as a child's head, and was occupied by crowds of pedunculous myxomatous growths containing muscular fibre.

In Dr. Rolleston's paper, a case is referred to which makes it probable that an adenoma preceded cancer. Papilloma is probably an earlier stage of cancer, and is rare.

Mr. Bennett removed one from the common duct of a

woman, aged fifty-eight, in St. George's Hospital, the specimen being shown at the Pathological Society of London in May, 1894. The growth was white and somewhat granular to the naked eye, and was in immediate relation with an impacted gall-stone. The papilloma was apparently due to the irritation of the calculus, which, from the history, had been impacted for two months.

Cancer is usually secondary to gall-stones, though, as in a case on which I operated, and which was reported at the Clinical Society in October, 1889, they may not always be found, having passed into the bowel before the operation.

Although these tumours are usually seen in the common duct, they may occur in the cystic or in the hepatic ducts.

In Musser's eighteen cases the hepatic ducts were alone involved three times, the cystic and hepatic ducts once, and the common duct fourteen times.

In Rolleston's eleven cases the common duct was always the seat of the tumour. These growths are usually found between fifty and sixty, and, unlike cancer of the gall-bladder, where 75 per cent. of cases occurred among women, the disease attacks both sexes equally.

Symptoms.—If forming in the cystic duct, jaundice will be absent at first, only coming on when the growth advances so far as to press on the common duct and obstruct the passage of the bile, or when, as is not uncommon, catarrh of the bile-ducts supervenes. The gall-bladder enlarges at an early stage, and this will probably be the earliest sign ; pain may be absent, unless gall-stones exist, when the usual spasmodic pains will occur so long as the muscular coat of the gall-bladder retains its contractile power.

When the growth is in the common duct, jaundice comes on at an early stage, and persists throughout, the liver gradually increasing in size, and the gall-bladder also enlarging ultimately; in the later stages, the change in the character of the blood brings about a condition rendering the subject prone to hæmorrhages from the nose, bowel, etc., to a petechial eruption in the skin, and to a tendency to bleed from wounds, thus rendering operation extremely hazardous.

Suppurative cholangitis is apt to supervene, the case then taking on a more acute course, and being accompanied by fever, ague-like attacks, and rapid loss of flesh and strength. If the tumour form in the hepatic duct, jaundice will be the earliest symptom, and the case will resemble one of obstruction in the common duct, with the exception of an absence of enlargement of the gall-bladder. Needless to say, the disease is uniformly fatal, though operation may delay the final catastrophe.

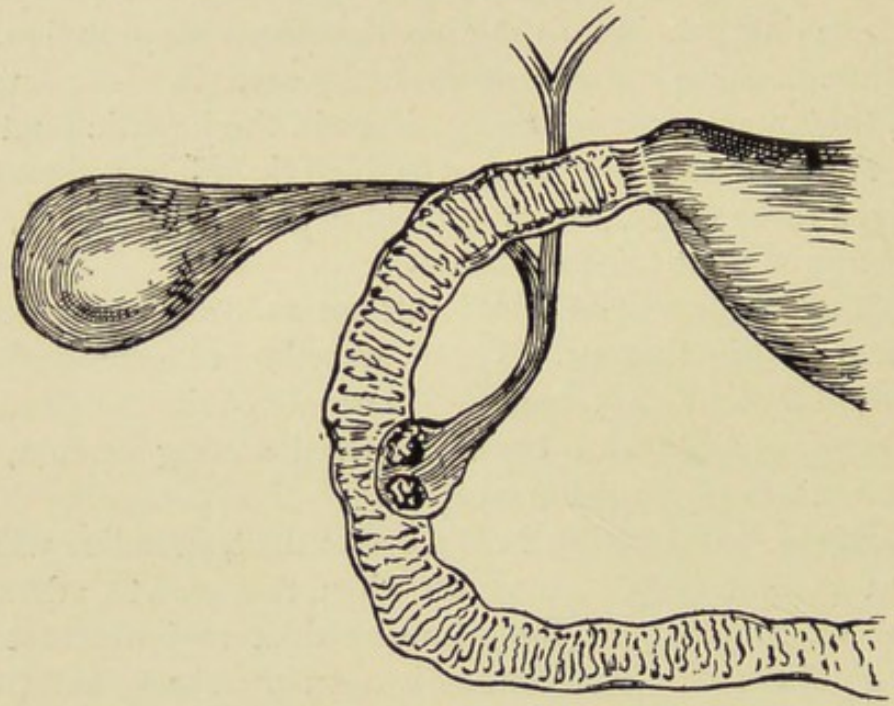

FIG. 41.—DIAGRAM TO ILLUSTRATE CANCER OF ORIFICE OF COMMON BILE-DUCT.

Cancer of the ampulla of Vater has received attention from M. Hanot (*Archives Générales de Médicine*, November, 1896), M. Durand-Fardel (*La Presse Médicale*, 1896), M. Rendu and Dr. Rolleston (*Med. Chronicle*, 1895). Two forms at least are described—one arising from the intestinal walls of the ampulla, and the other from the orifice of the common bile-duct and the pancreatic duct. They are characterized by intermittent jaundice, wasting and cachexia, but, as a rule, pain is absent.

The diagram (Fig. 41) shows the lips of the orifice of the common bile-duct invaded by a growth which does not pass beyond the limit of the ampulla. It was probably first de-

scribed by MacNeal in 1835 in the *North American Arch.*, Baltimore, and later by Stokes in 1846 (*Dublin Quarterly Journal of Medical Science*).

Diagnosis.—The diagnosis of new growth in the bile-ducts, from gall-stones, is practically impossible, as the symptoms are the same, and, in fact, the two frequently co-exist. The absence of pain in some cases and the rapid deterioration of health may afford a little help, but in some cases the pain may be as acute as in cholelithiasis.

Cystic dilatation of the bile-ducts is often indistinguishable from enlargement of the gall-bladder, as in Terrier's third case and in my own first case, for which it is usually mistaken; but it may resemble a cyst of the pancreas, as in Dr. Arnison's case and in Mr. Terrier's first case, or a hydatid tumour of the liver, as in his third case; but, as the treatment in all these conditions is abdominal section, no harm will be done if the diagnosis is only completed when the abdomen is opened.

Treatment.—The operative treatment of these tumours is in its infancy, and has thus far not proved uniformly satisfactory. Any growth should be removed if possible, but where that is impracticable, the dilated gall-bladder or ducts may be opened and drained, or, better still, drained into the duodenum or jejunum by means of one of Murphy's buttons.

If the cause be a removable one, such as a gall-stone, it should be taken away. Choledochostomy has not yielded good results in cystic dilatation of the bile-ducts, my own case being, I believe, the only example of recovery after the operation, whereas the experiences of performing an anastomosis between the cyst and the intestine, though as yet slight, has been so satisfactory as to establish its claim to being considered the best method of treatment.

CHAPTER V.

THE SURGICAL TREATMENT OF GALL-STONES, OR CHOLELITHIASIS.

THE importance of this subject may be gathered from the facts that post-mortem records on persons of all ages and both sexes prove gall-stones to be present in from 5 to 10 per cent. of all Europeans, in Strasburg the record being 12 per cent. (Schroeder), in Kiel 5 per cent., and in Manchester 4·4 per cent. (Brockbank).

Time will not permit me to enter on the pathology of the subject, although it is of such great interest, nor can I discuss the causes, composition, sizes, numbers or varieties of gall-stones, or enter into the ordinary symptoms, complications, diagnosis, and medical treatment, all of which subjects I have recently written on, in my article in Professor Clifford Allbutt's 'System of Medicine.' I must therefore at once pass on to the consideration of the surgical treatment of cholelithiasis, a subject of great importance, which will, I think, well repay careful study. Permit me first to draw your attention to the list of cases on which I have operated, and which will serve as a basis for my further remarks.

It is, of course, impracticable to give the full details of each case in the time allotted to me, and were I to attempt it, I know that I should only weary my audience. Each case is numbered in chronological order, and in the course of my remarks I propose to refer to the numbers so as to save time; but should anyone be specially interested in any one example, or in any group of cases, I shall be glad to give him fuller details.

An analysis of the table shows, that out of 170 operations of all classes, including malignant cases, 10 patients died.

Of the 93 patients without jaundice all recovered, all the deaths occurring among the 77 jaundiced cases.

Of the 10 patients who died, only 4 were the subjects of gall-stones, and they had deep jaundice or infective cholangitis, or both, at the time of operation; the remaining 6 were for the most part the subjects of malignant or other fatal diseases.

It will be found that, out of 115 cholecystotomies, there were 5 deaths, 3 being the subjects of cancer and 2 of suppurative cholangitis with jaundice; in other words, the mortality of cholecystotomy for gall-stones is only a little over 1 per cent. There were 7 cholecystectomies with 1 death, which is equivalent to a mortality of 14·28 per cent. That death was due to want of efficient drainage.

Of the 26 cholelithotrities all recovered.

Choledochotomy furnishes 6 cases in the list, out of which 1 patient died, as the result of an accidental laceration of the intestine in separating adhesions, not noticed at the time of operation. The mortality of choledochotomy therefore is equivalent to 16·6 per cent.

Of the 11 cholecystenterostomies, 1 died, and as that patient was the subject of extensive malignant disease, the percentage mortality of the operation for gall-stones is therefore nil.

Of the abdominal sections, 32 in number, 2 patients died from shock and hæmorrhage; these were among the 19 operated on for tumours or other serious organic disease; but out of the 11 operated on for separation of adhesions, 3 for intestinal obstruction, and 1 for peritonitis, all recovered.

Surgical Treatment.

After medical treatment has been fairly and fully tried and failed, I think all are now agreed that surgical measures should be resorted to.

While cholecystotomy is generally recognised as the operation to be aimed at in the treatment of affections of the gall-bladder or bile-duct, especially in cholelithiasis, it is often impossible to say what operation will have to be done until the abdomen is opened.

The indications for operating would seem to me to be as follows:

1. In frequently-recurring biliary colic without jaundice, with or without enlargement of the gall-bladder.

2. In enlargement of the gall-bladder without jaundice, even if unaccompanied by great pain.

3. In persistent jaundice ushered in by pain, and where recurring pains, with or without ague-like paroxysms, render it probable that the cause is gall-stones in the common duct.

4. In empyema of the gall-bladder.

5. In peritonitis, starting in the right hypochondrium.

6. In abscess around the gall-bladder or bile-ducts, whether in the liver, or under, or over it.

7. In some cases where, although gall-stones may have passed, adhesions remain and prove a source of pain and illness.

8. In fistula, mucous, muco-purulent or biliary.

9. In certain cases of chronic jaundice, with distended gall-bladder dependent on some obstruction in the common duct, although the suspicion of malignancy be entertained. In such cases the increased risk must be borne in mind, as malignant disease may be the cause of the obstruction, and operation in such cases is attended with greater danger than ordinary.

10. In phlegmonous cholecystitis and in gangrene, if the case be seen and recognised at a sufficiently early stage of the disease.

11. In gunshot injury or in stab wounds over the region of the gall-bladder.

12. In suspected rupture of the gall-bladder without external wound.

13. In some cases of chronic catarrh of the gall-bladder or bile-ducts.

14. In infective and in suppurative cholangitis.

Of the operative measures undertaken for diagnosis, sounding and aspiration of the gall-bladder must be referred to. The so-called 'sounding for gall-stones,' either by means of a probe passed through a cannula, or by the fine needle of an aspirator, is both uncertain and dangerous, and

may more safely be replaced by a small exploratory incision, which can be extended for treatment if required.

Aspiration of a distended gall-bladder through the unopened abdomen, though apparently a simple procedure, is not unattended with danger, death having followed in more than one instance. Murphy says it is fatal in 25 per cent. It is only in very exceptional cases that it can do any good.

I infinitely prefer to make a small exploratory incision, then to empty the gall-bladder by the aspirator, and afterwards to explore the bile-passages with the fingers. If, however, aspiration without exploration be decided on, a small needle should be used, and the cyst emptied as far as possible, in order that intracystic tension may not lead to extravasation through the needle puncture.

Since in the majority of cases, an operation for gall-stones is in the first place simply exploratory, the actual operation on the gall-bladder or bile-ducts being only determined by the conditions found when the abdomen is opened, it may be well for us first to consider a simple abdominal section in the gall-bladder region.

Position of Patient.

It has been proposed to suspend the upper part of the trunk when the patient is on the operating-table, by straps placed under the armpits, in order to allow the intestines to fall away from the liver, and thus to afford a better view of the parts to be operated on, just as the Trendelenberg position does in the case of the pelvic organs; but as this is inconvenient, and as a rule impracticable, it is worth considering whether we can in any way modify it. I think it will be found that a narrow firm sand-bag covered with flannel, placed at the liver level on the operating-table under the back, which is thus arched over it, will do all that we require, as it brings the common duct from 2 to 3 inches nearer the surface, opens out the costal angle, and tends to make the intestines slip down from the liver.

I have never seen or heard of this method having been made use of by others, but, as I have employed it on many occasions, I can speak well of its utility.

Incision.

A vertical incision in the right semilunar line is the one most frequently resorted to, and is the one I prefer. If there be a perceptible tumour, it is well to make the incision over the most prominent part; if there be no tumour, but an enlarged liver, the upper end of the incision will have to commence at the hepatic margin. If, however, as is so often

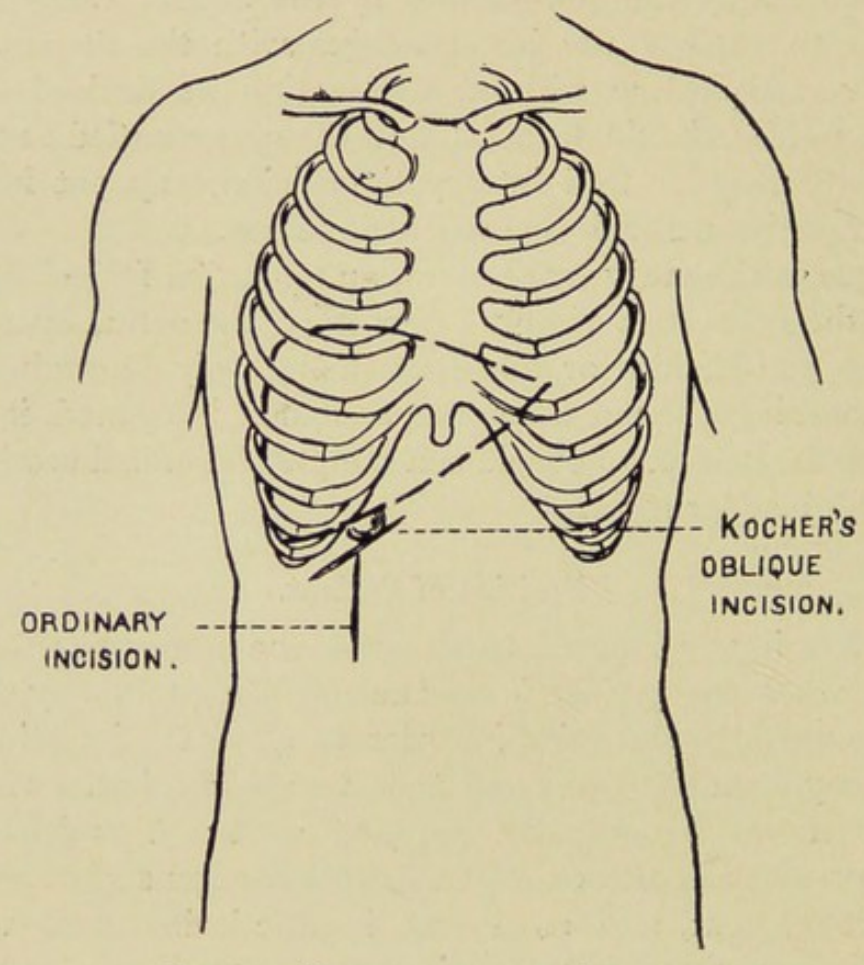

FIG. 42.—DIAGRAM TO SHOW INCISIONS.

the case, there be neither tumour nor enlargement of the liver, the incision will be from the ninth costal cartilage, vertically downward for 3 inches.

