To operate on a conscious patient is often undoubtedly to impose on the subject a certain degree of strain and fear, but in patients who are not acutely ill at the time, even in nervous and highly-strung individuals, the objection to infiltration anaesthesia on this score is of surprisingly little moment, and it is a pleasure to observe such patients comfortably enjoying a meal immediately on their return to bed. As a further set-off to this objection, the great and not altogether unreasonable dread of a general anaesthetic, which exists so prominently in a large proportion of patients, is to be borne in mind.

Infiltration anaesthesia occupies an unimportant position in the surgery of to-day, at least in this country. In the surgery of to-morrow I believe it will hold a different place.

The further developments of local anaesthesia in the form of medullary anaesthesia and regional anaesthesia produced by infiltration of large nerve trunks with stronger solutions are beyond the scope of this short paper, but in this connexion attention may be drawn again to the important researches of Crile² and Cushing³ in America. These experiments have demonstrated that the cocaineization of large nerve trunks supplying the field of operation, by blocking the transmission of centripetal impulses which would otherwise bring about reflex loss of vascular tone, abolishes what is probably the main cause of the phenomenon of shock.

By a combination of regional anaesthesia of the great nerve trunks and local infiltration at the seat of operation major amputations can be performed without general narcosis.

The regional anaesthesia produced by the injection of the anterior crural below Poupart's ligament enables Thiersch's grafts to be taken from the front of the thigh. It seems probable that Tagliacotian operations might be undertaken by a similar combination or by local infiltration alone, which would give the important advantage of the co-operation of a conscious patient.

REFERENCES.

- ¹ Connell, *Annals of Surgery*, vol. ii, 1903. ² Problems Relating to Surgical Operations. ³ Cushing, *Annals of Surgery*, vol. ii, 1902.

An Address

ON

CHOLELITHIASIS.

DELIVERED BEFORE THE STOCKPORT MEDICAL SOCIETY,
JANUARY 10TH, 1907.

By E. STANMORE BISHOP, F.R.C.S.ENG.,
SURGEON, ANCOATS HOSPITAL, MANCHESTER.

[AFTER some introductory observations Mr. Stanmore Bishop said:]

Confining ourselves only to our present subject, gall stones, it is to be noted that attention is no longer concentrated upon these concretions alone. These bodies, wherever found, whether in the gall bladder or in the ducts, are now recognized as being only part of a more general condition; a very important, perhaps from the patient's point of view the most important, factor, but not the only one, and except in certain cases, where their mere mechanical position renders them exceptionally harmful, not the most dangerous factor. The eye of the clinician seeks rather to discover the condition of the biliary channels which contain them, and the physician is as much concerned to know the specific organisms with which he has to deal as to witness the removal of the results of their agency.

It has been commonly received as an accepted fact since the writings of Kehr that only 5 per cent. of the persons whose biliary passages contain calculi develop during life any symptoms which call attention to this region. If by such symptoms the ordinary well-marked attacks of biliary colic are understood, this statement is probably near the truth, but subsequent research has shown that the presence of biliary calculi may be responsible for many conditions which in olden times were vaguely described as "stomach trouble," "windy spasms," "indigestion," "biliousness," or even "neurosis," and were indiscriminately referred to some functional disorder of the

stomach. As a consequence, many patients who later developed well-marked biliary colic only came for operation when the changes in the gall bladder and ducts had been in existence for years and were already complicated by alterations, local and general, which greatly accentuated the danger of the surgical interference itself, and effectually prevented the ideal return to the normal condition at which almost all surgical measures in the abdomen aim. The increased knowledge though, as I said, far from being complete, is rapidly enabling the surgeon to interfere earlier, and, consequently, to better purpose.

It is now accepted as a well-recognized fact that the essential condition which underlies all cases of cholelithiasis, whether accompanied by symptoms which cause its recognition during life or not, is a catarrhal inflammation of the biliary passages due to infection from certain micro-organisms, and that the most frequent of these are the *Bacillus typhosus* and the *Bacillus coli communis*. Other organisms have been found, but in much smaller numbers.

This infection may reach the channels implicated in one of four ways: (1) Through the duodenal opening, (2) through the portal circulation, (3) through the systemic circulation, (4) through the lymphatic circulation.

At first sight the duodenal opening would appear to be the most likely avenue of infection; there is a direct continuity of lining mucosa between the two channels of the small intestine and the common duct; the intestine is the natural habitat of the two micro-organisms most frequently encountered; from time to time the opening between the two is patent. But certain facts throw considerable doubt upon this theory.

