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REMARKS ON SURGERY OF THE BILE DUCTS.

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Clinically, it is impossible in all cases to separate the common duct from the rest of the bile ducts. I shall point out some facts referring to the ducts in general and the gall bladder, but on the whole limit my remarks to the surgery of the common duct.

1. Biliary Colic is a symptom common to the whole biliary tract. First, as to the causation of pain, which we will consider irrespective of the presence or absence of icterus. There are three distinct factors operative in the causation of the pain; namely, (a) Incarceration, (b) Inflammation, (c) Retention.

Incarceration.—Contraction of the wall of the duct around the obstructing stone or pressure of a stone too large for the duct against its wall may cause the attack. The observation of Dr. Billings that a sound passed through a biliary fistula into the cystic duct caused pain in the right scapular region is highly instructive. It is said the narrower a duct through which a stone passes, the more violent the pain. Thus the cystic duct which has the narrowest lumen would be the seat of the most violent pain from incarceration of a stone, much more so than if the wider common duct were the seat of obstruction (Lawson Tait). Courvoisier, in his monograph (*Casuistisch-Statistische Beiträge zur Pathologie und Chirurgie der Gallenwege*. Leipzig, 1890), shows that of the 9 cases of gall stones reported in the literature, where death occurred during the paroxysm of violent biliary colic, there was a stone in the common duct in 6, a large stone in the gall bladder in 1, stones in all parts of the biliary tract in 1, and no autopsy made in 1 case. It is doubtful, therefore, if the cystic duct is more to be dreaded in this respect than the rest of the biliary tract.

Inflammation of the wall of the duct in the region of the stone, mechanically injures the epithelial surface and creates an atrium for infection. This is found in most instances of remittent attacks of inflammation (suppuration) of the gall bladder,—typical attacks of pain and fever at intervals of months. Can the inflammation, however, be the cause of the daily colic or pain occurring every few weeks? As Dr. Billings has pointed out, a small and nonobstructing stone in the diverticulum of Vater may be the cause of this

Discussion of papers by Dr. Arthur D. Bevan, on Cholelithiasis; Dr. Ludvig Hektoen, on Pathology; Dr. J. B. Herrick, on Diagnosis; Dr. Frank Billings, on Symptomatology; Dr. N. S. nn, on Sequelae and Complications, and Dr. L. L. Mc Arthur, on Surgery of the Gall Bladder, read before the Chicago Medical Society.

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colic. I made the same observation in Case V. of my paper—"Stones in the Common Duct, and Their Surgical Treatment, With Remarks on the Ball-Valve Action of Floating Choledochus Stones" (The American Journal of the Medical Sciences, February and March, 1896). In this case the small stone lay loosely in Vater's diverticulum. This, I think, may be explained as follows: A daily or weekly exacerbation of an existing subacute inflammation takes place, analogous to a protracted nasal catarrh or laryngitis, which gets better and worse at intervals.

Retention of bile behind an obstructing (fixed or floating) stone or behind a valve or bend caused by adhesions is also found to cause biliary colic. It is probably the sudden obstruction only that causes an attack of colic, as none occurs in the cases of gradual obstruction, for example, following cancer of the duodenum or the pancreas near Vater's diverticulum. At the present stage of our knowledge, it is not possible in a given case of biliary colic to diagnose, from the clinical symptoms, which of the three etiological factors are operative. This may, however, be a possibility in the future.

2. Differential Diagnosis. Dr. Herrick has mentioned the fact that acute disease of the bile ducts sometimes simulates acute intestinal obstruction. A case of this kind is the following: I saw the patient, a woman of about forty, May 20, 1896, in consultation with Dr. Loevenson. She was suffering with all the symptoms of an acute intestinal obstruction, seemingly with peritonitis, and nothing to point to the biliary tract. She was taken to the German Hospital of Chicago for operation. I opened the tympanitic abdomen in the median line and found the peritoneum normal throughout, the intestines uniformly distended and nowhere obstructed. A distended gall bladder was the only abnormality found. I closed the median incision and made a lateral one over the gall bladder. The gall bladder was considerably enlarged, tense, free from adhesions and somewhat congested. Thinking that the condition of the gall bladder might not be the cause of the obstruction, but that the latter might be dynamic and of unknown cause, I resolved upon a cholecystostomy in two stages. I selected this operation as the one which, if subsequent events showed it to have been superfluous, would be least harmful in its effects. The symptoms of absolute obstruction continued unabated after the first operation. After thirty-six hours I felt constrained to incise the gall bladder. Pus escaped and 140 good sized gall stones were evacuated. The

symptoms of intestinal obstruction ceased immediately. She recovered with a fistula in which one year later a cylindrical celled carcinoma of the gall bladder made its appearance.