As a rule, the aponeurosis in the semilunar line is divided, but if the rectus be wide, its fibres may be separated, and the anterior and posterior layers of the rectus sheath will then be separately cut. If more room be required, it can be obtained either by extending the vertical incision or adding

a transverse one, either internal or external to the vertical line, in whichever direction it may seem advisable. It is desirable to avoid, as much as possible, dividing muscular fibres, as they retract and can only with difficulty be approximated in suturing the wound.

The transversalis fascia and peritoneum are best divided together, without separating them, as together they form a strong membrane, whereas singly they are too weak to hold stitches if there be tension.

Kocher employs an oblique incision parallel to the right costal margin (Fig. 42), which of necessity divides muscle, but which exposes the parts freely, as the wound at once gapes widely.

Although for cholecystotomy the transverse incision is quite unnecessary, and to my mind usually inadvisable, where it is necessary to expose or manipulate the common duct it presents the advantages of better exposure and more efficient drainage.

The lumbar incision, which has been suggested in order to reach the common duct without opening the peritoneum, is useful only in theory, and is surrounded by so many difficulties that it is quite impracticable.

Arrest of Hæmorrhage.

As a rule, pressure forceps and an occasional ligature effect all that is desirable or necessary; but in cases of long-standing jaundice, especially if accompanied by malignant disease, additional precautions are advisable on account of the tendency to hæmorrhage.

In order to avert this danger in deeply-jaundiced patients, I have found the administration of chloride of calcium, in 30 grain doses every four hours for a few days before operation, to make the blood more plastic and to lessen the tendency to bleeding, both at the time of operation and subsequently.

For this therapeutic measure I am indebted to Dr. A. E. Wright, whose researches on the 'Coagulability of the Blood,' published in the *British Medical Journal* for December 19, 1891, are well worthy of study. After operation, the drug

may be continued either by the mouth or by nutrient enema for some time with advantage. In jaundiced cases, I also prefer to ligature all bleeding-points, rather than to trust to pressure forceps for hæmostasis.

In order to remove the danger of ventral hernia, I suture the abdominal wall layer by layer, employing chromic carbolized catgut for the deep, and silkworm gut for the superficial, sutures ; but if the operations have been very prolonged, and the patient be suffering from shock, it may be advisable to suture the parietes *en masse*, using silk of medium thickness, and passing the sutures from within outward at intervals of half an inch. Where it is considered wise to employ gauze packing, it is well to apply the sutures and to leave them long, so as to be able to draw the edges of the wound together after the tampon has been removed, without putting the patient to the inconvenience of inserting stitches later.

The preliminary preparation and the after-treatment of these cases differs in no respect from that of abdominal section in general.

Cholecystotomy or cholecystostomy usually follows on exploration, as it is unquestionably the operation *par excellence* in the treatment of gall-stones.

The indications for the operation are :

1. In all cases where the gall-bladder is sufficiently large to permit of drainage, after gall-stones have been removed from the gall-bladder or ducts.

2. In cases where there are gall-stones in the ducts, but the patient is too ill to bear a prolonged operation, the gall-stones being deliberately left for treatment by some solvent solution.

3. In empyema of the gall-bladder, where that viscus is not too much disorganized to be permitted to remain.

4. In certain cases of chronic catarrh of the gall-bladder or bile-ducts.

5. In infective and in suppurative cholangitis.

6. In obstruction of the ducts due to hydatid disease.

7. In dropsy of the gall-bladder.

8. In idiopathic rupture, or laceration, or gunshot injury of the gall-bladder or ducts.

9. In cases of choledochotomy, in order to avoid tension in the sutured duct.

10. In certain cases of obstructive jaundice dependent on malignant tumour, which is occluding the ducts; but in these cases the increased danger must be borne in mind.

11. In some cases of phlegmonous cholecystitis or gangrene, where the patient is too ill to bear cholecystectomy.

Technique of Cholecystotomy.

If the gall-bladder be found distended, it is aspirated and then opened, the parts being isolated by thin flat sponges.

If, as is often the case, the gall-bladder be small and atrophied, it will probably be surrounded by adhesions, which require careful separation, which can for the most part be better done by touch than sight. If the operation has been undertaken for gall-stones, they are removed by means of forceps passed through the opening in the gall-bladder, or better still by the scoop which I now show: if they be small, they are removed whole; if large, they may be directly needled, or crushed and removed in fragments.

After the gall-bladder has been cleared, the fingers of the right hand are passed along the outside of the ducts, when, if there be any other concretions, they can as a rule be felt, and if possible they should be manipulated backward into the gall-bladder, from which they can be removed. If this be impracticable, without undue force, cholelithotropsy or choledochotomy may be necessary, which operations I shall consider later.

Supposing the bile-passages to have been cleared, or for some reason further manipulations are considered inadvisable, a non-perforated rubber drainage-tube is inserted into the gall-bladder, and the edges of the incision in it are brought up and sutured by fine chromic catgut to the aponeurotic layer of the abdominal wall, not to the skin, thus avoiding the danger of fistula, as between the opening in the gall-bladder and the skin is a considerable thickness of tissue, which soon becomes covered with granulations, and their contraction in healing secures closure.

Since adopting this method I have never had a fistula to

follow cholecystotomy, if the ducts have been cleared. Where there is time, I prefer to suture the peritoneum of the gall-bladder to the parietal peritoneum and the mucous margin to the aponeurosis, thus more completely shutting out the peritoneal cavity. The remainder of the parietal incision is closed as described under simple exploratory incision.

In ordinary simple cases the drainage-tube is shortened on the second or third day, and removed on the fourth or fifth; but if there have been much cholecystitis or cholan-

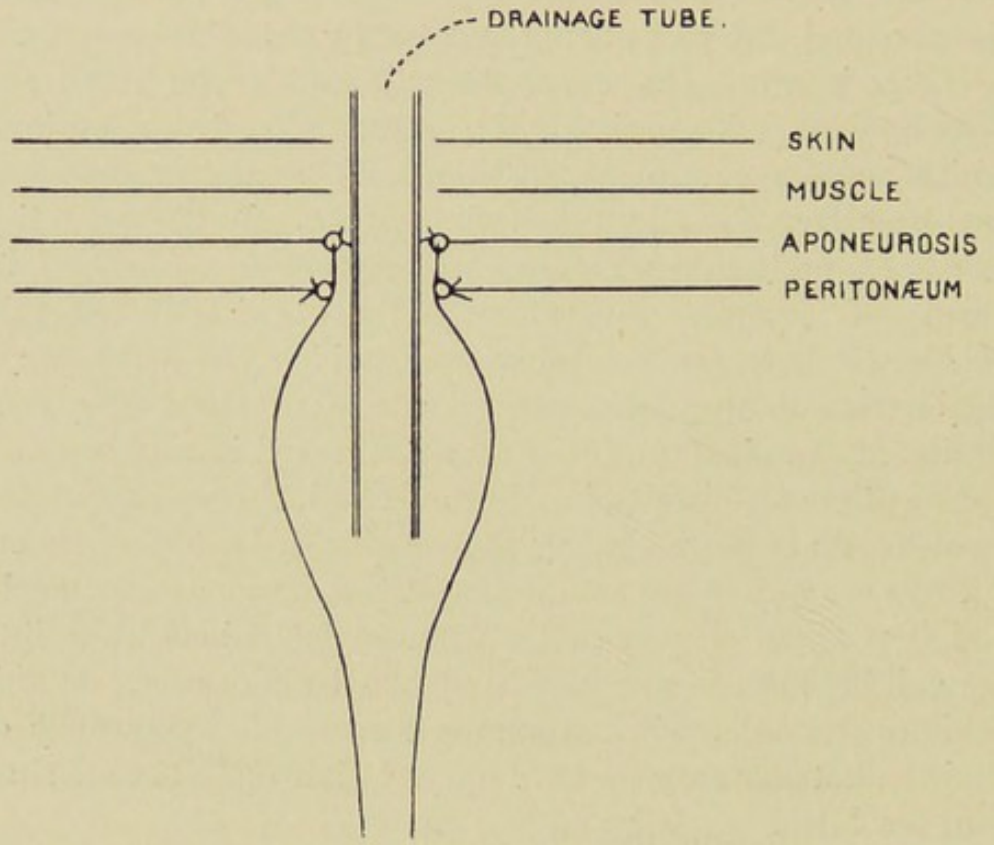

FIG. 43.—DIAGRAM TO ILLUSTRATE MODE OF SUTURE IN CHOLECYSTOTOMY.

gitis, it is better to drain for a week, or even longer. Dr. Terrier, in operating for suppurative cholangitis, suggests that the discharge should be bacteriologically tested from time to time, and that the tube should not be removed until the bile is sterile or nearly so, for at first it is loaded with organisms, and if all goes well these diminish, and finally disappear.

The tube may be either cut off close to the surface or may be brought through the dressings into a receptacle placed by

the side of the patient. The latter method saves frequent dressings, which are otherwise necessary when the discharge is free.

This description applies to the ordinary operation on a gall-bladder of ordinary size, or to one distended; but in case of a contracted gall-bladder situated deeply, the operation may be both prolonged and difficult. Where I have been unable to bring up the gall-bladder, I have at times succeeded in tucking down the parietal peritoneum to the edges of the gall-bladder opening and so effecting suture of the contiguous margins; but in several cases where I could not effect this, I have with complete success utilized the right border of the omentum, by suturing it to the margin of the gall-bladder opening and to the parietal peritoneum, thus forming a tube of peritoneum around the drainage-tube, and shutting out the general peritoneal cavity. This method has also since been efficiently employed by Mr. Arthur Barker. Where occlusion in this way cannot be effected, the insertion of a drainage-tube into the gall-bladder, without suture of the margins to the parietes, seems to be efficient, for it is, on account of intra-abdominal tension, easier for the bile to pass away directly through the tube than to enter the abdomen, and it is probable that within from twenty-four to forty-eight hours, plastic peritonitis shuts out the drainage track from the general peritoneal cavity. The method of packing around the tube with iodoform gauze in such cases is one in which I have great faith, as I have found it to be a safe means of occluding the peritoneal cavity.

Mr. Knowsley Thornton suggested suprapubic drainage in cases where occlusion of the bile-channels is doubtful; but if I require to drain the abdominal cavity in such cases, I prefer to do it either by means of a tube passed into the right kidney pouch and brought out at the lower end of the original incision, or through a stab puncture in the right loin.

Dr. Murphy has invented a 'button tube' for use in cases where the gall-bladder is contracted and cannot be brought to the surface; but in practice I have found that the contracted gall-bladder is, as a rule, too small to permit of its

employment, and, though I have taken it with me regularly to a number of operations, I have never yet met with a case where I thought it desirable to employ it.

In certain cases where the gall-bladder is contracted, after opening and clearing it and the ducts, the incision may be immediately closed by suture, the line of incision being isolated by a gauze drain; or in other cases cholecystectomy may be performed, and the cystic duct ligatured, the gauze drain being again employed; or, as suggested by Morison, the incision in the gall-bladder may be deliberately left patent, and the bile allowed to run into the right kidney pouch, from which it is removed by a drainage-tube in the loin.

The operation of cholecystotomy has been modified in several ways; for instance, the opening has been closed and then fixed to the abdominal incision, which has been closed over it; this operation is known as cholecystendysis (Courvoisier).

It can only be of use where the ducts are known to be thoroughly cleared, where there is no fear of subsequent stricture, and where there is no catarrh or inflammation of the bladder or bile-passages. I employed it in Case 116, for the cure of a biliary fistula.

The so-called 'ideal' operation suggested by Langenbach (*Centralbl. für Chirurgie*, 1887), in which the opening in the gall-bladder is sutured, and the viscus returned without fixing it to the surface, has been thought by Lange, Meredith, Kuster, Keen, and others, to be attended with greater risk than the operation of cholecystostomy. If it be thought advisable to adopt this method, it is necessary to prove that the ducts are clear, and this may be accomplished by distending the gall-bladder with warm sterilized water, and then forcing it through the ducts, or by catheterism of the ducts, as advocated by Drs. Terrier and Dalby (*Revue de Chirurgie*). I have employed both methods, but prefer the former, both on account of its safety and efficiency.

Recently reported cases of 'ideal' cholecystotomy would seem to prove that the dangers at first attending the operation may be overcome by a proper selection of cases, and

by carefully suturing the mucous, muscular, and serous margins separately; but I think the serious objection to it is that the benefits of drainage are not obtained, as in the operation of cholecystostomy.

A real use for this modification is found in cases where it has been necessary to open a contracted gall-bladder, but where, on account of the depth, it is found impracticable to bring it to the surface, as also when, from the contraction of its cavity, it is found impossible to insert a drainage-tube. Under such circumstances, sutures can readily be applied by means of a rectangular cleft-palate needle, or by Mr. Lane's needle-holder. The line of suture is made secure against dangerous leakage by the gauze drain, the lower end of which is packed moderately firmly over the gall-bladder.

Another modification suggested by Bloch is that in two stages. The operation consists in incising the parietes until the peritoneum is reached, the cavity of which, however, is not opened; the wound is then packed with gauze, and left for several days, when adhesions will have formed between the gall-bladder and the parietal peritoneum. The gall-bladder can then be safely opened. Or if the peritoneum be opened, the gall-bladder is fixed, but not opened until adhesions have formed.

As the method is only available for the simplest cases, viz., where the gall-bladder is distended, as it does away with all chance of exploring the ducts by the hand within the abdomen, and as it is frequently followed by fistula, I would only mention it to condemn it as clumsy and uncertain, and no safer than the ordinary operation of cholecystotomy.

In this opinion I would make one exception: I think the operation *à deux temps* presents considerable advantages when cholecystotomy is being undertaken in the presence of chronic jaundice associated with distended gall-bladder, as in such cases there is usually malignant disease either of the head of the pancreas or of the bile-ducts, and when the peritoneum is exposed but not opened, pressure can be applied to arrest the oozing of blood, which cannot always be stopped by ligatures or forceps. Bloch, however, in his original papers, and in his latest, in the *Revue de Chirurgie*

for 1895, does not recommend the operation for this reason, but on account of the fear of septic contamination of the peritoneum, which ample experience proves to be groundless.

The statistics of cholecystotomy vary very considerably in different hands. As in ovariotomy, experience leads to greater success, and those who have done a considerable number of operations will, as a rule, show the best results. Out of 115 cholecystotomies which I have performed, there were 5 deaths, 3 being the subjects of cancer, and 2 of infective cholangitis with jaundice. In other words, my mortality in cholecystotomy for gall-stones is only a little over 1 per cent., or even including malignant cases, only 4·34 per cent.