1. Virulent organisms such as would be found in the intestine do not cause the formation of gall stones; the effect of their presence is rather to produce the more acute inflammatory changes which determine phlegmonous cholecystitis, gangrene of the gall bladder, ulceration and perforation. For the formation of concretions a certain attenuation of the micro organism appears to be necessary. Mignot showed¹ that it was the milder catarrhal inflammations which were accompanied by calculous formation. A. Ewald also, in 1903, demonstrated the same fact.

2. Although the intestine as a whole is the habitat of the bacilli in question, the duodenum, as several observers have pointed out, is singularly free from them.

3. When the duodenal opening is patent, there is a free flow of bile through it. Although it has been shown that organisms of this character will grow readily in bile, they would be far more likely to be washed away from the edges of this opening into the intestine than to ascend against the discharging current.

4. If micro-organisms ascend in this way, why are not inflammatory disorders of the pancreatic duct as frequent as those of the biliary channels? The opening of the one duct is as accessible from the common diverticulum of Vater as the other.

So that the probability of such an infection as would lead to the formation of biliary calculi reaching the biliary channels by this route would seem to be gravely discounted. At the same time it must not be understood that this is denied. Lippmann² has isolated bacteria from the common duct in numbers decreasing upwards. Kelly³ says that in presence of gall stones, bacteria are not infrequently more numerous in the lower end of the common bile duct than elsewhere in the biliary tract, and that these are the motile much more commonly than the non-motile organisms.

That an attenuated infection, such as would give rise to calculous formation, will reach these channels by way of the portal vein is much more probable; and the information, mainly obtained by operative work and by experiments on animals, which supports this statement has, at the same time, considerably altered the view taken of the function of the liver itself.

Lately, owing chiefly to the work of the Italian-school of physiologists—Semmola, d'Amore, Geoffredi, Falcone, and Boccardi—the view that one of the functions of the liver is protective has been enlarged and emphasized until now, without denying its action in the production of glycogen, and the other already known facts concerning it, the tendency of modern thought is to look upon it as, in fact, the great toxin filter of the body; by its action the numerous toxins introduced in the food, or produced in the small intestine by the various fermentations and

decompositions which take place there, are neutralized and rendered inert, and bacteria accompanying them are at the same time destroyed or greatly weakened in virulence. Blood taken from the portal vein has been found to be markedly toxic, whilst that of the vena cava above the liver was only very mildly so, if at all. Extirpation of the liver, or ligation of its blood vessels in the lower vertebrates, is followed by a rapidly fatal group of toxic symptoms ending in coma, with or without convulsions, and death similar to that following acute poisoning. Whitridge Williams has shown that in the hyperemesis and eclampsia of pregnancy, when the waste products of two individuals have to be rendered innocuous, the liver, in fatal cases, showed a well-marked form of cloudy swelling of the cells passing rapidly into fatty degeneration and atrophy. Welch also has shown the action of the liver in the destruction of bacteria.

It is easy to understand how the liver cells may be temporarily overtaxed by an excess of toxic material, and consequently the bile excreted by it may contain effective though attenuated toxins, effective though weakened micro-organisms, both capable of producing the low-grade or "catarrhal" inflammation of the surfaces upon which they rest or over which they pass, which is so effective in causing the appearance of masses of cholesterol, whilst the disproportionate occurrence of cholecystitis and pancreatitis, biliary and pancreatic calculi, is also explained.

That bacteria do actually reach the gall bladder in this way seems to be proved by Lartigau's experiments. Having first closed the common bile duct, so that no infection could pass through to the biliary channels by this route, he fed the animals experimented upon with material containing the *Bacillus pyocyaneus*, and in almost half the cases found this organism, sometimes alone, sometimes associated with the colon bacillus in the gall bladder.

That infection by way of the systemic circulation is possible is certainly not to be denied. Doerr¹ injected micro-organisms into the veins of rabbits, and found them within a few hours in their gall bladders, the resulting lesions being usually catarrhal; but most of the evidence in favour of this is open to some doubt, and infection by means of the portal route is very difficult to exclude. Evidence of infection of the biliary passages in cases of influenza and pneumonia (Bryan and Kayser²) is necessarily open to this objection.

Infection through the lymphatic system, whilst not impossible, must be extremely rare.

