greatly concern himself. The physician, on the contrary, trained and accustomed to the patient solving of difficult diagnostic problems, is not content with what I may call a mere utilitarian diagnosis. He wants to find out all that possibly can be found out just as he does in the chest and other regions that are his own undisputed territory. In other words, he recognizes that in scientific medicine the first essential is accuracy of diagnosis, and that until an accurate diagnosis has been made all treatment must be haphazard and unscientific. Those have been the best clinical physicians who have held this opinion and have systematically acted upon it, availing themselves of every opportunity, whether in the *post-mortem* room or the operating theatre, of ascertaining how far their diagnosis is borne out by facts. If gynaecology is to advance in a scientific direction, this is the spirit, it seems to me, in which its work must be carried on. Hence I should view any step towards the severance of gynaecology from medicine with very great misgiving. That gynaecology is becoming more surgical is very true. It is inevitable that it should be so. But that is all the more reason why medicine should still keep a hold upon it, to exercise a wholesome restraint upon its surgical enthusiasm and to continue to inspire it with that reverence for accuracy of diagnosis which otherwise it might be apt to lose.

I desire, Mr. President, to thank you very sincerely for the honour you have done me in asking me to deliver this lecture. It is, I believe, the first time since the Bradshaw Lecture was established, twenty-one years ago, that the honour of delivering it has fallen to an obstetric physician. I trust that I may interpret this mark of your favour as an indication that this College has at present no intention of disowning either obstetrics or gynaecology, or of removing them from an influence—which I for one—believe to have been extremely beneficial.

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THE medical faculty of Berne is in the position of instructing more women than men students of the proportion of 252 to 199. Of the 1,179 students in the University of Berne, 637 are Swiss and 542 are foreigners. Of the 384 lady students, 291 are Russian and the majority have entered the faculty of medicine.

SEVENTIETH ANNUAL MEETING
OF THE
British Medical Association.
Held at Manchester, July 29th, 30th, 31st, and August 1st, 1902.

PROCEEDINGS OF SECTIONS.

SECTION OF SURGERY.

JAMES HARDIE, F.R.C.S., President.

(Concluded from p. 1316)

AN OPERATION FOR GALL STONES WITH THE AFTER-HISTORY OF A SERIES OF CASES OPERATED UPON.

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IN a previous paper[1] I drew attention to the anatomy of the right hypochondrium in relation to gall-stone surgery, and suggested then that an incision in the transverse direction was better than the vertical one usually advocated.

In the wards of the late Dr. John Duncan, of Edinburgh, I saw for the first time an incision in the transverse direction, but the one he used was not strictly transverse, it was oblique, for it skirted the costal margin, and it was short. My incision is transverse, is long, and is designed to expose the pouch I described by opening up the space between the liver above and the transverse colon below. The weight of authority is still, so far as I can judge from published papers, all in favour of operation through an anterior vertical incision in or about the linea semilunaris. The object of my paper is to emphasize more strongly than before my suggestion that this is not the best approach.

The operation I am about to describe allows of free access to the gall bladder and its ducts with a minimum of disturbance of the abdominal viscera; free drainage is assured by it, and the chances of hernia of the scar are less, I believe, than when the incision is vertical.

The skin incision, when a difficult common duct operation has be done, begins 1 in. below the tip of the twelfth rib and ends in front in the middle line, at the upper part of the middle one-third of a line drawn from the ensiform cartilage to the umbilicus. All the layers of the abdominal wall including the rectus muscle are divided, and the cut edges of the peritoneum (Fig. 1, p. 1491) are caught in clip forceps. A thick gauze pad or sponge is then packed into the abdomen under the lower flap of the wound over the colon and omentum, shutting off access to the general peritoneal cavity in this direction and on the inner side and in front the stomach is covered and protected by a gauze pad. The wound may be more thoroughly opened out by making the iliocostal space convex to the right and pushing the hips and shoulders to the left.

Drainage is secured by indiarubber tubing, which in the case of the gall bladder is fixed to it by a catgut suture and a thick broad strand of gauze brought through the wound posteriorly, the gauze being essential to secure the patency of the opening. Drainage of the common duct is effected by leaving the opening in the duct unsutured, with a large tube apposed to it. Drainage of the hepatic and common ducts by a tube in the lumen does not appeal to me. A tube in the healthy rectum or nose or urethra is badly tolerated, and it seems improbable that the inflamed biliary ducts would be an exception to this rule, and possibly stricture might follow ulceration produced by prolonged tube pressure. If a soft tube be used alone for drainage it soon becomes kinked, from the tendency of the external oblique muscle to draw the opening in it upwards over the ribs, hence the use of gauze.