Murphy of Chicago, at the Roman Congress, collected 201 cases of cholecystostomy, the mortality being 19 per cent.

Courvoisier gives the statistics, up to 1890, of 104 cases, the mortality being 21·14 per cent., and 16 per cent. had fistulæ. Of 31 cases operated on in two stages, the mortality was only 12·5 per cent., but 34 per cent. were left with a fistula.

Martig, up to 1893, gave the mortality as 17 per cent., with a fistula remaining in 20 per cent.; for the operation *à deux temps* he gives a mortality of 10 per cent.

Delagenière, in 1890, collected 99 cases with 17 deaths, or a mortality of 17 per cent.

Kehr, Halberstadt (*Berlin Klin. Wochenschr.*, June 15, 1896), gives the result of 209 operations on the gall-bladder and bile-ducts, in 174 different patients. Of his simple cholecystotomies, there was barely 1 per cent. of deaths; but of his complicated ones the mortality was 58·8 per cent., or a loss of 10 out of 17 cases, making the all-round mortality a little over 6 per cent. Mr. Greig Smith gives 11 simple cases without a death, and 1 complicated case which died, equivalent to 8·33 per cent.

Mr. Lawson Tait has published 55 cases, with 3 deaths—equivalent to 5·4 per cent.

Mr. Page, Newcastle, has been so kind as to furnish me

with the result of operation at the Newcastle Infirmary, where out of 24 operations 6 died.

Dr. Murphy, of Sunderland, has had 16 operations, with 2 deaths.

Mr. Symonds has performed 8 operations, with recovery in all, and Mr. Knowsley Thornton tells me that he has only had 3 deaths—all complicated cases.

With regard to recurrence, if the ducts be cleared and the gall-bladder drained, relapse is rare.

An eminent operator recently told me that he thought fistula frequently followed on cholecystotomy, which, however, is quite at variance with my experience since I adopted the modification of suturing the edge of the gall-bladder incision to the aponeurosis and not to the skin, for it distinctly proves that fistula will only follow under such circumstances if the ducts have not been cleared, and then it is better that there should be such a safety-valve, which can be remedied by a further operation.

In my first ten cases I had five fistulæ; these were all operated on by stitching the gall-bladder to the skin. In my later 160 cases, there were only seven fistulæ, all of which were cured by further clearing the ducts or short-circuiting the obstruction.

As one would expect, cholecystotomy *à deux temps* is often followed by fistula. Martig gives 20 per cent., and Courvoisier 34 per cent., which, of course, are due to imperfect clearing of the ducts.

After cholecystotomy has been performed, and the gall-bladder cleared of its contents, it may be found impracticable to remove other gall-stones impacted in the cystic or common ducts, either by means of forceps or scoop introduced through the gall-bladder incision, or by digital manipulation from without.

Under such circumstances, the gall-stones may be crushed or removed by choledochotomy, or under certain circumstances cholecystenterostomy may be performed. As crushing is the least severe procedure, and as I have had considerable and favourable experience of it, I will describe that operation first.

Calculi in the Common Bile-duct.

Before proceeding to a description of cholelithotrity or choledochotomy, it may be advisable to refer to the special condition of cholelithiasis, where the gall-stones are in the common duct, which, according to Courvoisier, occurs in about 4 per cent. of all cases. A reference to the cases that have come under my care shows this to be an under-estimate, as I find that, out of 170 cases on which I have operated, there were gall-stones in the common bile-duct on twenty-eight occasions, which equals 16·4 per cent.

Fenger has recently written on this subject in the *Annals of Surgery*, and quotes Conrade's statistics; he says that, in ninety-seven cases, he found gall-stones in the gall-bladder alone in eighty-two, in the gall-bladder and common duct in ten, and in the common duct alone in five.

Courvoisier says that in two-thirds of the cases there is only one gall-stone, and in the remaining third they are multiple, six being the largest number found. My experience shows a much larger proportion of multiple calculi in the common duct.

In 67 per cent. the stone is in the duodenal end of the duct, in 15 per cent. in the hepatic, and in 18 per cent. in the middle portion, where it is the most easily reached. In about a quarter of the cases the duct was dilated, and in some it was cystic, and the gall-stone floating.

Fenger has dwelt on the great importance of the ball-valve action of floating stones in the common bile-duct as explaining the remittences of jaundice in many cases, where it might have been supposed that the jaundice would be persistent. I have operated on five cases of floating stone, but in the greater number of my cases the concretions were, though easily moved by the fingers, too fixed to be called floating.

Fenger explains the contracted condition of the gall-bladder, which is almost universally found in cholelithiasis, to this floating of gall-stones in the ducts; but, as the same condition occurs where the gall-stones are fixed, this explanation must be only a partial one.

In my paper before the Clinical Society in 1888, and again on p. 82 of my work on Gall-stones published in 1892, I drew attention to this contraction of the gall-bladder as an important diagnostic point, and this has been borne out by other observers independently. I then remarked that jaundice with distended gall-bladder was presumptive evidence in favour of malignant disease, but that jaundice

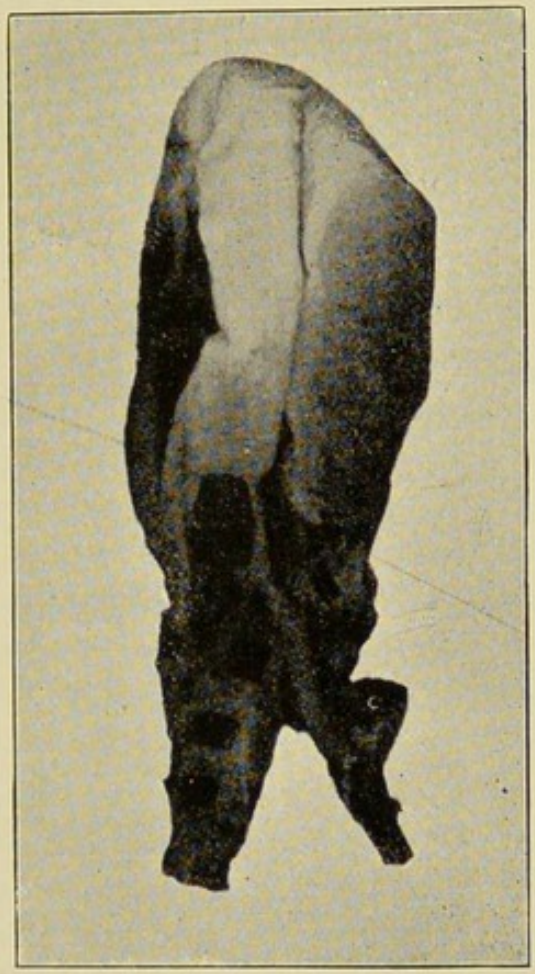

FIG. 44.—HEPATIC AND COMMON DUCTS DISTENDED WITH CALCULI—ONE IN CYSTIC DUCT, NONE IN GALL-BLADDER.

(No. 2,825, Royal College of Surgeons Museum.)

without distended gall-bladder favoured the diagnosis of cholelithiasis.

Of thirty-five operations for obstruction in the common duct, Courvoisier found that eighteen were due to causes unconnected with gall-stones, such as cancer, stricture or tumour; out of these, the gall-bladder was dilated in sixteen, whereas only seventeen were dependent on gall-stones, and

out of these seventeen, the gall-bladder was atrophied in thirteen.

Whilst Fenger's explanation is not all-sufficient to account for this contraction of the gall-bladder, neither does that given by Courvoisier fully explain it: he says the contraction is due to chronic inflammation of the walls of the gall-bladder set up by the stones when in it, before they passed into the ducts. This cannot account for all cases, for in some the gall-stones have never been in the gall-bladder, having been formed in the hepatic or common ducts. I think the explanation is due to a combination of causes:

1. All cases of cholelithiasis are accompanied by inflammation of the walls of the biliary passages, as shown by the almost universal presence of adhesions around the gall-bladder.

2. Gall-stones in the common duct seldom cause complete obstruction, either because they are floating in the duct or because they only partially fill it; there is therefore no sufficient backward pressure to cause dilatation of the gall-bladder.

3. The muscular coat of the gall-bladder, though feeble, is sufficient to enable it to contract, which it doubtless does in efforts of expulsion when there is any obstruction in the common duct.

4. The contraction, from being at first intermittent, becomes in the long-run constant, and the accompanying inflammation fixing the contracted gall-bladder, it atrophies.

The special symptoms pointing to stone in the common duct are: Absence of enlargement of the gall-bladder, with frequent mild attacks of pain, followed by an intensification of the jaundice, which in many cases never quite disappears. The seizures are often associated with intermittent feverish attacks and loss of weight. The pain is in the epigastric rather than in the right hypochondriac region, and passes through to the right dorsal or lumbar, rather than to the right infra-scapular, region.

Where jaundice is continuous and intense without much variation, especially if the gall-bladder be enlarged, there is usually malignant disease or some other cause than gall-

stones. All the other symptoms characteristic of gall-stones may have been present for some time previously, or may coexist with those above mentioned.

The treatment of calculous obstruction in the common duct is of the utmost interest, both on account of the difficulties to be overcome and the great importance to the patient, who in the greater number of cases is otherwise condemned to a lingering and painful illness, often ending in death.

1. In a few cases, a concretion of moderate size may be manipulated backwards into the cystic duct, and thence extracted by scoop or forceps; but it is seldom practicable, on account of the contraction of the gall-bladder and cystic duct.

2. Occasionally a small stone may be pressed into the duodenum, but this is rare, and not infrequently it may be pushed into a dilated diverticulum of Vater, and so be missed and the whole operation rendered futile.

3. Cholecystostomy, with subsequent treatment by solvent injections, is well worth bearing in mind, on account of its simplicity and safety, together with the certainty of giving immediate relief with a modicum of risk, and putting the patient in better condition for subsequent treatment, should such be necessary.

4. Cholelithotrity, or crushing the stones *in situ*.

5. Needling concretions through the duct walls.

6. Choledochotomy, or incising the duct and removing the calculi.

7. Choledocho-duodenotomy, or reaching the duct through the opened duodenum, for stones impacted in the duodenal end of the duct.

8. Cholecystenterostomy, or short-circuiting the obstruction.

9. Choledochenterostomy, or uniting the duct to the gut in case of largely dilated ducts.

10. Choledochostomy, or attaching the dilated duct to the surface and draining it.

It will thus be seen that the surgeon has a great variety of operations to choose from, and he will act the wisest who,

knowing all, is able to choose that peculiarity adapted to the case in hand. The various operative procedures I propose to consider in detail.

Cholelithotrity was first suggested and put in practice by Mr. Lawson Tait, and has since been extensively and most successfully employed by him, by myself and others. The ordinary incision for cholecystotomy may be large enough, but if the patient be stout, or the ducts cannot easily be reached, it may have to be increased so as to allow the hand to pass into the peritoneal cavity, in order that the fingers may locate and grasp the stone *in situ*. If the right hand be used, the thumb will enter the foramen of Winslow, and the index-finger will pass in front of the common duct; or in case of the left hand being used, these digits will be reversed, when the whole force of the opposing finger and thumb can be brought to bear on the concretion. I have found by experiment that this force amounts in my own hands to 10 kilogrammes without support to the fingers, and 13 when the fingers are supported.

Usually the gall-stone flattens out into a wafer shape, and in altering the position of the digits, the edges of the wafer are compressed, and the concretion is either converted into pulp or breaks into innumerable fragments, which can be passed on towards the duodenum or subsequently washed through.

I have performed this operation twenty-seven times, and have had no subsequent trouble on account of damage to the ducts.

In some cases of stones in the common duct, the concretions have been too hard to crush, and I have had to perform choledochotomy.

The disadvantages of cholelithotrity, are, first, the fear of seriously damaging the ducts by the manipulation, and, secondly, the danger of leaving fragments permanently in the passages, which may then grow by further deposit of cholesterine.

The cases referred to show that the first danger need not be feared, if the finger and thumb only be used as the compressing force; but I think it might be real if attempts were

made to crush hard stones by instrumental means, although I did employ padded forceps to some of my earlier cases.

The question of **needling impacted concretions** by the passage of a needle through the walls of the duct was raised by my colleague, Mr. Teale, in 1895. In my work on Gall-stones published in 1892 (p. 144), I referred to the subject, and Mr. Knowsley Thornton has employed it; it was also fully discussed after a paper I gave before one of the societies, and I think it was almost unanimously decided that, although concretions might be broken up by needling, the operation was inadvisable on account of the almost unavoidable damage to the ducts and the fear of infection.

It may, however, be borne in mind that some of the very hard stones can be broken up by means of a needle, and that the fragments can be further crushed between the finger and thumb.

The second danger, of leaving fragments in the ducts, may be overcome, by, at the same time, performing cholecystotomy and later syringing the ducts with sterilized water until they are clear of débris, or, if any fragments should be unavoidably left, by applying through the fistula some solvent solution.

In one case, after cholecystotomy, with crushing of calculi in the common duct, the fragments did not pass until I injected a few drops of a solution of turpentine in ether into the fistula; great pain followed, the duct became patent and the fistula closed, the patient having remained well since. The result in this case was probably rather due to the contractions set up in the duct than to the solvent action of the remedy used; and I cannot, on account of the severe pain set up for some hours, recommend its employment, though in this case the result was good. A more efficient method, which I now employ whenever I have reason to think that any of the fragments remain in the ducts, or wherever I have deliberately left a gall-stone which I could not crush and did not think it wise to remove by choledochotomy, is to syringe a warm ·5 per cent. solution of sapo animalis or warm olive-oil through the fistula night and morning until the passages are quite free.

The olive-oil and soap solution probably act in a double capacity as solvents and as lubricants.

Dr. Brockbank found that a gall-stone placed in a ·5 per cent. solution of sapo animalis in distilled water, and kept at the body heat in an incubator, lost 34 per cent. of its original weight in three weeks, and that a similar concretion in a ·1 per cent. solution lost 14 per cent. of its weight in the same time.

Choledochotomy, or choledocholithotomy, is the name given to the operation of incising the bile-ducts for the extraction of gall-stones in cases where the concretions cannot otherwise be removed.

It was probably first suggested by Langenbach in 1884, though Kummell (quoted by Fenger) stated in 1890 that he, several years before, had performed cholecystectomy on a female patient of forty, after which he had removed a stone the size of a walnut from the common duct through an incision which he afterwards sutured. The operation was a very prolonged one, and the woman died twenty-four hours afterwards.

Courvoisier performed the first successful operation on January 22, 1890, and two others, both successful, in February and March of the same year.

It has since been performed by Langenbach, Thornton, Fenger, Greig Smith, Page, Terrier, Symonds, myself, and others.

The cholecystotomy incision must be extended to 4 or 5 inches, and after the separation of adhesions, the wound must be held open by a retractor on the right, and preferably by an assistant's finger on the left, as the fingers can at the same time retract the pylorus and stomach on the left, and the colon and omentum below, without inflicting injury, as retractors are apt to do. The assistant who is using the retractor on the right may with advantage use his left hand to draw upwards the overhanging liver and costal margin. A sand-bag placed under the lower dorsal spine makes the region of the common duct more accessible.