Thus the weight of present evidence seems to show that the steps of the morbid processes are in the majority of cases these:—The small intestine contains normally, but especially during the process of digestion, numerous micro-organisms and toxins. These will, of course, be increased in number and virulence during such diseases as dysentery, typhoid fever, influenza, and similar states; they will also be multiplied by the ingestion of decomposing or decomposable food. These organisms and toxins are taken up by the radicles of the portal vein and carried to the liver, where they are rendered inert and excreted by the bile. Should the resistance of the liver cells be decreased or the toxins sufficiently powerful to paralyse them, some of these toxins and bacteria, much weakened in virulence, may pass through and be excreted with the bile, and produce desquamation of the epithelium of the excretory passages, first in the gall bladder mucosa, since they remain longer in contact with that membrane, thus permitting the penetration of the organism into its walls, and the consequent subacute inflammation which follows their attack. Should the toxins be still more virulent or the resistance of the hepatic cells still further lessened, some may pass into the systemic circulation and cause the headaches, confused mental sensations, and gastric disturbances grouped under the well-known term of "biliousness."

The morbid condition may entirely pass away, the liver being able in a little while to dispose of the poisonous material, while the flow of fresh and toxin-free bile washes out of the biliary channels the products of the previous slight attack upon their walls, or inflammatory changes in the gall bladder may cause the deposition of so much cholesterol from the decreasingly vitalized epithelium that it cannot be redissolved by the new bile, whilst the secretion of albuminous lymph is said

to cause precipitation of the bilirubin calcium from the bile, which acts as a cement to the original droplets of cholesterol, and calculi are thus formed. This reaction can be produced by adding egg albumen to bile, as in this specimen shown. In this way it is easy to understand the great preponderance of cases of calculi formed and stored in the gall bladder.

Even after the formation of these concretions the inflammatory changes in the walls, being produced by attenuated micro-organisms which are short lived and not reinforced by fresh colonies, may resolve and the organ regain its normal uninflamed condition. In such cases, although calculi will be found after death, the patient may never be cognizant of their existence. Again, after a longer or shorter interval, the same process may recur, and the freshly-inflamed walls will then contract painfully upon their previously formed, more or less angular contents; the result will be an attack of "biliary colic," one or more of the preformed calculi being forced into the cystic duct and either passing painfully through it, or plugging the entrance to the gall bladder.

The further progress of these cases is so well known that it is unnecessary to describe it. The practical points which interest us are:

I. The light hereby thrown upon the causation of "bilious" attacks and of several ill-defined so-called "stomach" troubles.

II. The connexion between these and cases of biliary calculi.

III. The great prospect opened out that, by the further study of such ill-defined conditions, operative interference may be employed at an earlier stage and under improved conditions, so that calculi may be removed and efficient drainage carried out before wide-spreading and dense adhesions around, so often encountered now, have gravely compromised the ultimate result of the operation. It may even be possible to prevent the cancerous degeneration and chronic pancreatitis which sometimes appear to follow and be associated with the presence and consequent irritation produced by these foreign bodies.

What are the changes which are observed in and around the biliary channels during operative work in this region, and what help in the diagnosis of cases of biliary calculi has been gained?

These are the two questions to which I shall endeavour to give some incomplete answer, and the evidence will be derived from the records of 62 operations in my own private and hospital practice.

1. The gall bladder and cystic duct may be greatly dilated and distended, whilst its colour may be altered from the normal bluish-green tint until the bladder resembles small intestine; this was the case with

Mrs. B. Case 61. On opening the peritoneum, apparently a distended and adherent duodenum presented itself. This was firmly adherent to the under-surface of the liver; this coil was not tense and there was no tinge of blue or green such as usually shows through the walls of a distended gall bladder; following this downwards, its lower extremity, equally distended as far as could be seen, disappeared beneath the liver; the colour of the coil was a light pink, its surface was covered by small arterioles, disposed like those of small intestine which had become congested; when a portion of the wall was picked up between the finger and thumb, its consistence was that of the duodenum; below, the hepatic flexure of the colon was easily identified, but the duodenum was not seen; as events proved, it must have been covered by the distended colon. Was this a dilated gall bladder or an adherent duodenum? and should we find the gall bladder, as often happens in these cases, shrunken and deeply placed below this adherent coil? It seemed impossible to be certain; yet if it were indeed duodenum, to open it would needlessly complicate the operation; that the portion presenting seemed to be a blind extremity carried on conviction, since if a loop of intestine is doubled upon itself and the sides of this loop adhere as they would be likely to do where adhesions were so widespread as in this case, such a loop would apparently end in a blind extremity. Only after separating for some little distance the attachment to the liver was it possible to introduce a finger sufficiently low down amongst the multiple adhesions to reach the lower part of this dilated tube and feel within it certain angular masses which the finger recognized as gall stones; on pushing these up—for they had all gravitated to the lower end of the cystic duct—these masses were found to be enclosed in the (doubtful) coil, and thereby its identity as the gall bladder could be established. The calculi shown were removed, drainage arranged for, and a month later recovery was complete.