Another point of interest in the diagnosis which has attracted my attention is the following: Does the shape of a given gall stone, passed by the bowels, give us any clue by which we may locate its former seat in the biliary tract, or the place it occupied during the greater time of its period of formation, and if so, where might we expect to find more stones?

(a) Stones with facets, pyramidal stones, I believe are ordinarily from the gall bladder, as here the stones occur in groups.

(b) Stones with two parallel facets, barrel-shaped stones, are commonly from the ducts where they lie in a single row.

(c) Spherical stones with no facets, when single, and either large or small may occur anywhere, but when multiple I believe they often come from a dilated common duct.

I will pass around stones in illustration of these views—stones from the common duct, Vater's diverticulum and the gall bladder. As an exception, however, in the following case all the biliary passages were filled with pyramidal stones.

Case I. Male. Age 32; first attack of biliary colic 15 years ago; second, 5 years ago; colic with increasing frequency since; icterus; no tumor felt; operation; cystic, hepatic and common ducts dilated and filled with stones; gall bladder small—contained stones—choledochotomy; removal of stones; cholecystotomy—removal of stones. Recovery—no attacks of biliary colic since.

Remarks. Duration of operation, 2 hours and 20 minutes. It was tedious and difficult to extract all the stones. Slight bleeding occurred from wall of duct, which stopped when sutures were tied. There was dilatation of hepatic half of common duct, of hepatic duct and of lower half of cystic duct. No dilatation of duodenal half of common duct.

Sometimes large quantities of gravel are found behind a large obstructing stone. These may occur either as amorphous masses of bilirubin lime and can be identified positively only by chemical tests, or as masses containing hundreds of well formed minute stones one to three millimeters in diameter. With a low magnifying lens these stones can be recognized as biliary calculi, especially if the broken surface with its characteristic radiation is seen. The importance of identifying as gall stones concretions passed with the

feces is obvious, as thereby we have a positive clue in tracing the origin of vague symptoms.

I believe it is yet impossible clinically to differentiate diseases of the gall tracts caused by stones, from those caused by bending or valve formation of the ducts. This I have shown in a former paper, viz.: "Retention from Displacement, Bending and Valve Formation—Oblique Insertion in Biliary Tract," (The Medical Standard, Chicago, November and December, 1896, and January, 1897; also Transactions of the American Surgical Association, 1896).

We may have either the frequently recurring short attacks of colic, as in floating stone in the common duct, or those monthly or semiannual attacks of colic with inflammation, as with stones in the infected gall bladder, or, finally, no colic at all, icterus, if present, being the only symptom pointing to the biliary tract.

(I will pass around specimens of bands and valve formation in cystic and common duct which have been already exhibited before the American Surgical Association, 1896.)

3. Should the operation of cholecystostomy in two stages be abandoned?

Courvoisier's statistics showed the mortality to be the same, namely, 10 per cent, whether the operation was performed in one or two acts. We read and hear less and less of the two stage operation being performed now. Many operators have given it up (F. Lange); others pronounce it a bad operation (Halsted, Bulletin of the Johns Hopkins Hospital, February, 1897. No. 32); others resort to it only exceptionally, as Kehr in 3 out of 100 operations (Ein Rückblick auf 209 Gallensteinlaparotomien. Langenbeck's Archiv, Bd 53, 1896; Heft 2, page 362). Riedel is one of a few who holds to it with certain well defined indications. (Penzoldt and Stintzing's Handbuch der Speciellen Therapie, Chirurgie der Gallenwege.)

The chief objection to the operation in two stages is that it does not allow of the removal of incarcerated stones from the neck of the gall bladder or from the ducts. This makes the operation for gall stones an imperfect one, necessitating perhaps a secondary operation to remove stones which cannot escape by way of the fistula.

Riedel's indication for the operation in two stages is the presence of a small deep seated gall bladder which can not be brought out and sutured to the parietal peritoneum.

I do not feel like giving up this operation entirely as it is safer against infection of the peritoneum than the operation in one stage.