The operator should now, after having separated adhesions, have a good view of the common duct within the free border

of the lesser omentum, and on inserting his left index-finger into the foramen of Winslow, or on grasping the duct between the index-finger and thumb, he can without difficulty bring the duct well within reach, the concretion making a distinct projection.

Over the prominent stone, a vertical incision, as low down and as far forward as possible, should be made, sufficiently large to allow the concretion to pass. Through this opening a probe can be passed, or even a finger, in order to explore the ducts thoroughly, so as to remove other stones if present.

To leave a small concretion may invalidate the operation, since, as Courvoisier, and later Fenger, have shown, a small gall-stone may by its ball-valve action occasion repeated attacks of pain and jaundice.

The incision in the duct may now be closed by interrupted sutures in two layers, first the muscular and fibrous coats being approximated, and secondly the serous margins; but if this be impracticable, the muscular and serous coats may be sutured together, and additional Lembert's sutures may be applied over all.

I have found a rectangular cleft-palate needle the most convenient instrument to employ in applying these deep sutures, though doubtless a small circular intestinal needle and holder will answer equally well, or the special needles and holder suggested by Mr. Lane may be found more convenient.

If a gall-stone be found in the hepatic duct, it may be reached by opening the common duct, and passing a scoop or forceps through this opening. Fenger has in this way explored the ducts and removed stones quite in the liver substance, and I have passed a long bent probe in this way quite into the primary division of the bile-ducts.

Dr. Elliott recommends the application of the sutures before removing the stone.

This is certainly an advantage, though, if the ducts have to be explored afterwards, the sutures are rather in the way. I think the same advantages may be obtained by introducing the two end stitches before extracting the calculus, as when they are drawn on, the edges are approximated and more easily sutured (Fig. 45).

A large drainage-tube should be left in the abdomen, and it may be wise to gently pack iodoform gauze over the duct, and to bring the end out by the side of the drainage-tube, if there be any doubt about the closure of the wound in the duct.

The tube may be removed in twenty-four or forty-eight hours if there be only a little discharge, and the gauze should be gradually removed day by day until it is all away.

Mr. Knowsley Thornton has thought it advisable in some

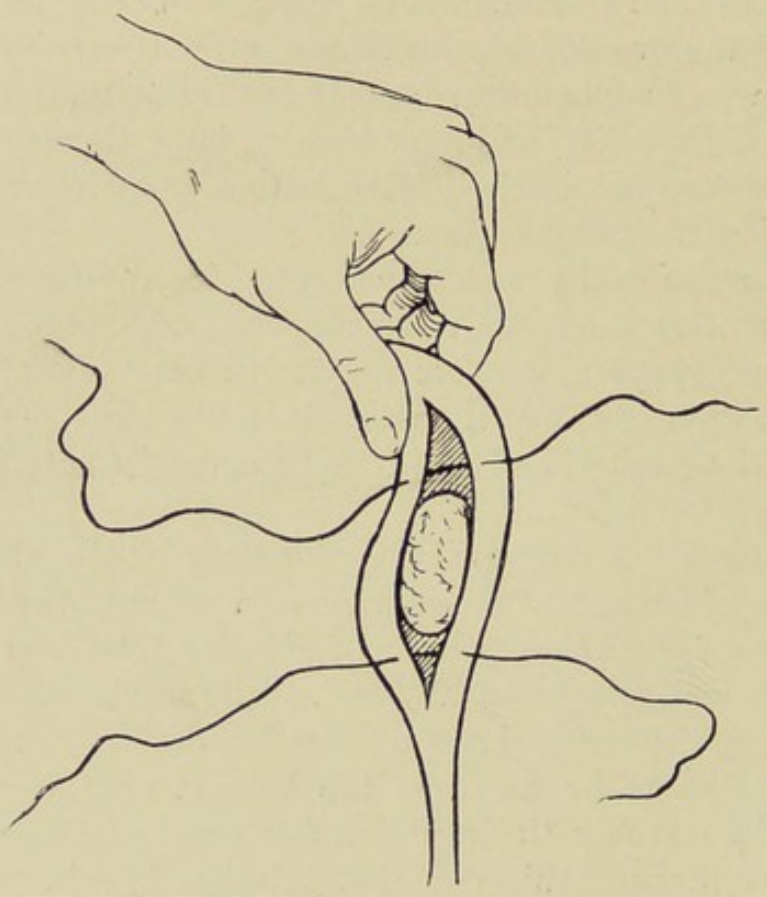

FIG. 45.—DIAGRAM TO ILLUSTRATE THE FIRST SUTURES IN CHOLEDOCHOTOMY.

of these cases to insert a glass drain through a small opening above the pubes, but this plan has not been generally followed by others.

Drainage through a stab wound in the right loin is an efficient means of draining the discharge from a leaking gall-bladder or bile-duct, since there is a distinct peritoneal pouch here, bounded above by the right lobe of the liver, below by the ascending layer of the transverse meso-colon covering the duodenum internally, externally by the parietal peritoneum,

and internally by the peritoneum covering the right side of the vertebral column and passing up to the foramen of Winslow (Fig. 46).

Morison has found this pouch to be capable of holding nearly a pint before it overflows into the general peritoneal cavity (*British Medical Journal*, November 3, 1894).

Mr. Morison, in his paper in the *British Medical Journal*, November 3, 1894, advocates drainage of this pouch, and non-suture of the ducts if there be any difficulty in securing the margins of the opening.

Mr. Frederick Page, on the other hand (*Lancet*, December 5,

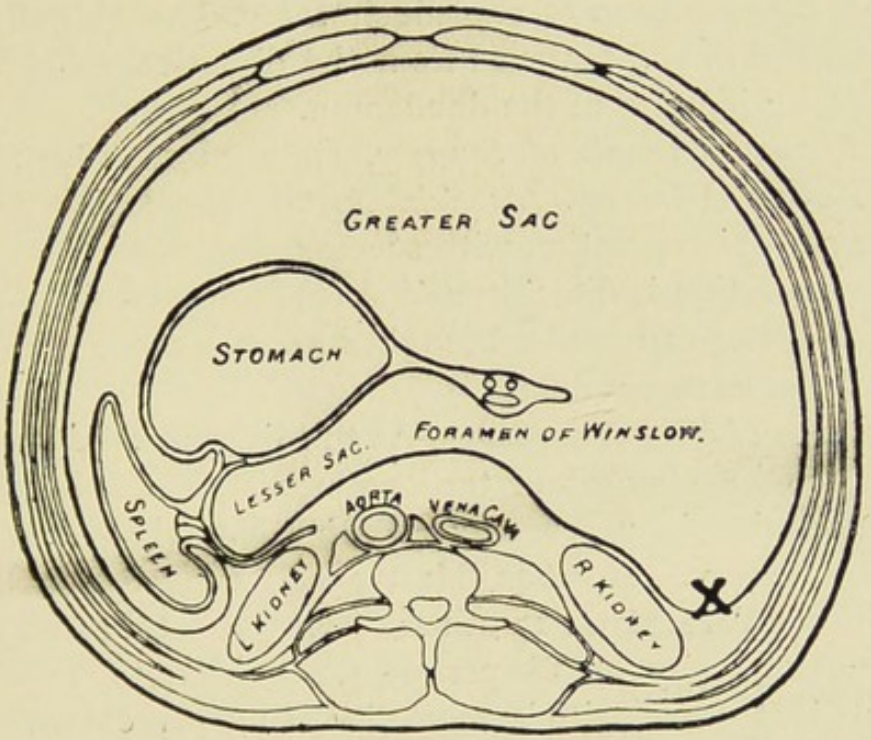

FIG. 46.—TRANSVERSE SECTION THROUGH CENTRE OF POUCH DESCRIBED.

1896), advocates careful suture of the opening in the duct, and closing the abdomen without leaving in a drainage-tube.

He gives four cases in support of his views.

Mr. Greig Smith says that drainage is always advisable, and in this view I fully agree, as although in several of my cases there has been little or no discharge from the drainage-tube, in others, the bile-stained discharge for a few days has proved that the closure of the opening was not perfect ; and it

must be borne in mind that, although the ducts appear to be clear, it is impossible to be absolutely certain, as was proved in one of my cases, where, under the supposition that I had effectually cleared the common duct, I removed a shrivelled and mutilated gall-bladder and ligatured the cystic duct, with the result that septic bile became extravasated into the peritoneal cavity and led to my only death from cholecystectomy. A small gall-stone was found obstructing the orifice of the duct where it was opening into the duodenum. The same difficulty was experienced in one of Fenger's cases and in several of Kehr's.

Choledocho-duodenotomy is a term applied to the modification of the operation of choledochotomy, where a gall-stone is impacted in and removed from the diverticulum of Vater, through an incision in the duodenum.

McBurney (*Annals of Surgery*, October 18, 1893), Pozzi and Kocher (*Korresp. für Sch. Aerzti*, 1895, No. 7) have performed this operation with success.

The operation is difficult, and should only be done where the gall-stone cannot be brought into the more accessible part of the common duct.

Statistics of Choledochotomy.—As this is, perhaps, the most difficult and prolonged of the operations on the bile-ducts, the mortality is necessarily greater than that of simple cholecystotomy. In 1892 Martig had collected 27 cases, and in 1895 Mermann 17 others, giving a total of 44 cases, with a mortality of 18 per cent. Terrier, in 1892, had collected 20 cases, with a mortality of 25 per cent. (*British Medical Journal Supplement*, January 7, 1893). Hans Kehr (*Berlin Klin. Woch.*, June, 1896) collected from various sources 84 cases of choledochotomy, with 31 deaths = 37·8 per cent. Even excluding severe cases, the mortality was 25 per cent., though in his own practice the death-rate was only 6·6 per cent.

He remarks : 'The operation involves many difficulties, which can only be overcome by one performing a large number of operations, and even then it is not very easy to remove all the concretions.

Out of 30 cases, in 5 all the stones were not removed; in

3 the operation was repeated; and in 2 cases the wound re-opened and gave exit to the calculi that had been left.

Fenger has reported 5 cases, of which 1 died = 20 per cent.

Murphy, of Chicago, 5 cases, of which 2 died = 40 per cent.

My own cases are 6 in number, out of which I have lost 1, due to the accident of a slight laceration of the colon in separating adhesions = 16·4 per cent.

Cholecystectomy, or excision of the gall-bladder, may be required:—

1. In bullet-wound or other wound of the gall-bladder, where suture is impracticable.
2. In phlegmonous cholecystitis.
3. In gangrene of the gall-bladder.
4. In multiple or in perforating ulcers.
5. In chronic cholecystitis from gall-stones, where the gall-bladder is shrunken and too small to safely drain, and where the common duct is free from obstruction.
6. In mucous fistula due to stricture of the cystic duct.
7. In hydrops of the gall-bladder due to stricture of the cystic duct; as also in certain cases where the gall-bladder is very much dilated.
8. In certain cases of empyema, where the walls of the gall-bladder are very seriously damaged.
9. In cancer of the gall-bladder.

It is contra-indicated in all cases of non-patency of the common duct, and it should not be resorted to under the idea that it will prevent the formation of gall-stones, as calculi may form in the bile-ducts, within the liver or below it.

The operation is performed through the usual incision for reaching the gall-bladder.

The peritoneum covering the gall-bladder just below the liver is incised parallel to the hepatic margin, and the gall-bladder is freed by means of a finger or a blunt dissector as far back as the cystic duct, the latter part of the dissection being done subperitoneally as much as possible.

The duct is ligatured and divided, the stump being asepticized either by the cautery or by the application of a

1 in 500 solution of perchloride of mercury. The peritoneum is now sutured over the top of the duct. There is usually little bleeding, and that is easily arrested by sponge pressure or by one or two ligatures.

Unless there be oozing, or unless the wound has been infected by pus or gall-bladder secretion, drainage may perhaps be thought unnecessary; but the adage, 'When in doubt drain,' is a good one, and it can do no harm to leave an efficient drainage-tube in the right kidney pouch for twenty-four or forty-eight hours after extirpation of the gall-bladder. Packing with iodoform gauze in these cases is better than using a tube, as it serves the double purpose of arresting oozing from the lacerated liver and acting as a drain.

Statistics.—Martig has collected 87 cases of cholecystectomy, with 12 direct and 3 indirect deaths (*Centralbl. fur Chir.*, April 14, 1894), thus giving a mortality of 17·24 per cent.; Kehr, 21 cases, with 1 death = 5 per cent. Murphy gives the mortality up to 93 as being 17 per cent.

Delagenière collected 38 cases of cholecystectomy, with 9 deaths, thus giving a mortality of 23 per cent.

Courvoisier collected 47 cases, of which 10 died directly as the result of operation, and 2 indirectly from the operation, giving a mortality of 25·5 per cent.

I have performed the operation 7 times, with 1 death, giving a mortality of 14·28 per cent.

Cholecystenterostomy consists in establishing an artificial opening between the gall-bladder and intestine, duodenum, jejunum or colon, preferably the first, when it may be termed cholecyst-duodenostomy.

Although the conception of the operation occurred independently to Harley, Gaston, and Nussbaum, the first operation was actually performed by Winiwarter, of Liége, in 1880, and my own case, in 1889, was the first of the kind performed in England, and the first anywhere for biliary fistula.

In its place it is an extremely useful operation, but, as it leaves the cause of the obstruction unremedied, it ought not to be resorted to except occasionally, where a more radical operation is impracticable or inadvisable.

Dr. Murphy, of Chicago, favours the procedure before other methods, and gives the following as the indications for its performance :

1. In all cases where it is desirable to drain the gall-bladder for accumulations therein.

2. In all cases of occlusion of the ductus choledochus.

3. In all cases of cholelithiasis where obstruction of the duct is present, or where the reflex disturbances of digestion are marked.

4. In all cases of cholecystitis, either with or without gall-stones.

5. In all chronic discharging biliary fistulæ, either following operations or as sequelæ of pathological changes.

6. In all cases of perforation of the common duct when it is necessary to obliterate the duct in the reparative process.

Murphy's Contra-indications.—1. In all cases in which the gall-bladder is too small for the insertion of the button.

2. When the adhesions are so extensive that the bowel cannot be brought in contact with the gall-bladder without kinking.

3. In obliteration of the ductus cysticus, with enormously enlarged non-adherent gall-bladder.

On these cases cholecystectomy should be performed.

My own conclusions are that the operation is indicated :

1. In biliary fistulæ depending on stricture or other permanent occlusion of the common duct.

2. Very occasionally in cancer of the head of the pancreas, or malignant tumour of the common duct leading to chronic jaundice and distended gall-bladder; but in such cases the mortality will necessarily be so high that the justifiability of the operation is questionable.

3. Occasionally in impaction of gall-stones in the ducts, where the patient is not in a fit condition to bear the more prolonged operation of separating adhesions, and crushing or removing the concretion by choledochotomy.

4. In certain cases of obstruction of the cystic duct where cholecystectomy is impracticable.

Contra-indications.—1. In any obstruction of the bile-ducts which can be cleared away with reasonable probability of success.

2. In malignant disease of the head of the pancreas or common bile-duct leading to distension of the gall-bladder the mortality is so great (eight operations with seven deaths) that it is hardly worth doing.