2. The next stage is illustrated by a case seen with Dr. Holt of Heaton Moor:

H. B., aged 28, male. Symptoms for two months; weight in epigastrium, vomiting of bilious fluid, with anorexia; attacks of severe pain, no jaundice until two days before operation. On opening the peritoneum the liver itself was found swollen, almost green in colour, whilst the gall-bladder fundus was distinctly yellow, the two colours contrasting somewhat vividly; in this case we found what I have more than once seen before and since, that the fundus was bent over upon itself so as to almost form a separate cavity; this portion of the gall bladder contained a purulent fluid, but no stones; communicating with it was the main bulk of the gall bladder, a shrunken tube with thicker walls containing one fairly large and over fifty small calculi; the wall of the fundus was infiltrated with pus. On the thirteenth day the drainage tube came away, and the external wound rapidly healed; but a month or two later an abscess cavity formed beneath the scar, and discharged pus and bile; the opening again healed and broke down a second time with a similar discharge. I have not heard whether any further discharge took place; but it is to be noted that no further symptoms of the presence of further formations were complained of. The urine did not contain bile, nor was there any pain other than that which would be caused by the formation of an abscess.

In this case, it will be seen, the changes in the gall-bladder walls had reached a further stage; they were not only inflamed, as in the previous case, but had begun to be infiltrated with pus. This change was most marked at its distal extremity, where stasis of the circulation was most likely to occur. The main bulk of this reservoir was, however, unimplicated; the purulent infiltration was limited to the fundus; drainage, therefore, of the gall bladder was still possible, and with it the tissues would probably return to a healthy state. This naturally required, however, a longer time. If drainage is possible, it is well to utilize the gall bladder, as a drain can be much more easily and rapidly fixed in this viscus than in the gall ducts; subsequent adhesions around this are not so dangerous as they sometimes prove to be when thrown out, as in any case they must be round the incised part, if the drainage tube has to be inserted in the common duct.

In the last case, at the junction of the fundus with the main body of the gall bladder, the mucosa formed a crescentic ridge which projected into the lumen of the viscus. I have noticed in five of my cases a similar tendency of the mucosa to project into the lumen at certain levels. If two projections arise opposite one another, they may blend, and a small cyst-like cavity be shut off, still, however, communicating with the main body by a variable opening. In one case to be mentioned directly the whole gall bladder was converted into a multilocular cyst, with apparently no communication between the cysts; this case is said by Robson to be unique, but comparison of it with several others I have seen in which the change I have described has reached various stages induces me to believe that this is but the same process carried to an extreme. The first case is one in which the extreme tip of the gall bladder was shut off in this way.

Mrs. G., aged 51. The gall bladder was found to be adherent to the small intestine and to the omentum; after these adhesions were separated, the shrunken, thickened gall bladder was brought to the surface, and its fundus incised; a space large enough to contain a large glass marble was opened into, containing mucus; when this was wiped away a very minute opening was found by a probe and easily dilated, giving access to the main body of the gall bladder. This illustrates, I think, the first complete stage of what has taken place to its fullest extent in the specimen shown, which was removed from a patient of Dr. Harburn of Buxton.

Mrs. S., aged 42. Bilious attacks had been frequent some years previously, but had entirely ceased for at least two years. Eighteen months before examination she had complained of a feeling of weight, and Dr. Harburn had discovered a rounded mass, dull on percussion, this dullness being continuous with that of the liver, and, like it, moving with respiration. On abdominal section this multilocular cystic mass was found occupying the position of the gall bladder, and, on cutting it away, bile issued from a crescentic opening in the stump, thus proving its identity with the gall bladder.

This, however, is a digression. We return to a consideration of the various stages of inflammation.