It protects as certainly and surely when we operate for a suppurating gall bladder as when we operate for abscess of the liver or any other retroperitoneal collection of infective material. I never had a patient die from the effects of an operation in two stages; in one cholecystostomy in one stage, however, a fatal septic peritonitis followed. It seems to me that when the object of a cholecystostomy is not so much the removal of stones from the biliary tract as drainage of a septic gall bladder, (a temporary operation to avert the danger of rupture, perforation and sepsis) the two stage operation is preferable or the only rational one (Riedel).

If we have to operate during an acute attack of cholecystitis and find a small deeply situated gall bladder—to which all the surrounding organs, namely, duodenum, transverse colon, stomach, pylorus, etc., are adherent, or a gall bladder that is entirely buried beneath succulent, edematous adhesions to other organs, I prefer to operate in two stages. In some of the most complicated cases—and the cases of disease of the bile ducts that come to operation at the present time are generally more or less complicated, as 73 of Riedel's 120 cases were complicated—the local condition and condition of the patient may necessitate the two stage operation as the wisest compromise, as the patient may not be able to bear an operation lasting one to three hours.

There is another reason aside from safety that induces me to operate in two stages in some of the most complicated cases; namely, the simple drainage of the gall bladder not only relieves symptoms, but brings about a change in the pericystitis whereby the hard, edematous infiltrated adhesions become soft and pliable and the organs again become movable. At a later operation, under these circumstances, the isolation of the bile ducts without rupturing the gall bladder or intestines becomes possible. We can then recognize the identity of the different structures which is sometimes impossible in the acute active stage of the pericystitis.

There are many cases reported where the radical operation had to be abandoned, or where the patient died because the operation was too complicated or the intestines were opened into. I have in several cases of this kind been satisfied to be able to lay bare a square inch of the gall bladder surface for an operation in two stages. The majority of my cholecystostomies in two stages, although operations of necessity, have given permanent relief.

For the young surgeon who begins to operate on the biliary tract it is better to perform more cholecystostomies in two stages,

even at the risk of making incomplete operations, than to venture too far into a more complete operation and lose the patient. With years of experience his operations will gradually become more and more complete.

4. Pericystitic Abscesses or Fistulas. The greatest difficulties are encountered in the cases where pericystic abscesses are located between the biliary and the intestinal tract with fistulae between these hollow organs. A localized hard mass in the adhesions indicates the presence of an abscess. As an instance, I cite the following case of fistula into the pylorus:

Case II. Female. Age 35; married; first authentic attack of biliary colic one year ago; one or two attacks every month; no icterus at first; after eight months icterus and clay-colored stools. Operation; indurated mass uniting ducts and stomach; found to contain cavity filled with cheesy detritus and a sinus opening into stomach; fistulous opening in stomach sutured. Stone in common duct removed by choledochotomy. Cholecystostomy. No recurrence of biliary colic. Recovery.

In another instance a pericystitic abscess between the gall bladder and the transverse colon terminated in a fecal fistula, one month after a cholecystostomy in two stages. In this case the gall bladder was buried among the adjacent intestines.

Would it have been better to have laid the bile ducts bare and sutured the colon at the first operation? If this had been done would the patient be alive to-day?

5. Displacement of the gall bladder and of the entire liver I found in two cases due to very firm adhesions to the parietal wall. Lateral displacement will necessitate a transverse branch to the longitudinal incision. Displacement upwards under the costal arch may require resection of the costal cartilages as proposed by F. Lange.

An instance of this is the following case:

Case III. Male, age 47. Biliary colic for 10 years. At first without jaundice nor clay-colored stools. August, 1897, severe biliary colic with jaundice and clay-colored stools. Operation—liver and gall bladder retracted high up under ribs requiring resection of costal cartilages to bring gall bladder in view. Very extensive adhesions everywhere; operation in two stages; gall bladder with difficulty sutures to peritoneum; gall bladder opened 13 days later; stones escaped; fistula for some months; eventually recovered; no more colic.