3. In contracted gall-bladder where it is impracticable to insert the button.

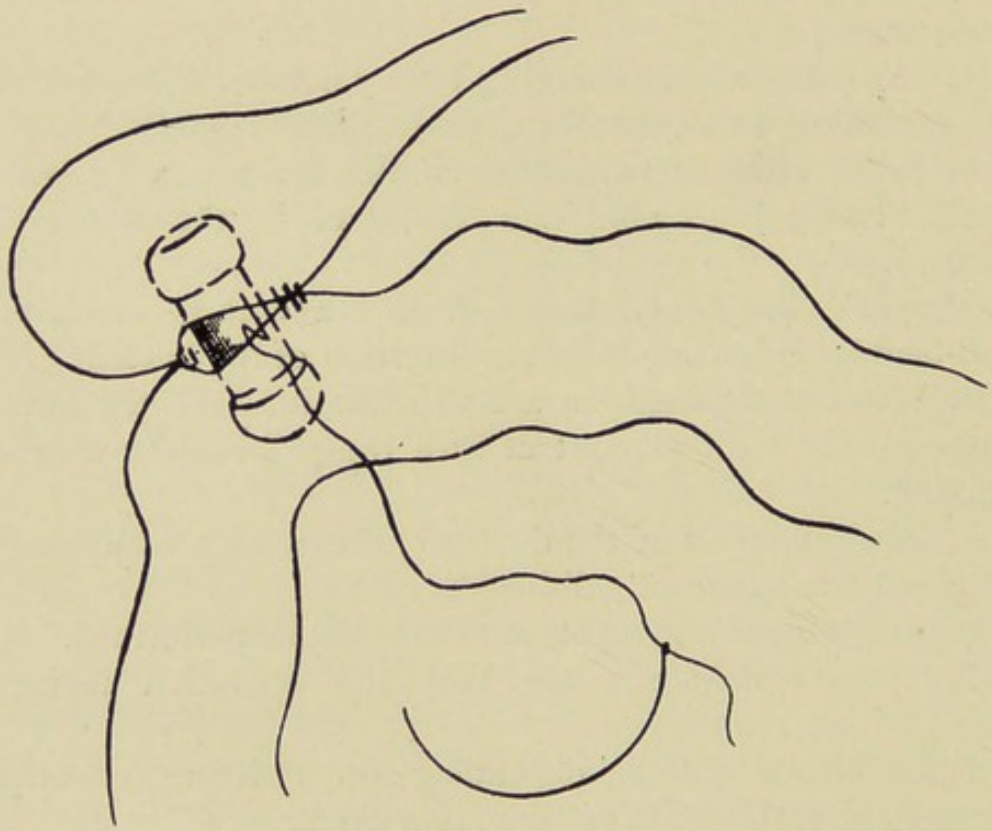

FIG. 47.—DIAGRAM TO SHOW APPLICATION OF MUCOUS OR MARGINAL SUTURE IN THE BONE BOBBIN OPERATION.

4. Where there are extensive adhesions which would lead to kinking of bowel.

5. In very large gall-bladder with obstruction of the cystic duct, where cholecystectomy should be done.

The operation may be performed:

(*a*) By means of simple suture.

(*b*) By means of my decalcified bone bobbin.

(*c*) By means of Murphy's button.

My first case, in 1889, was performed by suture, my second and third by means of the decalcified bone bobbins, and in all my later cases I have used the Murphy button. Although all the cases, when the operation was unassociated with cancer, recovered, I decidedly prefer to make the union by means of the Murphy button, both on account of its efficiency and the expedition with which it can be used.

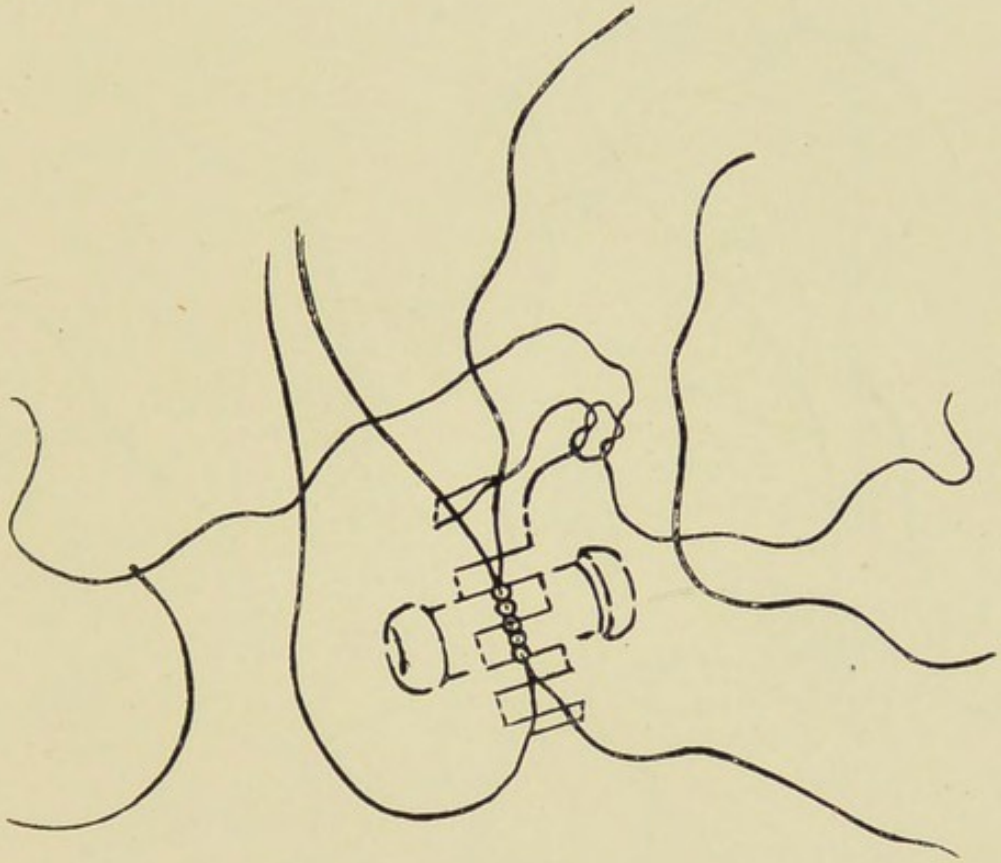

FIG. 48.—DIAGRAM TO SHOW APPLICATION OF SEROUS SUTURE IN THE BONE BOBBIN OPERATION.

The operation of cholecystenterostomy is performed through the same incision as is made for cholecystotomy, and after the gall-bladder has been aspirated and the intestine clamped, either by an indiarubber tourniquet or by intestinal clamps, the junction is effected. If sutures be employed, a semicircle of interrupted silk stitches is inserted to unite the contiguous serous surfaces of the gall-bladder and gut; the viscera are then opened, and the mucous margins of the two openings are united by interrupted catgut

stitches, after which the circle of catgut stitches and then the circle of serous sutures is completed.

If the bone bobbin be used, two continuous sutures only are employed: a silk stitch to unite the serous surface $\frac{1}{3}$ or $\frac{1}{2}$ inch from the visceral openings, and a catgut suture to join the mucous margins of the visceral openings.

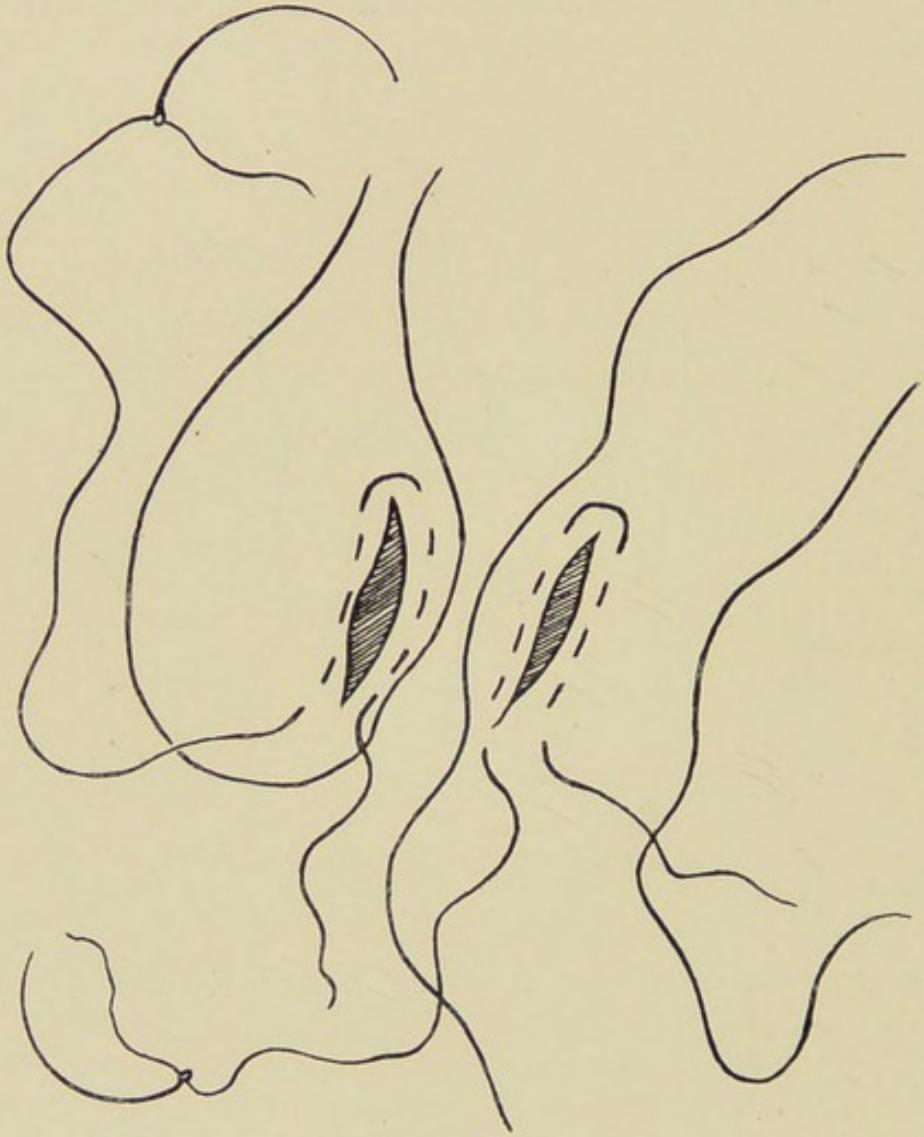

FIG. 49.—FIRST STAGE OF THE BUTTON OPERATION.

For convenience, the posterior semicircle of the serous suture is first applied, and the needle laid aside for a moment, but not unthreaded; the openings are then made, and the posterior half of the mucous suture is inserted. The bobbin is then introduced, and the mucous suture continued around until it meets the other end of the catgut, when the two

ends are tied and cut off short; the serous suture is then carried around the anterior half until it reaches the point where it began, when the two ends are drawn on and tied. (Figs. 47 and 48.) The bobbin keeps open the lumen until it is dissolved, and the mucous and serous sutures effectually protect the channel from leakage.

If the Murphy button be used, the smallest size is selected,

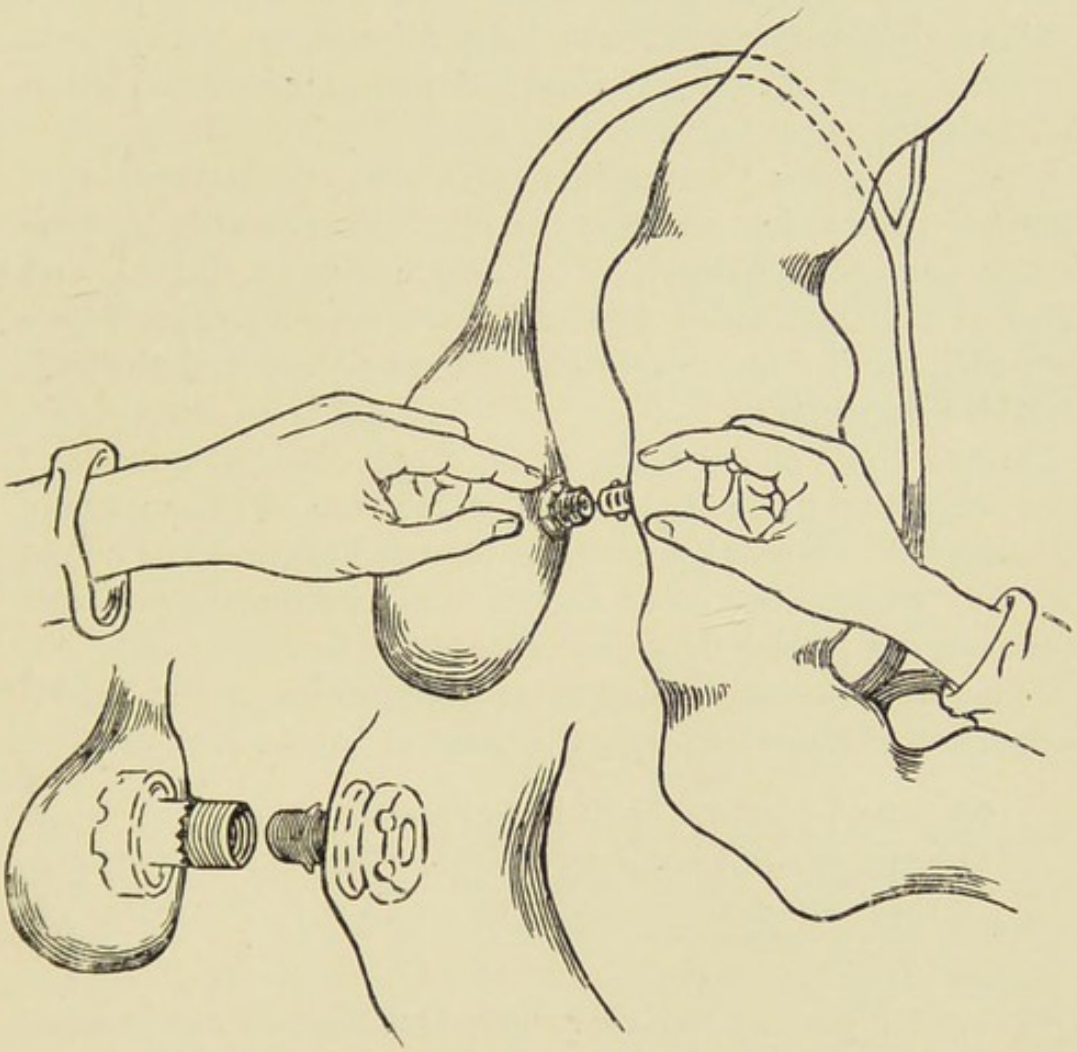

FIG. 50.—LAST STAGES OF THE BUTTON OPERATION.

and two running sutures are applied, as shown in the diagram. After the gall-bladder has been emptied, and the bowel clamped either by Murphy's intestinal clamps or Lane's clamps, or by a simple elastic tourniquet, the openings are made in the viscera just sufficiently large to admit the separate ends of the button. The threads are then drawn on and tied around the central barrel of the

button (Figs. 49 and 50), after which the two ends of the button are approximated and pushed home firmly. The anastomosis is then complete.

The whole process occupies a very short time, and is really very simple. It is, however, necessary to bear in mind that the button has to separate, by causing the approximated margins of the openings to slough, and that the true bond of union is only slight at first, so that it is well to keep the patient absolutely quiet for at least a fortnight, lest the new bond of union should give way and permit of extravasation of the visceral contents.