3. The inflamed gall bladder, containing puriform fluid and calculi, may attach itself to surrounding parts by adhesions; this is Nature's effort to provide against widespread mischief should any part of the wall of the gall bladder yield. Should such yielding occur, a collection of pus will then form outside the bladder wall, but shut off

from the general cavity of the peritoneum by these protective formations, and by their aid the infective material may be conducted to the outside of the body, or it may collect for a while in a space hollowed out in the abdominal wall itself. It is precisely in such cases that the incision advised by Rutherford Morison—the transversely oblique incision—is of so much value. By its use the pus makes its escape readily without any danger of infecting the most perilous area—that of the small intestine. Such a case was that of

Mrs. A. B., aged 42. Admitted October 16th, 1906; transferred by Dr. Marsden, from the medical out-patient department of the Ancoats Hospital.

For two months she had been treated by Dr. Marsden for persistent frontal headache, abdominal pains of an indefinite character, occasional vomiting, and malaise. On October 11th she was seized with sharp abdominal pain, which commenced at the umbilicus and became generalized, but always most severe in the epigastrium and right hypochondrium; this was followed six hours later by large vomiting of bile; the bowels were constipated.

On examination she was seen to be anaemic, wasted, and jaundiced; respiration was easy and the pulse 100, full, and regular. The abdomen moved very slightly on respiration and there was generalized tenderness on palpation, accentuated in the right iliac and hypochondriac regions; a mass in the latter could be felt, extending from below the ninth costal cartilage to a point half an inch above and to the right of the umbilicus; the liver itself was not enlarged; the urine was loaded with bile.

On October 18th the bowels were freely opened, the stools containing bile; on the 20th there was renewed severe pain in the epigastrium with vomiting; from that date until November 1st the pain and all the other symptoms abated, but on that day she was again attacked by intense pain—now for the first time associated with shivering—in the epigastrium. This pain commenced during the night and progressively increased; the mass felt before enlarged still more and became not merely palpable but visible; it was tender to touch; the patient had lost her jaundice, and this did not return with the last accession of pain.

On November 5th the right hypochondrium was opened by Rutherford Morison's incision; an abscess containing 3 oz. of pus was opened in the substance of the rectus muscle; the gall bladder was enlarged and inflamed; it contained some twenty stones, but the mass which had been felt was the superjacent abscess, the shape of which had strongly resembled that of the gall bladder itself. Both the abscess and the bladder were drained, and the patient recovered perfectly, going home well on November 30th.

4. But perhaps the most disconcerting appearance is to be found in certain cases of which I have seen eight examples. On opening the peritoneum in such cases, the under-surface of the liver appears to be convex; no gall bladder can be seen; the convex under-surface is soft and fluctuant, and if this is cut into, pus mixed with bile escapes. After the contents have flowed away for a little time the gall bladder gradually defines itself, standing out gradually from the normally concave under-surface of the liver; such a gall bladder may or may not contain calculi.

Mrs. M. A. B., aged 52, symptoms for twelve months. On opening the abdomen the liver was seen to be enlarged, with its edge rounded and tense; no sign of a gall bladder could be found. The case was one of the first upon which I had operated, and I was not a little at a loss as to how to act. Thinking that probably my diagnosis was at fault, and that there was really a liver abscess, which it closely resembled, I opened it with all due precautions, and watched the gall bladder slowly disengage itself from the liver substance, becoming minute by minute more and more defined and unmistakable. One rough gall stone, the size of an almond, was found within it.

5. The most frequent condition, however, is of course the small, contracted gall bladder, deeply placed beneath the liver, in such a position and so far from the anterior abdominal wall that any attempt to palpate it from without must necessarily fail, it being difficult enough to reach it when the abdomen is freely open. One can but smile at the stories one used to hear of men who could diagnose the presence of calculi in the gall bladder by feeling the calculi rub against one another. How utterly impossible this would be is demonstrable at once in even ordinary cases; how much more when complicated, as in the next case, by the presence of a Riedel's lobe—a condition far from rare!

Miss C., aged 48, sent to me by Dr. Willis, of Gorton, near Manchester. As her history is interesting I quote it at length. When she was 4 years old her parents went to New Zealand, where she lived for eighteen months. Then she came back to England. At 16 years of age she had a severe illness, the

details of which are vague, and which did not last long. Four to five years later, she being about 21, she had a long illness lasting for eight months, and culminating in the formation of a swelling in the epigastrium which burst at that point, giving exit to a number of hydatid cysts; from this she slowly recovered. For the next twenty-one years she appeared to be in good health, then pain was felt for the first time in the right hypogastrium. At this time she would be 42 years old. A very severe and prolonged attack occurred, lasting more or less for eighteen months. After a period of rest this recurred, but not so severely, several times at irregular intervals until three months before examination. From that time until operation the attacks increased rapidly in severity and frequency, requiring constant morphine injections.