6. In what cases should we operate and when, are questions concerning which there exists a difference of opinion between internal medicine and surgery. Operation is now performed earlier in the disease than formerly, when only the most desperate cases sought surgical aid. The local conditions which tend to make operation difficult, if not impossible, are due to the recurrent attacks of infection and inflammation in and about the gall bladder. In Kehr's 209 operations, 41 lasted more than two hours, six more than three hours and two over four hours; in other words 25 per cent lasted over two hours. In the early operation less complications are liable to be encountered and the operation is consequently shorter, and for this reason it should be advocated. It is questionable, however, if the cases that present the greatest difficulties during operation always present a history pointing to the same or indeed have a history that indicates early operation.

In cases with remittent attacks I prefer to operate in the interval of rest, as in appendicitis. I do so because I believe the adhesions are less rigid and edematous and the microbes less active in the free interval.

When stones are being passed with the feces, whether through a dilated Vater's diverticulum or through perforation, into the intestine, we naturally await the result and see if relief does not follow. This is evidenced by the following case:

Case IV. Male, age 60; biliary colic for four years; icterus two years ago; stone found in the feces; recurrence at least once or twice every month; during last year attacks almost every week; sometimes very severe; icterus; late in December, 1896, severe biliary colic; each day stones were found in feces until there were six. Spontaneous recovery without operation. Has had no attacks since.

7. In choledocholithotomy it is important to find and remove all of the stones, as a stone being left may necessitate a second operation. Kehr was unable to find all the stones in 5 out of 30 cases (16.6 per cent). I was unable to find a small stone in Vater's diverticulum, and Küster, Terrier, Lauenstein and Riedel according to Kehr each report one case. Where do these stones hide, even sometimes after they have once been felt at first? When they do not slip up into a dilated hepatic duct where they may be felt with the finger or probe, I believe that they hide in diverticula in the wall of the ducts. I will pass around a paraffin cast of a common duct showing such a diverticulum 1 centimeter in diameter;

the same is also reproduced in my plate No. II. (American Journal Medical Science.)

As an aid in detecting stones after the common duct has been opened, I devised my flexible metallic probe, made of spiral wire as described in my paper of 1897. (Medical Standard.) Not only is a click felt when the probe strikes a biliary calculus, but, what I consider of much greater importance, should the point of the probe glide past a calculus, half hidden we will say, in a diverticulum, we feel a grating sensation caused by contact of the stone and the uneven surface of the probe. I believe that I might have been thus able to feel a small stone in Vater's diverticulum, which would otherwise have remained undiscovered, and perhaps saved my patient.

8. The wound in the common duct is always closed with sutures; or, as Kehr terms it, the choledochotomy operation is always the ideal one. It is difficult to insert the sutures in the common duct, located as it is at the very bottom of the deep field of operation. I will pass around the hammer devised by Halsted to facilitate the introduction of the sutures.

9. The prognosis of choledochotomy, as of operations on the ducts in general, is improving. In 1896 I estimated the mortality of the 44 cases then reported in the literature and found it to be 18 per cent. I have operated on seven cases with one death—14.3 per cent. In Kehr's 30 cases there was a mortality of 6.6 per cent. only; this is an exceptionally favorable record that will probably not be obtained by the majority of operators, nor be improved by a larger series of cases.

10. Of the cases demanding operation on the biliary tract which are easy and which are difficult of operation? It is notable that the two operators who have had the most extensive personal experience in this field of surgery should have such diverging opinions. Riedel (page 106) has greater fear of the cystic duct than of the common duct. Kehr, however, performed 23 cystocotomies without encountering complications or having a death, whereas he found his 30 choledochotomies mostly difficult and complicated. The explanation is that the number of operations is yet too small to avoid drawing erroneous conclusions.

In my opinion the difficulty in operating on the ducts increases as we approach the duodenum, but conditions aside from the location of the disease must also be considered. Some of these are for example—adhesions, fistulae, abscesses, bands and valve forma-

tion, retracted inaccessible location of the gall bladder, etc. The former may complicate the disease in any part of the tract to such an extent as to render the aspect of the case extremely grave and the operation highly dangerous, if not impossible.

I have no time for, and dislike controversy. Before reading his paper, Dr. Bevan made known to me his intention of questioning the anatomical relations of the common duct and portal vein as set forth in my paper on "The Treatment of Gall Stones." I endeavored to demonstrate to him that he was in error. As he still holds to his opinion, I feel it incumbent upon myself to set him and the matter aright. It is a serious accusation to state that I am mistaken in the anatomy by claiming that the portal vein comes up on the anterior surface of the common duct. Especially so as I had brought out some points in the pathological surgical anatomy of this region never before described. I cannot allow the suspicion of unreliability to rest upon any of my writings. In my paper I have illustrated and described the pathological surgical anatomy of the field in operating on the common duct.