In the paper previously mentioned I pointed out that biliary fistula not infrequently followed suture of the gall bladder to the abdominal wall as a reason why this should never be done.

The wound is closed either with four tiers of catgut or

Table of the After-Histories of Every Case that could be Traced on which an Operation for Gall Stones was Performed from 1888 to End of 1900.

No.	Initial	Sex	Age	Duration of Symptoms	General Condition	Position of Stone	Operation, with Date	Complications	Results	Date of Report	Time since Operation	After-History	Remarks
1	H.	F.	45	8 years, worse lately	Good.	Gall bladder	Cholecystotomy, Feb. 29, 1888		Good recovery		5 years	Patient very well. No return of symptoms. Has a hernia through the short vertical incision	At first operation a stone was felt in the common duct, but I dare not remove it. Gall bladder stitched to skin.
2	P.	F.	41	3 years	Bad jaundice	Gall bladder and common duct	Cholecystotomy, March 11, 1891		Good recovery.			Patient was well for 5 years, but had a biliary fistula with attacks of pain and jaundice when it closed. At this time Mr. A. E. Morison removed a single stone from the common duct. Patient made a good recovery, and has remained well	
3	E. W.	F.	45	12 months	Bad jaundice	Common duct	Cholecystotomy and choledochotomy, Aug. 13, 1894		Good recovery.	1901	7 years	Patient very well. Scar sound.	
4	H.M.D.	F.	28	16 months	Good; slight jaundice	Gall bladder and impacted in cystic duct	Cholecystotomy, March 17, 1893		Good recovery	1901	8 years	Was long in healing; often healed up causing pain, then broke down with relief. Now all healed and patient very well	Gall bladder stitched to skin
5	M.A.D.	F.	42	12 months	Good; no jaundice	Gall bladder and impacted in cystic duct	Cholecystotomy, Sept. 11, 1894	Bronchitis	Good recovery	1901, April 8	7 years	None of old symptoms. Health very good. All healed, no trouble with scar	Gall bladder stitched to skin.
6	D. F.	F.	17	5 years 3 weeks' severe illness	Very ill; jaundiced	Stones in bladder and common duct	Cholecystotomy and choledochotomy, Nov. 20, 1894	Suppurating gall bladder	Good recovery	1901, Aug. 2	6 years, 10 months	Had an attack of pain with jaundice in Jan., 1901, which lasted 3 weeks. Is very weak, not able to get about much. Hernia of scar	Suture inefficient on account of critical condition.
7	S.A.W.	F.	13	8 years, worse for past 2 months	Good; no jaundice	Gall bladder	Cholecystotomy, Dec. 21, 1894	Pregnant 3 months	Good recovery	1902, July	7 years, 6 months	Perfectly well. None of old symptoms, better than before. No trouble from scar	Baby born 6 months after operation.
8	W. L.	M.	50	14 years, attacks every 6 months	Good; no jaundice	Gall bladder and cystic duct	Gall bladder and cystic duct excised, June 18, 1895		Good recovery	1901, Aug. 8	6 years, 2 months	Was well for 4 years. During last 18 months has had gall stone attacks, 3 months ago had a severe one. No trouble from scar	Dr. James Drummond writes: "I have seen this patient with all the symptoms of true biliary colic."
9	M.	F.	32	9 months. 3 months severe illness with jaundice and rigors	Very ill. Deep jaundice	Gall bladder and common duct	Cholecystotomy and choledochotomy May 12, 1896	Pus in gall bladder	Good recovery	1901, Aug. 9,	5 years, 3 months	Very well. None of old symptoms. Health better than before operation. Scar sound	
10	H.	F.	56	7 years. 5 months ago became much worse	Good condition. No jaundice	Gall bladder and cystic duct	Cholecystotomy June 2, 1896		Good recovery	1902, May 12,	6 years	Very well. None of old symptoms. General health better than before. Scar sound	
11	M. R.	F.	55	2 years. Worse lately	Good condition	Gall bladder, cystic duct, common duct	Cholecystotomy and choledochotomy Nov. 26, 1896		Good recovery	1901, Aug.,	4 years, 9 months	Very well. Health good; better than before operation. Scar sound	Some stones lay in a sacculus of the gall bladder
12	L.	F.	32			Gall bladder	Cholecystotomy Dec. 17, 1896		Good recovery	1902, June 6,	5 years, 6 months	Very well. No return of symptoms. Scar sound	Insufficient notes
13	M. T.	F.	31			Gall bladder	Cholecystotomy Aug., 1897		Good recovery	1902, June 6,	4 years, 10 months	Very well. None of old symptoms. General health better than before. Scar sound	Insufficient notes
14	E. A.	F.	55	2 years.	Good. Slight jaundice	Gall bladder and cystic duct	Cholecystotomy Sept. 14, 1897		Good recovery	1902, May 14,	4 years, 8 months	Perfectly well. None of old symptoms. Scar sound.	Greatly benefited by operation.