Each of these later attacks began with a sense of dull aching in the right hypogastrium, or with dyspepsia; then either acute pain would commence suddenly, or a subacute pain would be felt for some time, slowly becoming more and more unbearable. In these latter there was felt occasionally a dull pushing sensation, sometimes a sudden shooting which made her jump. The actual pain was always in the gall-bladder area, but the aching passed round the right side across the back below the scapulae, being worst on the right side.

On opening the peritoneum, nothing could at first be seen but liver; this extended apparently down as far as the iliac fossa, but on an attempt to rotate the viscus it quickly could be seen that this appearance was due to the extension downwards of a portion, like a flap of the liver, which is known as a Riedel's lobe; its base opposite to the line of the costae was scored by a fibrous intersection which did not extend beyond a few lines of its thickness. When this apron-like process was drawn up the extremely small and contracted gall bladder was found buried in a mass of adhesions about the middle line of the under surface of the liver, from before backwards, containing a single mammillated calculus (shown). Removal of the calculus and drainage for a month ended in her complete recovery.

Nothing would be easier than to multiply instances of this, the most frequent condition found; nothing is more constantly being proved at operations of this kind than that Courvoisier's law is correct in the majority of instances; where gall stones are present a shrunken contracted gall bladder is to be expected; when the gall bladder can be felt before operation some other cause than gall stones is at the root of the mischief; but it is doubtful if any good purpose would be thereby served. Besides, the question of diagnosis has yet to be considered, and will, I think, be found much more interesting than a mere enumeration of cases which mainly differ in the varying complexities of the adhesions met with and the position of the stones removed.

Operations on the Cystic and Common Ducts.—These are fortunately less often required than those upon the gall bladder. Since such concretions are usually primarily formed in the latter viscus, and only reach the duct by dilating the passage between the gall bladder and the point at which they are found, this dilatation admits as a rule of their being once more carried up into the bladder, from which they may be extracted. Occasionally, however, this is not possible, and the stone must be removed through an incision in the duct itself, as in the following case:

Mrs. S. A. D., aged 43, admitted July 15th, 1906, in whom symptoms had existed for twelve years; acute biliary colics for six years. Jaundice was seen in the first attack and occasionally since.

On July 19th, Robson's incision having been made and the liver rotated, a shrunken gall bladder was found containing several faceted calculi; the cystic duct barely admitted a probe; below in the common duct several angular calculi could be felt; as these could not be reached through the contracted cystic duct, the common duct was incised, and five stones were removed from that channel; a drainage tube was sewn into the bladder, and another secured to the opening in the duct. These tubes came away on the tenth day; free escape of bile continued from both openings for over a month. Recovery in the end was perfect.

In two instances I have removed stones from the lower third of the common duct through an opening made in the duodenum, the McBurney operation. As these stones were lying, in the one case in the diverticulum, in the other immediately above, the wall covering them was simply incised to permit of their escape; this incision was not sutured, but the duodenal incision was closed by two layers. Both cases recovered.

I have not yet mobilized the duodenum in order to reach such stones from behind, as recommended by Sencert of Paris, by Haasler, and by Bloch of Copenhagen, simply because I have not so far met with a stone which could not be reached by one or other of the previous

methods, but the operation as described by them would seem to be not without utility in certain cases. The danger of wounding the pancreas and so setting free pancreatic juice in the connective tissue spaces behind would appear to be mainly theoretical, since in the cases described the pancreatic tissues had themselves undergone such changes as to render them harmless. Still there is always the possibility that they might still be secreting, and for that reason the transduodenal method would appear to be safer.

The mortality in my series of all operations has been four, and in the last twenty none at all.

In considering the question of symptomatology, the first thing to be done is obviously to get rid of some of the old teaching on this point. Every one knows the classic symptoms—pain in the right hypochondrium, spreading round to the right scapula and up into the right shoulder; jaundice; tumour below the edge of the liver, its own dullness being continuous with that of the liver, and the mass of it moving with respiration; clay-coloured stools; bile in the urine; and probably stones to be found after careful washing of the faeces. Operative work has shown that in any given case one or more of all these symptoms may be present, but that they are seldom or never all present together; that one of them, the tumour, is far more indicative of other conditions, and that even the most constant of all, the pain, requires modification, since in the experience of most it but rarely rises as high as the shoulder. In my own cases I have only met with it at such a height in three cases; in all the rest pain has been felt nearer the angle of the scapula and in that plane, very seldom higher. Jaundice, as we all know, is only seen when there is some obstruction to the outflow in the common or hepatic ducts, and is as likely to occur with simple catarrh of these ducts, when the swollen mucosa diminishes their calibre as with biliary calculi. Clay-coloured stools and the presence of bile in the urine are equally symptomatic of catarrh of these ducts, whilst they are most marked in chronic pancreatitis affecting the head of the pancreas, or in carcinoma in or pressing upon these channels. The discovery of calculi in the stools is, no doubt, evidence that calculi have existed in the biliary channels, but it cannot prove that they are still present there.