In considering the question of cholecystenterostomy, it has to be borne in mind that the operation can only be done when the gall-bladder is of moderate size or dilated, and that it is inapplicable to the difficult class of cases where a gall-stone is impacted in the common duct and the gall-bladder is atrophied.

When it can be done, the anastomosis should be made to the duodenum; but, if preferred, a free loop of jejunum may be selected and brought over the hepatic flexure of the colon. In only exceptional cases should the anastomosis be made between the gall-bladder and colon.

The statistics according to Murphy, given in the Transactions of the International Congress at Rome, are:

23 cases by suture, with 8 deaths = 34 per cent.
21 cases for gall-stone by button, 0 deaths = 0 per cent.
2 cases for malignant disease, with 2 deaths = 100 per cent.

From a report up to date, which Dr. Murphy has been so kind as to furnish me, cholecyst-duodenostomy has been performed with the aid of the anastomosis button in 67 non-malignant cases, with only 3 deaths, these being due to continuous hæmorrhage from laceration of the liver substance on the seventh day, to cholæmia on the fourth day, and to septicæmia on the fourth day, respectively. Of his 12 malignant cases 10 died, giving a mortality of 83·3 per cent.

My own cases are 11 in number, with 1 death, and that

in a case of malignant disease with long-continued jaundice; my percentage mortality for cholecystenterostomy for gall-stones is therefore nil.

Choledochostomy is the term applied to the direct surface drainage of a dilated bile-duct. Terrier has described four cases (*Revue de Chirurgie*, February, 1893). I heard of a fifth from Dr. Arnison, of Newcastle, and found a sixth in Guy's Museum, all ending fatally within a few days or weeks of operation, owing to associated choledochitis and infection of the bile-channels in the liver itself.

In July, 1896, I performed choledochostomy in a man of twenty-five, after crushing a gall-stone the size of a small hen's egg, situated at the junction of the cystic and common ducts; the gall-bladder was much smaller than the duct, and I found it easier to fix and drain the duct. The patient made a good recovery. (Case 150 on my list.) I have since heard of a case by Yversen, but am unaware of the result.

Where it is impossible to clear the ducts, instead of performing choledochostomy, the operation of *choledoch-enterostomy* may be done, the union of the dilated duct to the duodenum being made by means of a Murphy's button. I have twice performed the operation, which has also been done successfully by Drs. Sprengel and Kiedel, and by Dr. Swaine.

In my own cases I removed the shrunken and diseased gall-bladder, fixing the end of the dilated cystic duct to the bowel by a Murphy's button in one case, and by a bone bobbin in another. (Cases 55 and 121.) No drainage was employed. The button was voided at stool on the tenth day.

In concluding my lectures, I must thank you, Mr. President, and my audience, for the kind forbearance which you have shown in listening to details which, I fear, may at times have been somewhat wearisome.

My wish has been to show the importance of the subject I have taken up, and some of the results which may be looked for by appropriate surgical treatment; and if I have

succeeded in exciting your interest, and in making it evident that in the greater number of diseases of the gall-bladder and bile-ducts surgical treatment is well worth considering after a fair, though not too prolonged, trial of medical means, my aim will have been accomplished.

A CONSECUTIVE SERIES OF OPERATIONS

ON THE

GALL BLADDER AND BILE DUCTS,

By Mayo Robson, F.R.C.S.

No.	Date.	Initials. Age. Sex.	Operation.	Description.	Result	After History.	With whom seen.
1	21-6-84	B. F. 33 F	Cholecystotomy ...	Distended gall bladder; 12 gall stones removed	R	Small mucous fistula. In good health, 1897	Mr. Wheelhouse
2	20-7-85	L. S. 22 F	,,	Distended gall bladder; 60 gall stones removed	,,	Mucous fistula for a time, cured by cholecystectomy. In good health, 1895	Dr. Churton
3	14-1-88	V. B. 42 F	,,	Empyema of gall bladder. Cause, gall stones	,,	Biliary fistula for a time. Ultimately quite well, and in good health, 1892	Dr. Loe
4	19 3-88	E. C. 44 F	,,	14 gall stones removed	,,	Cured	Infirmary
5	2-5-88	H. F. 32 F	,,	42 gall stones removed	,,	Cured	Infirmary
6	14-6-88	G. T. 40 F	,,	2 large gall stones removed. Empyema of gall bladder and abscess of liver. Jaundice	,,	Mucous fistula, otherwise well, *see* 58	Dr. Churton

No.	Date.	Initials. Age. Sex.	Operation.	Description.	Result.	After History.	With whom seen.
7	15-6-88	S. T. 31 F	Cholecystotomy and Cholelithotrity	Tumour of gall bladder, 2 years. One large gall stone removed from gall bladder. One crushed in cystic duct	R	Recovery	Infirmary
8	9-7-88	E. J. 40 F	Cholecystotomy ...	Distended gall bladder; 2 large gall stones removed	,,	Complete recovery	Infirmary
9	29-7-88	A. H. 42 F	,,	Slight jaundice; 2 large gall stones removed, one from gall bladder, and one from junction of cystic and common duct	,,	Cure; well 3 years after	Dr. A. Atkinson
10	29-8-88	S. G. 49 F	,,	66 gall stones removed	,,	Complete recovery for a time, but ultimately developed stricture of cystic duct and required cholecystectomy, *see* **22**	Dr. Horne, Barnsley
11	10-9-88	G. B. 50 M	,,	Intense jaundice; distended gall bladder; cancer of pancreas	D	Ninth day, hæmorrhage and exhaustion	Dr. Clifford Allbutt
12	23-12-88	W. T. 42 M	,,	Deep jaundice and infective cholangitis; distended gall bladder; cancer of common bile duct	R	Relief for a time; death later from progress of disease	Dr. Churton
13	2-3-89	V. B. 44 F	Cholecystenterostomy	Gall bladder united to colon by sutures	,,	Quite well, 1893	Infirmary
14	28-3-89	C. 41 M	Cholecystotomy ..	Distended gall bladder; 14 gall stones removed	,,	Cured	Infirmary

No.	Date.	Initials. Age. Sex.	Operation.	Description.	Result.	After History.	With whom seen.
15	2-5-89	H. 32 F	Cholecystotomy ...	Distended gall bladder; 42 gall stones removed	R	Cured	Dr. Allbutt and Mr. Wheelhouse
16	7-9-89	H. 55 M	,,	70 gall stones removed. Jaundice.	,,	Quite well, 1897	Dr. Black, Har'g'te
17	26-9-89	A. W. 41 F	,,	3 gall stones removed	,,	When last heard of well	Dr. Swann, Batley
18	10-10-89	F. 34 F	,,	12 gall stones removed. Shrunken gall bladder. Jaundice present	,,	Quite well when last seen, 1896, *see* 37	Dr. G. Coleman, Hemsworth
19	16-1-90	H. 32 F	,,	Distended gall bladder; 2 gall stones removed	,,	Quite well when last seen	Dr. Fairbank, Doncaster
20	14 2-90	G. T. 42 F	,,	1 large gall stone removed	,,	,, ,, ,,	Infirmary
21	5-5-90	R. 50 M	,,	1 large gall stone removed	,,	,, ,, ,, 1897	Dr. Britton, Har'g'te
22	14-5-90	S. G. 51 F	Cholecystectomy ...	Mucous fistula, stricture of cystic duct, following gall stones	,,	Complete and permanent cure; well, 1893	Dr. Horne, Barnsley

No.	Date.	Initials. Age. Sex.	Operation.	Description.	Result.	After History.	With whom seen.
23	3-6-90	C. 30 F	Cholecystotomy and Cholelithotrity ...	Jaundice; several stones crushed in common duct	R	Well, 1894	Dr. Dobson
24	19-6-90	B. B. 29 M	Cholecystotomy ...	6 gall stones removed. Shrunken gall bladder	,,	Cure; well, 1892	Dr. Dearden, Wyke
25	22-6-90	B 42 F	Exploratory	Jaundice; tumour close to common duct, thought to be malignant	,,	Perfectly well some months after	Dr. Sykes, Cleckheaton
26	15-8-90	E. P. 29 F	Cholelithotrity ...	Spasms for years; shrunken gall bladder with numerous adhesions. Gall stone crushed in cystic duct	,,	Recovery	Infirmary
27	2-9-90	J. E. 25 F	Cholecystotomy ..	Gall stones in gall bladder with Empyema, also abscess of liver, containing gall stones (38 in all)	,,	Apparent cure. Well when heard of some months later	Infirmary
28	30-10-90	S. C. 22 M	Exploratory. Adhesions separated	Five years' history of spasmodic pains in gall bladder region. Numerous adhesions found and detached	,,	Quite well some months after	Infirmary
29	1-11-90	H. 30 F	Cholecystotomy and Cholelithotrity	1 gall stone removed, several crushed in ducts. Jaundice present	,,	Quite well some months after	Dr. Squance, Sunderland
30	12-11-90	H. E. 68 F	Laparotomy	Gall stone producing volvulus; laparotomy and untwisting volvulus, large gall stone 1½ in. × 1 in. afterwards passed per anum	,,	Heard of as well and healthy a year after	Dr. Hamilton, Crowle

No.	Date.	Initials. Age. Sex.	Operation.	Description.	Result	After History.	With whom seen
31	14-11-90	E.W. 40 F	Cholelithotrity ...	Large gall stone crushed in common duct. Jaundice present	R	Rapid recovery and apparent cure. Well in 1891	Dr. Purdy, Woodlesford
32	29 12-90	R. 39 M	Cholecystotomy and Cholelithotrity	Numerous gall stones removed	,,	Rapid recovery. Returned to America within month. Well, 1893	Mr. Wheelhouse
33	29-12-90	J. R. 45 F	Cholecystotomy ...	Cancer of pancreas with gall stones ; intense jaundice ; hæmorrhage from nose, bowel, &c.	D	Patient extremely exhausted at time of operation, which probably did not much hasten death	Dr. Hollings, Calverley
34	13-1-91	E. W. 55 F	Cholecystotomy and Cholelithotrity ...	Gall stones crushed in cystic duct. Slight jaundice	R	Cured	Infirmary
35	5-2-91	HMC 42 F	Choledochotomy and Cholecystotomy ...	Cyst of liver due to dilated hepatic duct. Incision of duct in liver, about 8 oz. of fluid evacuated and drainage adopted. Free bleeding controlled by gauze packing. 3 gall stones removed. Jaundice	,,	Relief ; small discharge of bile persisted for a time	Dr. Lee, Dewsbury
36	17-2-91	T. G. 50 M	Exploratory	Distended gall bladder; 30 oz. fluid removed by aspirator; tumour of head of pancreas. Deep Jaundice	,,	Marked relief; returned home within the month	Dr. Chatham
37	26-2-91	F. 35 F	Cholecystotomy and Cholelithotrity ...	Stones crushed in common duct. Jaundice present.	,,	Well, 1896	Dr. Coleman

No.	Date.	Initials Age. Sex.	Operation.	Description.	Result.	After History.	With whom seen.
38	5-3-91	J. L. 45 M	Cholecystotomy and Cholelithotrity ...	Deep jaundice; gall stone crushed in common duct	R	In 4th week diarrhœa and sudden death apparently from perforation of bowel. nothing abnormal in region of bile-ducts. Wound had healed	Dr. Drake
39	12-3-91	B.S 40 F	,,	25 gall stones removed and 2 crushed in common duct; jaundice	,,	Cured	Dr. Oglesby, York
40	19-3-91	HMC 42 F	Cholecystotomy ...	Intense jaundice; gall stone ¾ in. diameter removed	,,	Relief; after returning home at end of month, contracted influenza and had fatal pneumonia	Infirmary
41	23-3 91	H. 32 F	,,	1 gall stone removed. Gall bladder contracted. Numerous adhesions	,,	Cured. Well, 1894	Dr. Braithwaite
42	2-4-91	E. R. 40 F	Cholelithotrity ...	Gall bladder not opened; 1 stone size of filbert crushed in cystic duct. Gall bladder displaced considerably to right	,,	No recurrence of symptoms; well, 1894	Infirmary
43	13-4-91	R. F. M	Exploratory	Epigastric tumour with pains over gall bladder region. Calcified hydatid tumour with adhesions found	,,	Relieved	Infirmary
44	7-5-91	E.S. 50 F	Cholecystotomy and Cholelithotrity ...	5 stones crushed with fingers and forceps	,,	Apparent cure	Infirmary

No.	Date.	Initials. Age. Sex	Operation.	Description.	Result	After History.	With whom seen.
45	5-12-91	M. 59 F	Cholecystotomy ...	Distended gall bladder; movable right kidney. Chronic catarrh	R	Good recovery. July, 1893, no recurrence of symptoms	Dr. Dobie, Keighley
46	14-1-92	J. R. 51 F	Exploratory	Solid tumour of gall bladder; thought to be malignant; exploration by needles after abdomen had been opened	,,	Ultimate complete recovery without further treatment	Dr. Black, Harrogate
47	1-2-92	P. 56 F	,,	Chronic jaundice with attacks of pain over liver. Hæmorrhagic diathesis; cancer of liver found. Chloride of calcium used before operation. Little bleeding	,,	Greatly relieved for over a year	Dr. Macgregor Young, Leeds
48	12-2-92	H. C. 44 F	Cholecystotomy ...	8 gall stones removed from gall bladder, 15 from cystic duct	,,	Cured	Dr. Stewart, Batley
49	3-3-92	J. O. 51 M	Cholecystotomy and Cholelithotrity ...	Gall stones crushed in cystic duct. Jaundice present	,,	Cured	Dr. McGregor, Huddersfield
50	10-3-92	A. M. 37 M	,,	Jaundice; gall stones removed from gall bladder and cystic duct	,,	Biliary fistula persisted for a time, but ultimately closed, to re-open after another attack of biliary colic followed by jaundice. *See* No. 55	Infirmary

No.	Date.	Initials. Age. Sex.	Operation.	Description.	Result.	After History.	With whom seen.
51	1-4-92	W. P. 32 M	Cholecystotomy ..	Deep jaundice ; distended gall bladder ; emaciation. No pain. No gall stones. Hardness of head of pancreas. Scirrhus ?	D	Patient much exhausted and emaciated at time of operation, almost died under anæsthetic; died apparently from shock on second day	Dr. Woods, Killinghall, and Dr. Barrs
52	7-6-92	A.D. 35 M	Exploratory	Malignant disease of liver ; jaundice, and symptoms of gall stones	R	Recovered	Infirmary
53	15-6-92	R. 56 F	Cholecystotomy and Cholelithotrity ..	Gall stones in bladder and in cystic and common ducts, latter crushed, former removed	,,	Cured	Dr. Blomfield, Pontefract
54	6-8-92	F I'W 18 M	Exploratory	Recurrent attacks of pain in hypochondrium; extensive adhesions of pylorus to gall bladder broken down	,,	Gained 2 stones in weight after operation ; well, 1894	Dr. Walker, Kirkby Stephe
55	6-8-92	A.M. 38 M	Cholecystectomy and Choledochenterostomy	Biliary fistula. Dilated cystic duct united to colon by small decalcified bone bobbin	,,	Perfectly well for some months, after which jaundice recurred. *See* 59	Infirmary
56	29-9-92	T. 50 F	Cholecystotomy and Cholelithotrity	Jaundice 9 months ; shrunken gall bladder ; cholangitis ; gall stone in contracted bladder, and several in cystic and common ducts crushed. Case had been pronounced malignant by a consulting physician, and operation not advised	,,	Well, 1893	Dr. Harwood, Burnley