No.	Initials	Sex	Age	Duration of symptoms	Condition	Site	Operation	Complication	Result	Date examined	Interval	Notes	Remarks
15	E. S.	F.	41	20 years' history of attacks; more frequent and worse for past 2 years		Gall bladder	Cholecystotomy, Sept., 1897		Good recovery	1902, May 6	4 years, 8 months	None of old symptoms. As well now as ever before during life; much better than for past 25 years. Regained old weight 6 weeks after leaving hospital. Scar sound.	Insufficient notes.
16	B.	F.	56	2 years	Deep jaundice; very ill	Gall bladder and common duct	Cholecystotomy and choledochotomy, Oct. 21, 1897		Good recovery	1902, July 19	4 years, 9 months	9 months after operation had recurrence of symptoms. typical attacks. Readmitted August, 1898, and one large facetted stone removed from common duct. From this time has remained perfectly well. Scar sound.	
17	M. L.	F.	54	3 years	Jaundice bad	Gall bladder and cystic duct	Cholecystotomy, Nov. 22, 1897	Suppurating gall bladder	Good recovery; death after second operation		6 months	Readmitted May, 1898. Never been well since first operation. Constant pain with two attacks of jaundice. General health fair, no jaundice. Common duct empty. Gall bladder contained pus and was removed. Death 6 days later.	
18	N.	F.	36	10 years. For 3 years attacks worse, with continuous jaundice	Bad jaundice	Gall bladder and cystic duct	Cholecystotomy and choledochotomy, Dec. 22, 1897		Good recovery	1901, Jan. 21	3 years, 1 month	Perfectly well. None of old symptoms. Scar sound.	
19	.	F.	41	15 years. Admitted during severe attack of 9 days' duration	Very ill	Free in belly	Laparotomy, June 28, 1897. Bile-stained fluid in belly, and stones free in peritoneum. Gall bladder sloughing. Stone felt in cystic duct, patient too ill for its removal		Good recovery	1901, Aug. 28	4 years, 2 months	A sinus remains unhealed, from which there is a constant discharge. Not much pain. General health poor	Refuses further operation.
20	M. E. T.	F.	53	4 months	Bad	Gall bladder	Cholecystotomy, June 23, 1898	Suppurating gall bladder	Recovery, death later	1902, June 6		Patient died at home on Sept. 20, 1898 (3 months later). A sinus kept discharging up to her death, which appeared to be from exhaustion.	
21	E. S.	F.	62	4 years	Good	Gall bladder	Cholecystotomy, August, 1898		Good recovery	1901, Aug. 12	3 years	In good condition. Has had indefinite pains. but nothing suggestive of gall stones. Scar sound.	
22	T. D.	M.	60	2 years	Good	Gall bladder	Cholecystotomy, Sept., 1898		Good recovery	1902, May 18	3 years, 8 months	Perfectly well. None of old symptoms; never been better in his life. Scar sound	Insufficient records.
23	D.	F.	55	8 months	Good	Gall bladder	Cholecystectomy, Dec. 5, 1898		Good recovery	1902, May 25	3 years, 5 months	In her usual health. No further attacks. Scar sound.	
24	S.	F.	63	3 years	Good	Gall bladder	Cholecystotomy, Dec. 5, 1898	Suppurating gall bladder		1902, Aug. 10	3 years, 8 months	None of old symptoms. Has a large hernia through the posterior part of scar	Gall bladder drained. Very fat woman, 17 st.
25	M. M.	F.	38	10 years	Good	Cystic duct	Cholecystotomy, Oct., 1898		Good recovery				
26	W. G.	M.	14	14 weeks; 16 years ago had a similar attack	Good	Common duct	Choledochotomy, March 9, 1899		Good recovery	1902, April 28	3 years, 1 month	Recovered quickly, and has had good health since.	
27	E. A.	F.	19	12 months	Good	Gall bladder and cystic duct	Cholecystotomy, May, 1899		Good recovery	1902, May 19	5 years	Has had three gall stone attacks, the last 12 months ago; they were exactly like previous attacks, and were accompanied by jaundice. General health good; very much better than before. Scar sound.	
28	H. B.	M.	50	2 years	Good	Gall bladder	Cholecystotomy, June, 1899		Good recovery	1902, May 14	3 years	None of old symptoms. Health very much better than before. Scar sound.	
29	J. N.	M.	55	2 years	Bad; jaundiced	Common duct	Cholecystotomy, choledochotomy Dec, 1899	Some pus in common duct	Good recovery	1902, May 17	2 years 5 months	None of old symptoms. Health better than before Scar sound.	
30	Y. T.	M.	36	4 months	Bad	Gall bladder	Cholecystotomy, Dec. 30, 1899	Gall bladder ruptured	Good recovery	1901, Aug. 22	1 year, 8 months	None of old symptoms. Health better than before. Scar sound.	