But if it is easy to show that the symptoms upon which we used to be taught to rely may mislead, does the fresh evidence as to the formation of these bodies throw any new light on diagnosis? I think that it does, and in this way:

Since biliary calculi only produce symptoms which call for their removal when the channels in which they lie are inflamed, tenderness of those channels on pressure is the one inevitable symptom which must always be present; and it is to be noted that this tenderness is not only to be found during an attack, but persists afterwards and can always be elicited by pressure properly applied. That inflamed tissues should show tenderness is only what might be expected; that they will do so much more if they are compressed upon a hard mass contained within them is still more evident; if in addition they can be compressed against a firm backing, such as the liver substance itself, this tenderness will become more striking still.

That this method of testing is reliable was first demonstrated by Murphy of Chicago, who has in this way not only supplied a means of detecting biliary calculi which otherwise might not have been suspected, but of distinguishing between them and renal calculi, the most likely condition to be confounded with them when the other symptoms present might not have been sufficient to differentiate between them.

Robson had shown that pressure directly backwards over the lower third of a line drawn from the tip of the ninth rib on the right side towards the umbilicus elicited pain in cases of biliary calculi; but this might also be the fact in those of renal calculus, especially if that calculus happened to be one composed of calcium oxalate; direct backward pressure might also impinge on a tender duodenum or hepatic flexure; it was not, therefore, sufficient for exact diagnosis. Murphy's method supplies the requisite differentiation.

The patient, all clothing being removed from the lower chest and abdomen, is placed in a sitting position with his back to the examiner; the latter, sitting behind, places

both hands on the front of the abdomen immediately below the costal margins; the patient bends forward, placing his own hands on his knees. He is instructed to breathe deeply; at each expiration the examiner's hands sink more deeply into the abdominal walls; they not only sink inwards, but they rotate on their own axes, so that soon the ulnar edge lies more deeply than the radial and the tactile surface of the fingers is directed upwards.

Very soon the hands begin to approach the under surface of the stomach on the left, and of the liver on the right side; as soon as the tender gall bladder comes near the compressing right hand during inspiration, which forces the liver downwards, pain is experienced, and the act of respiration is abruptly checked; the pain is definitely referred to the right hand.

Pressure so applied is absolutely deflected from the kidney, which is not compressed. Any pain due to the duodenum or hepatic flexure is felt at first, and is not so definitely caused at a comparatively late period, or at a definite moment in the examination; nor has it any but a general effect upon the respiration, or the respiration upon it. This method of Murphy's will be found, as far as my experience goes, to be extremely reliable.

When, therefore, pain of a paroxysmal character referred to the right hypochondrium occurs, especially if it is associated with nausea or vomiting, it is well to test in this way, since, if the result is negative, we can at once, and safely, so far as my experience goes, eliminate the possibility of biliary calculi; the pain will be found to be due to other causes. If, on the other hand, it is affirmative, the only other condition which might produce it is uncomplicated inflammation of these biliary canals. Any one who has used this test in these two conditions will recognize at once the sharper, more acute pain and interference with respiration which occurs in the calculous cases, and is not, I think, likely to be misled. But, even if such a mistake should occur, no great harm will have been done, since drainage of these inflamed channels is by far the best treatment for such a condition, whilst it is also the best preventive against calculous formation in the future.

By means of this test, also, we may hope to detect calculi which are the real causes of many ill-defined affections at present frequently diagnosed as functional gastric disorders, and, by removing these concretions, rescue some sufferers from long-standing invalidism or persistent, unexplainable misery.

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THE REMOVAL OF ENLARGED TONSILS.

By RODERICK MACLAREN, M.D.,

CONSULTING SURGEON TO THE CUMBERLAND INFIRMARY.

SOME recent communications to the JOURNAL on this subject have suggested to me to put on record a method of operation which I have employed for a long time.