No.	Date.	Initials. Age. Sex.	Operation.	Description.	Result.	After History.	With whom seen.
57	4-10-92	E. 50 F	Cholecystotomy ...	Jaundice 10 months ; ague-like attacks due to cholangitis. 2 large gall stones in gall bladder, 1 in common duct removed by scoop. Cancer diagnosed by consulting physician, and operation not advised	R	Well, 1893	Dr. Clifton, Sheffield
58	12-1-93	L.P. 40 F	Cholecystotomy and Cholelithotrity	6 gall stones from cystic duct ; several crushed in common duct	,,	Small biliary fistula persisted, but at times closed. *See* 73	Infirmary
59	28-1-93	A.M. 38 M	Choledochotomy ...	Large gall stone removed from common duct through incision, which was afterwards sutured ; drainage. Jaundice	D	Fæcal extravasation through small perforation in colon, caused by separating adhesions and unrecognised at time of operation. Death in 2nd week	Infirmary
60	24-2-93	B. 36 F	Cholecystotomy ...	6 large gall stones removed	R	Cured. Well, 1896	Dr. Watts, Dewsbury
61	3-3-93	J. O. 51 M	Cholecystotomy and Cholelithotrity	Contracted gall bladder ; several stones crushed in common duct Jaundice.	,,	Recovery complete ; quite well, 1894	Infirmary
62	11-3-93	A. B. 37 F	Cholecystotomy ..	Shrunken gall bladder ; 1 large stone in cystic duct removed	,,	Cured ; well when last seen	Infirmary
63	22-3-93	T. G. 39 M	Laparotomy and separation of adhesions	Dilatation of stomach following on history of gall stones. Extensive adhesions of gall bladder to pylorus separated. Gall stones not found	,,	Quite well 3 months afterwards	Infirmary

No.	Date.	Initials. Age. Sex	Operation.	Description.	Result	After History.	With whom seen.
64	11-4-93	H. 50 M	Cholecystotomy .	156 gall stones removed from gall bladder and cystic duct	R	Cured	Dr. Topham, Halifax
65	28-4-93	G. T. 44 F	Cholecystectomy ...	Mucous fistula over gall bladder	,,	Perfect recovery ; well, 1894	Infirmary
66	5-5-93	M. T. 54 F	Exploratory	Cancer of gall bladder. Large hard nodular tumour yielding only blood to exploring syringe. Every appearance of malignancy	,,	Wound healed by first intention and patient left apparently relieved, and reported to be well some months later	Infirmary
67	6-5-93	E. B. 44 F	Cholecystotomy ..	Contracted gall bladder ; 2 stones in cystic duct ; crushed	,,	Well when last heard of	Infirmary
68	19-5-93	H. G. 40 F	,,	Gall stone weighing 112 grs. removed from cystic duct	,,	Perfectly well some months subsequently	Infirmary
69	19-5-93	S. J. R. 35 F	,,	2 large gall stones in cystic duct and common duct. Gall bladder contracted	,,	Cured. Well in 1895	Dr. Taylor, Meadow Lane
70	25-5-93	P. S. 31 F	Cholecystotomy ...	Stone crushed in common duct. Jaundice	,,	Quite well when seen some time after	Dr. Scatterty, Keighley
71	6-6-93	F. 54 F	,,	Distended gall bladder ; 3 stones removed from cystic duct	,,	Quite well, 1894	Dr. Rowe, Leeds. & Dr. Mais, Thorner

No.	Date.	Initials. Age. Sex.	Operation.	Description.	Result.	After History.	With whom seen.
72	20-6-93	B. B. 58 M	Cholecystotomy and Cholelithotrity	Several large stones in cystic and common ducts removed, others crushed. Jaundice.	R	Bronchitis third week, and patient left the infirmary at his own request, though not well	Infirmary
73	31-7-93	L. P. 40 F	Cholecystenterostomy by decalcified bone bobbin	Biliary fistula	,,	Quite well, 1894	Infirmary
74	24-8-93	J. G. 52 M	Cholecystotomy ..	Large stone in cystic duct; several in common duct crushed. Jaundice	,,	Quite well, 1894	Infirmary
75	4-9-93	C. 35 F	,,	27 gall stones removed from gall bladder and cystic duct. Jaundice	,,	Well, 1896	Dr. Mackenzie, Douglas, I. of M.
76	26-9-93	B. 40 F	,,	Distended gall bladder; 6 stones removed from gall bladder and cystic duct. Slight Jaundice	,,	Perfectly well, February, 1895	Dr HodgsonWright, Halifax, and Dr. Ozanne, Harrogate
77	28-9-93	K. B. 44 F	Cholecystotomy and Cholelithotrity	Stones removed from cystic duct and several crushed before removal. Extensive adhesions. Jaundice	,,	Well when last heard of	Infirmary
78	21-10-93	E. R. 56 M	Cholecystotomy and Cholelithotrity	6 gall stones removed and several crushed in common duct. Jaundice	,,	Cured. Well some months after	Infirmary
79	14-11-93	C. 35 F	Cholecystotomy ...	Sinus discharging at umbilicus; 18 gall stones removed from gall bladder, together with pus and mucus	,,	March, 1894; writes to say very well	Dr. Walker, Redcar

No.	Date.	Initials. Age. Sex.	Operation.	Description.	Result.	After History.	With whom seen.
80	30-11-93	M A K 30 F	Cholecystotomy and Cholelithotrity	5 gall stones removed	R	Cured	Infirmary
81	-12-93	P. 49 M	Laparotomy, lavage and drainage	After symptoms of gall stones for 29 years, acute general peritonitis starting over gall bladder. Rupture of bile ducts and extravasation of several pints of bile, with pus, found at operation	,,	Perfect recovery. Patient well and at business within 2 months	Dr. Braithwaite, Leeds
82	18-1-94	S. E. 27 M	Exploratory	Malignant tumour of gall bladder and liver	,,	Recovery	Infirmary
83	18-2-94	H. C. 45 F	Cholecystotomy ...	6 gall stones in bladder, and 23 in cystic duct	,,	March, 1894; writes to say "better than for years"	
84	20-2-94	M L S. 30 F	,,	Distended gall bladder, with attacks of pain. Gall stones removed	,,	Recovery	Infirmary
85	3-3-94	L. 32 F	,,	20 gall stones removed from gall bladder and cystic duct. No jaundice	,,	Well, 1897	Dr. McGregor Young
86	7-3-94	E. 35 F	,,	Distended gall bladder; 35 gall stones removed; no jaundice	,,	,, ,,	

No.	Date.	Initials. Age. Sex.	Operation.	Description.	Result.	After History.	With whom seen.
87	12-3-94	J. G. 39 M	Laparotomy, separation of adhesions of pylorus to gall bladder	History of cholelithiasis 6 years before ; 5 years' history of pain, vomiting, &c.	R	Gained two stones in weight in 3 months. Apparent cure	
88	13-3-94	M. O. 60 F	Laparotomy	Acute intestinal obstruction ; volvulus after gall stones seizure. Gall stone attacks for 7 years. Acute obstruction 5 days	,,	Complete recovery after untwisting volvulus. Perfectly well when heard of in June, 1894	Dr. Lownds, Doncaster
89	24-5-94	S. 50 M	Cholecystotomy ...	"Spasms" for 3 years ; 96 gall stones removed from gall bladder and cystic duct. Drainage 4 days	,,	Well in 1897	Dr. Eddison, Leeds, and Dr. Swann, Batley
90	29-5-94	L. 39 F	Cholecystotomy ...	10 years' history ; no jaundice ; 49 gall stones removed. Drainage	,,	Cured. Well, 1896	Dr. Helm, Sheffield
91	30-5-94	J. P. 49 M	Laparotomy	Chronic catarrh of bile ducts and jaundice ; tumour of liver, probably soft carcinoma with suppuration. Drainage	,,	Improved, sinus remaining	Infirmary
92	9-6-94	M. 46 F	Cholecystotomy ...	Excessive vomiting for 6 weeks, and during past 3 weeks had subsisted on nutrient enemas ; very ill. Gall bladder contracted, and surrounded by firm adhesions. Jaundice present, and infective cholangitis ; 18 gall stones removed from ducts, and gall bladder drained without complete suture to parietes	D	Death from exhaustion, due to continuation of vomiting on 12th day after operation. No peritonitis	Dr. Townsend, Cork

No.	Date.	Initials. Age. Sex.	Operation.	Description.	Result	After History.	With whom seen.
93	18-6-94	S. P. 43 F	Cholecystotomy ...	"Spasms" 10 months; jaundice; emaciated and extremely weak. 160 stones, size of peas, removed from gall bladder and cystic duct. Adhesions. Drainage. Jaundice.	R	Cured	Infirmary
94	19-7-94	S. A. 40 F	,,	160 gall stones removed	,,	Recovery	Infirmary
95	10-8-94	W. R. 37 M	Cholecystotomy and Cholelithotrity	Admitted for biliary fistula following on cholecystotomy, performed at Wolverhampton some months before, when 10 gall stones were removed. Catheterism and syringing ducts having failed, cholelithotrity was performed, and 2 stones crushed in the common duct	,,	Cured	Infirmary Dr. Deansley
96	18-8-94	V. 60 M	Cholecystotomy ...	30 gall stones removed from cavity in liver. Ulceration into duodenum. Jaundice.	,,	Some months after, died from cancer of liver	Dr. Carter, Ilkley
97	6-9-94	W. 34 F	Cholecystotomy, with separation of adhesions	Extensive adhesions of gall bladder to omentum and stomach. Gall bladder filled with thick mucus and bile. Chronic cholecystitis. No gall stones. Drainage	,,	Well when heard of in 1896	Dr. Byers and Dr. Steen, Belfast
98	12-9-94	H. 60 F	Laparotomy... ...	Cancerous nodules on liver and jaundice. Gall bladder dilated.	,,	Recovered from operation, but ultimately died some weeks after from progress of disease	Dr. Broughton, Dewsbury

No.	Date.	Initials. Age. Sex.	Operation.	Description.	Result.	After History.	With whom seen.
99	13-9-94	L. F	Laparotomy	Acute intestinal obstruction 5 days; large gall stone found in ileum, removed by incising intestine	R	Complete recovery. Patient well, 1896	Dr. Raimes and Dr. Anderson, York.
100	23-10-94	T. 36 F	Cholecystotomy ...	8 oz. milky fluid removed from gall bladder. 3 stones the size of nutmegs from cystic duct. Drainage 3 days	,,	Complete recovery.and gained nearly a stone in weight in a month. Well, 1896	Dr. Tweedy, Northallerton
101	10-11-94	G. 60 F	,,	Spasmodic intermittent pain. Gall bladder filled with mucus and bile. Chronic cholecystitis. Drainage	,,	Cured. Quite well in 1896	Dr. Clifton, Sheffield
102	2-12-94	F.C.C M	,,	Gall stones removed	,,	Recovery	Infirmary
103	10-12-94	A. 50 M	,,	Persistent jaundice. Malignant disease. Drainage of gall bladder, with decided relief for a time	,,	Recovered from operation. Returned home at month end. Died some months later	Dr. Menzies, Edinburgh
104	8-1-95	H. P. 55 M	Cholecystotomy and Cholelithotrity	History of attacks, 8 years. Jaundice at times. 11 stones removed; several crushed in the common duct; drainage of gall bladder	,,	Relief. Fistula persisting. *See* 121	Infirmary
105	13-2-95	S. J. 50 M	Cholecystotomy ...	1st attack 12 years ago; no tumour felt; had passed 8 stones at various times; 5 stones removed. Drainage	,,	Cured	Infirmary

No.	Date.	Initials. Age. Sex.	Operation.	Description.	Result.	After History.	With whom seen.
106	8-3-95	C. 50 M	Cholecystotomy ...	Empyema of gall bladder. No jaundice. 16 gall stones removed from gall bladder and cystic duct. 2 oz. of muco-pus in gall bladder. Drainage 4 days	R	Returned home well in 3 weeks. Well, 1897	Dr. Husband, Ripon
107	14-3-95	C. 51 M	,,	Slight jaundice. 720 gall stones removed. Drainage 7 days	,,	Cured. Well, 1897	Dr. Fairburn, Doncaster
108	20-3-95	J.R.D. 44 M	,,	History, 2 years with jaundice. Large stone removed from cystic duct	,,	Cured	Infirmary
109	18-4-95	C. 37 F	,,	Gall stones removed from cystic duct	,,	Recovered. Well, 1897	Dr. Legh de Legh, Redcar
110	11-4-95	H. P. 55 F	,,	One large gall stone removed, size of cherry	,,	Well, 1896	Infirmary
111	2-5-95	M. 46 M	Cholecystectomy ...	Gall bladder cavity contracted. Walls hypertrophied and adherent. Frequent seizures of intense pain like gall stone attacks, which had doubtless been the cause of the cholecystitis and cholangitis	,,	Recovered, and 9 months later in perfect health	Dr. Keyes, New York, and Dr. Gilchrist, Nice
112	15-5-95	A. B. 41 F	Cholecystotomy ...	Attacks with jaundice for 11 years. 43 stones removed, 6 the size of cherries.	,,	Cured	Infirmary

No.	Date.	Initials. Age. Sex.	Operation.	Description.	Result.	After History.	With whom seen.
113	20-5-95	G. 45 F	Cholecystotomy and Cholelithotrity	8 gall stones removed from cystic duct; several crushed in common and hepatic ducts. Drainage.	R	Completely cured. Well, 1897	Dr. Meade, Bradford
114	27-5-95	A. S. 35 M	Cholecystotomy ...	Attacks for 10 years; passed 14 stones. 397 small and 5 large stones removed	,,	Cured. Well, 1896	Infirmary
115	6-6-95	A. L. 25 M	Laparotomy and separation of adhesions	Spasms. Adhesions round pylorus and gall bladder	,,	Cured	Infirmary
116	3-7-95	S. C. 36 F	Cholecystotomy and Cholecystendysis	Had biliary fistula following operation at another hospital, when 18 stones were removed. Gall bladder detached, edges inverted and sutured	,,	Cured	Dr. Salter, Scarbro'
117	4-7-95	EMD 41 F	Cholecystotomy ...	Single severe attack 7 months ago. Numerous seizures since. One large stone removed; adhesions	,,	Cured	Dr. Rowe
118	15-7-95	C. 51 F	Cholecystenterostomy (Murphy's button)	Persistent jaundice. Several gall stones removed or crushed. Tumour of pancreas thought to be felt; but the sequel makes it probable that the tumour was glandular	,,	Recovered, but Murphy's button never found. Well, 1897	Dr. Smith, Doncaster
119	18-7-95	W. L. 62 M	Cholecystotomy ..	Spasms and jaundice 20 years. Cancer of liver and gall bladder. 32 gall stones removed. Drainage	,,	Recovered from operation. Relief from pain and from jaundice	Infirmary