Table of the After-Histories of Every Case that could be Traced on which an Operation for Gall Stones was Performed from 1888 to End of 1900 (continued).

No.	Initial.	Sex.	Age.	Duration of Symptoms.	General Condition.	Position of Stone.	Operation, with Date.	Complications.	Results.	Date of Report.	Time since Operation.	After History.	Remarks.
31	D.	F.	62	1½ years	Bad	Gall bladder, common duct, hepatic duct	Cholecystotomy and choledochotomy, Mar. 27, 1899		Good recovery	1901, Aug. 5	2 years, 5 months	Very well. None of old symptoms. Scar sound.	
32	C.	F.	55	4 years	Good	Gall bladder, common duct	Cholecystotomy and choledochotomy, Nov. 15, 1899		Good recovery	1901, Aug. 7	1 year, 6 months	Very well. None of old symptoms. Health better than before. Scar sound.	
33	L.	F.	39	12 months	Bad; very thin	Gall bladder and cystic duct	Cholecystotomy Dec. 6, 1899	Hour-glass stomach. Gastroplasty performed at same time	Good recovery	1901, Aug. 8	1 year, 8 months	Very well. None of old symptoms. Still rather thin. Scar sound.	
34	K. B.	F.	36	1 year, 10 months	Good	Gall bladder	Cholecystotomy, Aug. 1, 1899		Good recovery	1902, April	2 years, 8 months	Very well. None of old symptoms. Scar sound.	
35	J. A.	F.	72	20 years; 7 months ago severe attack	Bad	Gall bladder	Incision of abcess in abdominal wall, Nov., 1899	Suppurating gall bladder with abscess in abdominal wall	Good recovery	1902, May 27	2 years, 6 months	Very well. None of old symptoms. Sinus still discharges clear mucus (probably due to stone in cystic duct). General health better than before	Several stones removed from abscess cavity at operation.
36	M. P.	F.	40	2 years	Bad	Gall bladder and cystic duct	Cholecystotomy, Dec., 1899	Some pus in gall bladder	Good recovery	1902, May 8	2 years, 5 months	Very well. None of old symptoms. General health better. Scar sound.	
37	M. H.	F.	29	5 weeks	Bad jaundice	Gall bladder	Cholecystotomy, Jan. 1, 1900		Good recovery	1902, May 7	2 years, 5 months	None of old symptoms. Very well. Better health than before. Scar sound	Complete paralysis of right rectus abdominis, from which she feels no inconvenience.
38	T. D.	M.	43	3 months	Bad; slight jaundice	Gall bladder and common duct	Cholecystotomy and Choledochotomy June 29, 1900		Good recovery	1902, June 29	2 years	Very well. None of old symptoms. Better health than before. Scar sound	
39	A. S.	F.	49	23 years	Bad	Gall bladder	Cholecystotomy. Aug., 1900		Good recovery	1902, May 9	1 year, 9 months	Very well. Has had two attacks of gall-stone pain; after each she passed a small stone. Has a large ventral hernia through posterior part of incision; front part sound.	
40	M. S.	F.	33	3 weeks	Good	Gall bladder and cystic duct	Cholecystotomy, Sept., 1900	Pus in gall bladder	Good recovery	1902, May 8	1 year, 8 months	Very well. None of old symptoms. Scar sound. Health better since operation	
41	J. M.	F.	53	23 days	Very ill; jaundice	No stones found	Incision of large abscess in abdominal wall, Oct., 1900	Suppurating gall bladder; abscess in abdominal wall	Good recovery	1902, May 8	1 year, 7 months	Has had two attacks of pain with jaundice 6 weeks and 4 weeks ago, with escape of several stones from the sinus. Health better than before. Wound quite healed.	
42	J. L.	M.	59	15 years	Very ill	Gall bladder and common duct	Cholecystotomy and choledochotomy, Nov. 28, 1900	Emphysema	Good recovery; very ill for a time, pneumonia	1902, May 30	1 year, 6 months	Very well. None of old symptoms. Better health than for past twenty years. Scar sound.	
43	J. P. Q.	M.	27	16 months	Good	Gall bladder and common duct	Cholecystotomy and choledochotomy, Dec., 1900		Good recovery	1902, May 21	1 year, 6 months	Very well. None of old symptoms. Scar sound.	