For the sake of clearness and comprehensiveness, as I stated in my preface, I decided to describe the relative position of the organs in question as they are observed with the patient in the horizontal position, as on an operating table.

The relation of the organs of the patient lying down, to the operator standing, has therefore changed 90 degrees from vertical to horizontal. Thus it follows that, for example, the anterior aspect of the common duct with patient erect becomes the upper surface when the patient is recumbent. Under the same conditions the upper surface becomes posterior, the posterior aspect becomes inferior and the inferior becomes anterior when the patient is placed in a horizontal position. When I state, therefore, that the vena porta, emerging from behind is located, relative to the common duct, first on the posterior, then on the inferior, and finally on the anterior surface, I refer to the relation in the horizontal position. In the upright position of the patient it would follow that the vein is first superior or above, then posterior, finally inferior or below the common duct. I consider that the relations described with the patient horizontal are more comprehensible to the surgeon as they are thus exposed by operation.

Dr. Bevan has evidently read my article carelessly if he doubts my statement that the portal vein in its terminal course is found located on the anterior (or inferior) surface of the right hepatic portion of the common duct.

Furthermore, the statement of Dr. Bevan that the specimens from which my plates were made were anomalous is equally erroneous. As I state in my paper, I have, in operating on patients with stones in a dilated common duct, found the relation of vein and ducts repeatedly and constantly just as it appears in the specimen and plate in question. My experience has upheld my opinion, that the description of the specimen was correct and expresses the anatomical pathological relations ordinarily met with in operating for stones in the common duct. I have further, through the kindness of Dr. William Hessert, procured a specimen of the normal organs with vessels and ducts injected with plaster of Paris and gelatin. This specimen also corroborates the correctness of my description, as do the pathological specimens which I now demonstrate. Owing to their treatment with formalin they are somewhat shrunken.

The description attached to my plates contains exact measurements in millimeters of all parts. The figures are not schematic drawings, like those of Dr. Bevan, but are exact reproductions from nature of the organs involved. They are equal in correctness to photographs, but superior in comprehensiveness.

Dr. Bevan presents a specimen of a liver and bile ducts with the latter together with the vessels, dissected out, and the vein empty. When the ducts and vessels are loosened from their surroundings it is practically impossible to judge of their relative position because they are then easily displaced. When the portal vein is empty it is impossible to obtain even a remote idea as to its relation to the ducts; an empty vein is collapsed and appears like a strand of fascia or a band of connective tissue. In operating on the neck we are familiar with the great difference presented by a full or an empty internal jugular vein.

Consequently, inasmuch as Dr. Bevan's drawings are made evidently from specimens in which the portal vein was not injected, they must necessarily convey a false impression; they portray the organs and relations as taken from the cadaver and not as seen in the living subject as is the case with my description. Surgery does not deal with cadavers.

I would say further that it is well to consider the relation of the portal vein to the common duct, while the left index finger is passed into the foramen of Winslow.

In this manner the hepatico-duodenal ligament enclosing the common duct and portal vein is lifted upward (patient horizontal)

or forward (patient erect). It is an advantage to study relations in this position because palpation of the ducts (common, cystic and hepatic) is thus accomplished, and furthermore, because incision of the common, cystic or hepatic ducts is made with the finger in this location, and the organs thus exposed. It facilitates orientation and tends to prevent injury to the portal vein. Finally, it is important as neither by inspection nor palpation can the operator distinguish individually the vein from the ducts.

Dr. Bevan has made some 40 dissections and presents us as the result a series of drawings of the bile ducts and their surroundings. These drawings do not differ materially from the time-honored classic illustrations of this territory to be found in the anatomical atlases. They differ only in that they are less correct than the classic ones inasmuch as they are entirely schematic and do not give any dimensions.

Some of the illustrations are evidently intended to show the pathological anatomy of the bile ducts. The doctor has in some of his charts inserted imaginary gall-stones in the normal ducts. This matter of developing pathological anatomy at one's writing desk must lead necessarily to grave errors and absolutely erroneous conceptions.