Fifteen or twenty years ago I became dissatisfied with the two usual operations. Of these the removal by guillotine was the worst. As a rule it took a mere shaving off the face of the tonsil, leaving behind a varying amount of the gland, sometimes as much as two-thirds. The procedure was little under the control of the surgeon. It was hit or miss, and the result was often disappointing; the narrowing of the fauces for which the operation was done was sometimes very imperfectly relieved. It was far from unusual for temporary improvement to be followed by increased growth of the part left, and by a return to the stenosed condition. The operation by vulsellum and blunt-pointed bistoury was a little better. The gland could sometimes be drawn well out from between the pillars and effectively amputated, but not always. It was often attended by more hæmorrhage than was at all desirable. It was also wanting in precision. By thinking over these various disadvantages, I dropped into the way of operating described below. The results have been such as to satisfy me.

I always have a deep anaesthetic administered. The patient is laid on one side, that being chosen which best allows light to reach the back of the mouth. Occasionally but not often difficulty of removal is taken into considera-

tion. It is somewhat more easy to get at the tonsil which is on the lower side, and the patient may be so placed as to put lowest the side on which the gland is most embedded in the palate. The following instruments are required:

A Gag.—I use one which I had made for the purpose. Its bearing points are four bars placed in contact with the upper and lower bicuspid teeth on both sides. It is so contrived that it does not interfere with the use of instruments in the mouth. Generally it is self-retaining, but occasionally in a narrow mouth, or when teeth are deficient, it must be tied in place by a tape across the back of the neck.

A Straight Vulsellum.—This should have long teeth which guard each other when the blades are locked, and prevent the points catching where they are not wanted.

A Blunt Dissector.—The one I use has a blade $\frac{1}{4}$ in. broad. The point and edges will not cut. It is slightly curved on the flat. I first knew it as a periosteum elevator.

Two Pairs of Long Strong Forceps to hold tampons.

A Pair of Scissors curved on the flat.

An Ordinary Scalpel.

A Probe-pointed Bistoury.

The instruments necessary for curetting adenoid growths.

At one time a guillotine was always included, but presently it was left out as a rule, and only taken for an exceptional case. It does well under one condition, when the tonsil is attached by a distinct neck. This is unusual; generally the large tonsil is ensheathed in the mucous membrane of the soft palate, only a small portion of it protruding from between the pillars.

The operation is commenced by opening the mouth as widely as possible with the gag. The tonsil of the side on which the patient is lying is then caught by the vulsellum. The best grip is got by placing one blade on the nasal and the other on the laryngeal end of the tonsil. The tonsil is drawn inwards and forwards. If it comes out from between the pillars no knife need be used, but if a considerable part of it remains behind the palate a transverse incision is made to expose the gland thoroughly. This is done with a sharp-pointed scalpel from within outwards through the mucous membrane. It starts about the middle of the anterior pillar and is from half to three-quarters of an inch long, according to the size of the tonsil, which is made to bulge through it. At this stage, whether the mucous membrane has been cut or not, as much traction is put on the gland as it will bear and the blunt dissector is pushed behind it from above. It is then systematically teased out from its connexions. There is this distinct advantage in starting in this way, that it prevents the uvula being injured, as it might be if the gland were taken out from below. Most tonsils peel cleanly out with a smooth and rounded back surface. Much of the completeness and facility of the operation depends on the consistence of the gland. If it is firm the removal is easy, but if it is soft and bears traction badly it may be a matter of difficulty to get it out whole owing to the teeth of the vulsellum tearing through. Scissors or the blunt bistoury are very useful for a tonsil of this latter sort. It is first well loosened by the dissector, and then its final attachments snipped or cut.

When one tonsil has been removed it is advisable to wait for a few minutes to allow bleeding to diminish. The second tonsil is then dealt with in a similar way and adenoid growths and turbinate thickening attended to if necessary.

By this method there is only a very moderate amount of bleeding. I have not encountered troublesome hæmorrhage for many years; very occasionally it has been necessary to hold a tampon on the wounded surface which can be compressed between a finger outside and a pad within. This has always proved sufficient to control any active vessel till it closed in due course. The proximity of the internal carotid artery is a time-honoured surgical bogey. If the operation is done as just described there is no risk of injury to it. The dissection is kept close to the gland, which is turned cleanly out of its bed, and the traction which is exercised by the vulsellum tends to lift the tonsil away from the neighbourhood of the vessel.

The gland when thus removed never returns, and the operation definitely accomplishes the object for which it was undertaken.

There is generally discomfort and pain for two days after the operation, but by the third or fourth day these have much subsided. Healing is generally complete in about ten days.