No.	Date.	Initials. Age. Sex.	Operation.	Description.	Result.	After History.	With whom seen.
120	23-7-95	W. 42 M	Cholecystotomy and Cholelithotrity ...	Never jaundiced; one large stone in cystic duct which was crushed. Drainage	R	Recovered. Well, 1897	Dr. Sproule, Mirfield
121	24-7-95	H. P. 55 F	Cholecystectomy and Choledochenterostomy	Operation undertaken for closing a mucous fistula, when the gall bladder was found to be forming a tumour with walls ½ to ¾-inch thick. Cholecystectomy was performed and the open end of the cystic duct connected to the small bowel by means of a Murphy's button	,,	Completely cured and in good health, 1896	Infirmary
122	27-7-95	G. 40 M	Laparotomy ...	Persistent jaundice; cancer of liver and pancreas	,,	Recovered from operation. Relief for some weeks	Dr. Bronner, Bradford
123	27-8-95	J.W.B. 56 M	Cholecystenterostomy	Dilated gall bladder; no calculi; stenosis of common duct. Pain and jaundice for a year. Gall bladder distended containing 3 oz. of fluid tinged with bile		Recovered. Murphy's button passed in 2 weeks. Report 1897, gained weight after operation, and has been at work ever since. Occasional attacks of pain and jaundice	Dr. Lee, Dewsbury
124	10-9 95	J.C.F. 35 F	Cholecystotomy ...	10 years' history, with intermittent jaundice; 30 stones removed; adhesions	,,	Cured. Well, 1897	Mr. H. B. Hewetson
125	26-10-95	S.W. 52 M	Cholecystotomy and Choledochotomy	Slight jaundice; gall bladder ruptured suddenly during separation of adhesions; 1 stone removed ¾ inches in diameter through incision in common duct; drainage through loin	,,	Cured	Infirmary

No.	Date.	Initials. Age. Sex.	Operation.	Description.	Result.	After History.	With whom seen.
126	18-11-95	B.H. 60 M	Laparotomy	Jaundice and pain ; cancer of pancreas	R	Decided relief for several months	Dr. Haynes, Low Moor
127	23-11-95	W. F	Cholecystectomy and Hepatectomy ...	2 gall stones removed from gall bladder. Gall bladder distended and dilated with thick material like putty. Walls infiltrated with malignant disease ; cancer in cystic duct. Gall bladder excised with ½-lb. of liver	,,	Patient improved and remained well till Feb. 27/96, when she returned with superficial nodule in abdominal wall, which was excised. She died some months afterwards from recurrence of disease. Case reported Clin. Soc., 1896	Dr. O'Connell, Keighley
128	28-11-95	T.M. 43 M	Cholecystotomy	48 stones removed. Drainage. Jaundice	,,	Cured	Infirmary
129	3-12-95	J. M. 32 F	,,	Attack with jaundice for eight years. After each attack passed 4 or 5 stones. Gall bladder, cystic and common ducts packed with stones, 129 removed	,,	Cured	Infirmary
130	9-12-95	L. M	Laparotomy, with separation of adhesions	Adhesions around pylorus, gall bladder and liver causing kinking and dilatation of stomach, probably due to gall stones which had been passed before operation	,,	Separation of adhesions. Cured. Well, 1897, and had gained a stone in weight	Dr. Lownds, Newcastle

No.	Date.	Initials. Age. Sex.	Operation.	Description.	Result.	After History.	With whom seen.
131	14-12-95	W. 29 F	Laparotomy, with separation of adhesions	Adhesions around pylorus, gall bladder and liver causing kinking and dilatation of stomach, with stricture of pylorus probably due to gall stones which had been passed before operation. Pyloroplasty	R	Cured, Well, 1897	Dr. Salter, Scarboro'
132	17-12-95	S. W. 37 F	Cholecystotomy	Gall stone attacks with jaundice associated with pregnancy (6th month), very weak ; gall bladder contained 8½ ozs. of fluid and 7 large stones.	,,	Owing to a disturbance in the ward one night, a week after operation, patient aborted, but made a complete recovery. *See* 146	Dr. James, Oulton
133	4-1-96	S. 50 F	,,	Gall stones, extensive malignant disease of cystic and common ducts ; persistent jaundice	,,	Recovered from operation and was relieved for a time, but died 6 or 8 months afterwards	Dr. Booth, Grimsby
134	12-1-96	B 36 F	,,	3 large gall stones impacted in cystic duct. Empyema of gall bladder. Drainage	,,	Cured	Dr. Taylor, Chester
135	-2-96	M. D. 52 M	,,	No stone found. Drainage. Malignant disease	,,	Relieved	Infirmary
136	17-2-96	S. 51 F	,,	Slight jaundice ; infective cholangitis. 40 gall stones removed from gall bladder and cystic duct. and two crushed in common duct. Wound healed 27th day	,,	Cured. Well, Jan., 1897	Dr. Barrs

No.	Date.	Initials. Age. Sex.	Operation.	Description.	Result.	After History.	With whom seen.
137	5-3-96	G. 40 F	Cholecystotomy ...	8 stones removed from gall bladder. Ducts apparently clear	R	Recovered. Several small stones passed through fistula, which was kept open for several weeks, but ultimately closed spontaneously. Now well	Dr. Burnie, Bradford
138	17-3-96	P. H. 37 F	,,	16 gall stones removed; 3 as large as Brazil nuts	,,	Cured	Infirmary
139	26-3-96	E. F. 44 F	Exploratory	Pains over gall bladder; no stones; adhesions	,,	Cured. In May the patient said she was better than for many months	Infirmary
140	26-3-96	J. P. 53 M	,,	Malignant disease in gall bladder; secondary to pyloric cancer. Jaundice	,,	Recovered from operation, but unrelieved	Infirmary
141	2-4-96	E. C. 47 F	Cholecystectomy	18 stones removed; adhesions very firm and gall bladder shrunken. Cystic duct ligatured and gall bladder removed. Patient jaundiced	D	Ligature slipped from duct on 2nd day, and bile became extravasated, producing toxæmia and peritonitis. I was unfortunately absent at the time, or I should have reopened the abdomen. Stone found in diverticulum of Vater	Infirmary
142	1-6-96	R. 62 M	Exploratory	Tumour in gall bladder region. Malignant of liver and gall bladder. Jaundice	R	Recovered	Dr. Gibson, Kirkby Stephen

No.	Date.	Initials. Age. Sex.	Operation.	Description	Result.	After History.	With whom seen.
143	8-6-96	H. 32 F	Exploratory	Persistent and deep jaundice 17 months; frequent and various hæmorrhages for several months. Tight stricture of common duct; no gall stones. Questionable malignant disease	D	Death occurred from hæmorrhage and shock 24 hours after operation	Dr. Sharpe, Matlock
144	23-6-96	E. R. 50 F	Cholecystotomy	39 gall stones removed; drainage	R	Cured	Infirmary
145	25-6-96	E. F. 44 F	Cholecystotomy and Choledochotomy	Numerous gall stones removed from gall bladder; common duct blocked by large stone which was removed by incising the duct; gall bladder distended and much thickened. Drainage. Deep Jaundice	,,	Cured	Infirmary
146	27-5-96	S. W. 37 F	Cholecystenterostomy	This case was operated on during pregnancy, Dec. 17/95, and 2nd operation performed for pain and jaundice; 7 large stones removed, and gall bladder fixed to intestine by Murphy's button	,,	Button never found	Infirmary
147	13-7-96	D. T. 37 M		Biliary fistula following operation at St. Bartholomew's Hospital, persistent jaundice. No stones found. Tumour probable. Cholecystenterostomy by Murphy's button	,,	Bile all passing into bowel and wound healed	Dr. Sykes, Barnsley

No.	Date.	Initials. Age. Sex.	Operation.	Description.	Result.	After History.	With whom seen.
148	13-7-96	S. F	Exploratory	Persistent jaundice; gall stones in shrunken gall bladder and in common duct; extensive cancer of liver: operation not proceeded with; hæmorrhage in wound afterwards, but controlled by calcium chloride	R	Recovered from operation and lived 4 months longer	Dr. Empey, Steeton
149	17-7-96	A. S. 49 M	Cholecystenterostomy	Cancer of pancreas and common duct. Distended gall bladder. Jaundice continuous for 4 months. No gall stones	D	Intra-parietal and intra-peritoneal hæmorrhage. No peritonitis. Very exhausted at time of operation, but lived a week after	Infirmary
150	18-7-96	J. C. 25 M	Choledochostomy	Large gall stone, size of small hen's egg, in cystic and common duct, crushed; cystic duct dilated and longer than gall bladder. Drainage of duct. Jaundice	R	Recovery	Infirmary
151	27-7-96	S. 34 F	Cholecystotomy	2 oz. thin pus in gall bladder; 2 stones size of cherries in cystic duct. Tense adhesion to duodenum separated. Jaundice slight	,,	Complete recovery	Dr. Patterson, Dalton-in Furness
152	31-7-96	G. M	Hepatotomy	Persistent jaundice for several months and loss of 21 lbs. in weight, due to chronic catarrh of bile ducts. Large fluctuating tumour. Liver dulness below umbilicus. Hydatid cyst; removed; drainage	,,	Recovery; jaundice disappeared slowly within two months. Quite well Jan., 1897	Dr. Sadler, Barnsley

No.	Date.	Initials. Age. Sex.	Operation.	Description.	Result.	After History.	With whom seen.
153	20-8-96	E. E. 38 F	Cholecystotomy	Jaundice. Infective cholangitis. 2 gall stones removed; symptoms for 5 years; acute 2 months. Contracted gall bladder with numerous adhesions	D	Oozing from torn adhesions led to death from hæmorrhage, which was concealed at first. No vessel of any size could be found, but every point bled. Calc. chloride inadvertently omitted	Dr. Mackenzie, Bradford
154	27-8-96	S. H. 38 F	Cholelithotrity	"Spasms" 12 years. Gall bladder shrunken, and adherent to surrounding structures; too small to bring to surface; stones found and crushed	R	Cured	Infirmary
155	15-10-96	R. T. 56 F	Cholecystotomy	"Spasms" almost continuous for 6 months. Jaundice and rigors. Cholangitis. No gall stones present. Numerous adhesions around ducts separated	,,	Cured	Infirmary
156	1-11-96	E. O. 52 M	Cholecystenterostomy	"Spasms" 10 months. Jaundice. Cholangitis. Liver found nodular. Murphy's button used. Large stone in common duct too hard to crush, and patient too ill to bear prolonged operation	,,	Complete recovery, and jaundice had disappeared before he left the Infirmary	Infirmary
157	18-12-96	M. 44 M	Hepatotomy	Jaundice and pain. Attacks like gall stone seizures. Chronic catarrh of bile ducts due to hydatid disease. Hydatid cyst removed from liver. Drainage.	,,	Healed. Jaundice gradually disappearing	Infirmary

No.	Date.	Initials. Age. Sex.	Operation.	Description.	Result	After History.	With whom seen.
158	8-12-96	A. W. 50 F	Cholecystotomy and Choledochotomy	Spasms; jaundice; loss of weight; common duct incised; 2 stones removed; duct sutured, and gall bladder drained	R	Cured	Infirmary
159	17-12-96	T. 65 M	Exploratory and drainage, with separation of adhesions	Violent pain; slightly distended gall bladder; greatly dilated stomach; pyloric stenosis; extensive adhesions. No gall stones found. Rigors and fever accompanied attacks of pain. The gall bladder continued dark, thick, grumous material, and similar contents were found in the stomach, to which it was adherent	D	Shock, 36 hours. Unfortunately the autopsy could not be made until 48 hours after death, when decomposition and p.m. digestion had softened the tissues and prevented the exact nature of disease being made out. The question of previous gall bladder stomach fistula could not be determined	Dr. Selkirk, Boston Spa
160	24-12-96	C. 42 F	Exploratory and separation of adhesions	Spasmodic pain resembling gall stones. Abdominal section and separation of adhesions of gall bladder to stomach and colon	R	Recovery. No pain since operation reported in Feb., 1897	Dr. H. J. Robson, Leeds
161	28-1-97	H. M. 44 M	Hepatotomy and Cholecystotomy	Hydatid disease, 6 years. Simulating gall stone attacks, one year; small cysts probably discharging into bile ducts; infective cholangitis and jaundice. Hepatotomy, the incision being at the lower and back part of the right lobe. Jaundice	,,	Doing well	Dr. Scatterty, Keighley

No.	Date.	Initials. Age. Sex.	Operation.	Description.	Result.	After History.	With whom seen.
162	15-1-97	H. 59 F	Cholecystotomy ...	Spasmodic pain for years. Jaundice in November. Cholangitis with rigors, etc. Removal of 10 large gall stones from gall bladder. Drainage	R	The patient returned home in three weeks, and looked quite ten years younger than before operation	Dr. West, Morley
163	24-1-97	B. 35 M	,,	Spasmodic pain for 15 years. Jaundice on several occasions. Intense pain for several weeks, with slight jaundice. 14 gall stones removed from cystic and common duct	,,		Dr. Raimes, York
164	22-1-97	B. 50 F	Exploratory ...	Cancer of liver and gall bladder. Jaundice	,,	Recovered from operation, but not materially relieved	Dr. Williams, Harrogate
165	18-2-97	S. 30 F	Cholecystotomy ...	Symptoms, 2 years. On two occasions jaundiced, and gall stones found in motions. Numerous attacks since last gall stone found. Slightly distended gall bladder. No gall stone found; thickened mucus; chronic catarrh of gall bladder	,,	Doing well	Infirmary
166	18 2-97	D. C. 36 M	Laparotomy and separation of adhesions	Paroxysmal pain over upper right abdomen 20 years. Rigid right rectus. No tumour. Explor. Adhesions of gall bladder to duodenum, omentum and colon separated. No gall stones found	,,	Doing well	Dr. Porter, Helmsley

No.	Date.	Initials. Age. Sex.	Operation.	Description.	Result	After History.	With whom seen.
167	22-2-97	G. 35 F	Cholecystotomy ...	Paroxysmal pains 12 years, usually followed by jaundice, but no gall stones found in motions. Rigid right rectus. No tumour. 2 gall stones size of large cherries removed, one from gall bladder and one from cystic duct	R	Doing well	Dr. Grant, Elgin, N.B.
168	25-2-97	A. B. 34 M	Cholecystenterostomy	Painful attacks resembling Cholelithiasis since June, 1896. Deep and continuous jaundice since December. Distended gall bladder. No gall stones could be felt ; numerous adhesions. Gall bladder connected to duodenum by a Murphy's button. Calcium of chloride administered before operation	,,	Doing well	Dr. Dowsing, Hull
169	25-2-97	E. W. 40 F	Cholecystotomy ..	Some jaundice ; painful indigestion for 20 years. Severe cholelithic pains since June, 1896. Usually jaundiced after attacks. Empyema of gall bladder with adhesions ; 20 gall stones removed. Calcium chloride administered before operation	,,	Doing well	Dr. Beesley, Darton
170	25 2-97	E. B. 33 F	,,	Painful attacks since July, 1896, following on a fall ; tumour in gall bladder region. Gall bladder filled with calculi. 26 removed from it and cystic duct, with some muco-pus.	,,	Doing well	Dr. Atkinson, Romaldkirk

I am indebted to my friend, Dr. H. COLLIGAN DONALD, for abstracting and arranging the foregoing list of cases.

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AN

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