A beginner in the surgery of the bile ducts who, in a given case of stones in the gall bladder or ducts, would rely upon Dr. Bevan's anatomical plates as guides in his operation, would be much deceived and very much at sea. He would find the conditions in the case so entirely different from the normal anatomical conception, that he would be at an utter loss to find his bearings.

Dr. Bevan seems to ignore the fact that surgical diagnosis and operating are based indirectly only on normal anatomy. Nobody will deny that a prospective surgeon must first acquaint himself with normal anatomy. But operations are not performed on the normal body or on normal organs. The second step in the development of the surgeon and operator is the study of pathological anatomy. General pathology enlightens him relative to the different morbid processes of diseased organs. This knowledge is needed for an intelligent comprehension of the anomalous life processes in diseased organs. A surgeon might diagnose and do moderately good mechanical work on the plane of the ordinary artisan without much attention to pathology or pathological physiology.

But pathological anatomy, namely, the knowledge of the shape, size and relations and so on of diseased organs is absolutely es-

sential to the good operating surgeon. The field of operation, its topographical pathological anatomy, as I have, for example, described it in operating on the common duct, is often widely different from the same region in perfect health. The ducts may be dilated and tortuous, irregularly sacculated in places, diverticula may be present; these conditions necessarily change the relations of the parts concerned. For example, how would it aid the surgeon, operating on a fibroid in the broad ligament, to have before him an illustration of a normal uterus and adnexa? The normal anatomical relations are entirely and absolutely distorted. If the surgeon has not studied the pathological anatomy of uterine fibroids he will be guided by normal anatomy alone, and will be utterly helpless when he comes to operate. Pathological anatomy must first be studied at autopsies preparatory to work in the operating room.

Next the pathological anatomy must be studied during operations; at first in seeing others operate, and finally in operating one's self.

The variety of pathological lesions met with during operations is so great, that an extensive experience only will in time enable the operator to unravel the difficulties encountered amongst the diseased organs with their abnormal relations and surroundings Riedel justly remarks: "The surgeon who intends to operate for gall stones must acquire an exact knowledge of the pathology (pathological anatomy) of the disease, and then be familiar with all the operations proposed and performed by all the different operators." (l. c page 89.) This remark of Riedel's may explain the fact with which we are all familiar, that a very good anatomist often makes a very poor surgeon.

In conclusion a word relating to the phrasing of Dr. Bevan's criticisms of my paper. He "feels sorry" for me that he must "do his duty by the profession" by "correcting my erroneous anatomy," because my paper has been widely read and has attracted attention. This, with my previous reputation for reliability, might mislead those who read my paper, etc., etc.

I need not suggest that such language is not used in the best scientific medical literature. Time and experience, however, may improve the tenor of the doctor's future writings.

The next question I wish to bring before the society concerns the history of choledochotomy or choledocholithotomy (Courvoisier). Most writers, including myself, assign the priority of this operation to Courvoisier, who performed his first operation Jan-

uary 22, 1890. Dr. Henry O. Marcy, of Boston, disputes the priority of Courvoisier, basing his claim on an operation performed October 26, 1889 (Journal American Medical Association, Dec. 20, 1890).

In preparing my paper on the "Treatment of Gall Stones" (American Journal Medical Sciences, February and March, 1896), in reviewing the history of choledochotomy, I considered the case of Dr. Marcy not choledocholithotomy, but simply an operation on the gall bladder or cystic duct for the removal of a stone. I therefore made no mention of it as my paper treated of the surgery of the common duct only. In a letter to me, Dr. Marcy still claimed priority, and reproached me for overlooking his paper and thus doing an injustice both to him and to American surgery and surgeons. In my answer to him I stated my reasons for not considering him in the question of choledochotomy, and expected the matter to be ended thereby. That Dr. Marcy, however, holds to his claim of priority is seen in a later publication—"Obstruction of the Common Bile Duct." (Annals of Surgery, January, 1897.) Dr. Alexander Hugh Ferguson in an article, "Personal Observations on the Surgery of the Gall Bladder and Bile Ducts" (British Medical Journal, November 6, 1897), sustains the claim of Dr. Marcy. In order to settle the question of priority I will lay the facts in the case before the society to-night.

I consider the operation performed by Dr. Marcy on October 26, 1889, to have been an incision either in the neck of the gall bladder or perhaps in a dilated portion of the cystic duct for removal of an impacted stone. I do not consider it possible that it was an incision of the common duct for the following reasons:

In the first place, the first report of Dr. Marcy's case is very imperfect. For this reason alone I could have disregarded it in the bibliography of my paper. In sifting the literature for reports of cases bearing on a certain subject, we must necessarily pass over those that are inaccurately reported, as no accurate opinion can be based upon them.

Dr. Marcy's first report of the case (*loc. cit.*) as well as a more extended later report of the same case (*l. c.*) show that any operation on the common duct can be excluded.

His patient, female, age 40, suffered with attacks of biliary colic with icterus, diarrhea and clay-colored stools. The abdomen being opened the gall bladder "like a cystic growth distended the lips of the wound." Gall bladder sutured to peritoneum—incised—ten

ounces of bile together with a calculus evacuated. (Dilated gall bladder.) With a probe he felt a stone deep down, "quite beyond the cystic duct." He does not specify by measurement how far he probed, and this is important. This statement of the probe passing "quite beyond the cystic duct" is not contained in his first report in 1890, but is found in his report of 1897, published after I had raised the question of priority. This stone could not be dislodged or crushed. The gall bladder was washed out, the stitches between gall bladder and peritoneum cut, and the wound packed with gauze. "After having somewhat forcibly drawn the gall bladder through it (the wound), even this procedure did not enable us to seize and remove the calculus. I then divided the walls of the duct (paper of 1890) [of the common duct (paper of 1897)] with scissors and everted its edges from over the roughened calculus, which was even then removed with difficulty. The thickened mucous membrane of the duct (what duct? Evidently not common duct, but cystic duct) and bladder was joined by a fine, continuous tendon suture, and in a like manner the peritoneal edges were carefully adjusted, while over all a third layer of suturing was taken." A continuous para serous stitch interfolded the edges, "the entire wound of the viscus measuring about four inches (paper of 1890)." In the paper of 1897 it reads: "The wound through the duct and gall bladder thus closed measured four inches." Abdominal wound closed without drainage; patient recovered. "The rough, mulberry-looking calculus, grape size, was the offending member, weighing when dried fifty-nine grains."

To say nothing of the very significant changes made in the text of the second publication and overlooking the lack of clearness and comprehensiveness in the description of the operation, it is evident that Dr. Marcy first incised the enlarged gall bladder at its fundus. This incision was then later enlarged downward toward the neck of the gall bladder, or to the cystic duct for a distance of four inches.

A normal gall bladder, containing from one to three ounces of contents, is about four inches long from the fundus to the cystic duct. A gall bladder containing ten ounces and appearing "like a cystic growth distending the lips of the (abdominal) wound" is longer, we will say at least, by one inch, making a total of five inches from fundus to neck. The normal cystic duct measures two inches in length. A continuous incision from the fundus of a normal gall bladder to the beginning of the common duct would be

$4+2=6$ ins. A continuous incision from the fundus of the dilated gall bladder in Dr. Marcy's case down to the beginning of the cystic duct would be five inches, and to the beginning of the common duct would be two inches more, or at least seven inches. It is evident, consequently, that Dr. Marcy with his four-inch incision divided only the gall bladder, the stone being lodged firmly in a sacculation in the wall of the gall bladder, which occurs commonly. His four-inch incision might have reached slightly into the cystic duct, although to accomplish this would have required an incision of five or six inches. It is a physical impossibility that Dr. Marcy's four-inch incision reached the common duct. Before the second publication of 1897 I communicated to him by letter my disbelief in his claim. His persistency, however, in the matter of priority imposes upon me the thankless task of setting the matter right.

As to Dr. Bevan's incision for which he claims superiority, because (1) it gives more room for operating, and (2) avoids the section of nerves and muscle fibers, and is consequently less liable to be followed by hernia. The upper oblique branch of the incision divides the rectus muscle transversely, and the lower oblique arm divides two of the flat abdominal muscles and runs at right angles to the motor nerves. Consequently it divides as many nerves as is possible in this region,

The incision of Dr. Bevan is a compromise between the oblique incision parallel to the costal border and the longitudinal incision along the outer border of the sheath of the rectus muscle. It is not well chosen, as it divides about the greatest possible number of nerves and muscle fibers.

I always make a longitudinal lateral incision through the outer third of the sheath of the rectus muscle. Occasionally only is it found necessary to extend a transverse lateral branch as proposed by Czerny. This incision is preferable, as it divides the least number of nerves and muscle fibers.

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