with two of catgut and two of silkworm gut. The first layer of catgut brings together at the sides the peritoneum, fascia, transversalis, and internal oblique muscles, the second the external oblique muscle, the third secures the fat and skin subcutaneously to the external oblique, the fourth is subcuticular for the skin edges. If silkworm gut is used the first layer of deep, far-distance, interrupted sutures attach the skin to the external oblique muscle and bring the skin edges together roughly; the second intermediate interrupted sutures through the skin edges complete the apposition. In front the rectus muscle and aponeurosis receive the same care.
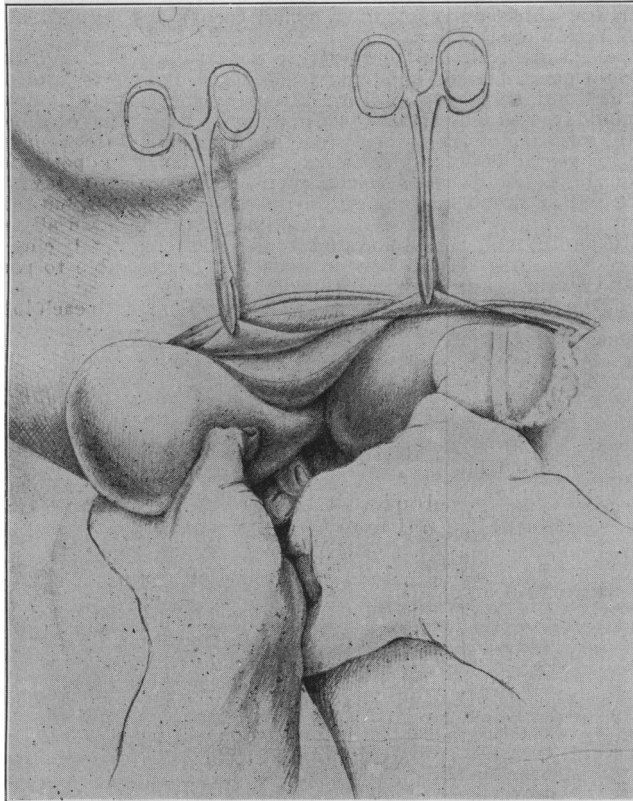
Fig. 1.

To form a just estimate of the value of such an operation we require not only the information that the patient recovered from it, but to know the after-history for some considerable time.

To one who has not attempted such work as this it may seem easy enough, but in a colliery district patients are constantly "flitting," and we have found it to be no mean task. Our efforts to trace a case have too often been unavailing, but in all probability the accompanying table of after-histories (pp. 1488-1490) for which I am indebted to Mr. G. Grey Turner, Surgical Registrar, Royal Infirmary, Newcastle, represents the average results for every case we could find is recorded in it.

The total number of cases available is 43. All, with the exception of the first two, were operated upon by transverse incision.

The results generally confirm the surgical belief that gall-stone operations in the majority of cases are followed by permanent relief and by great improvement in the general health. They also bear out the expectation of every one acquainted with the results of necropsies of gall-stone cases that in some instances stones will be left behind after the most careful and thorough operation, for it is impossible to remove stones from some of the hepatic ducts or stones embedded in certain parts of the liver.

The first consideration was given to the question of recurrence of symptoms after operation, and the conclusion forced upon us was that a return of the symptoms meant gall-stone trouble.

Of the 43 patients 7 complained subsequent to operation. In one case (2) a stone was known to be left in at the time of operation. The patient was very ill, and the operation an early experience.

In 2 cases (8 and 5) recurrence of symptoms was probably due to new stone formation, for there was no relapse till four years and six years after operation. Case 8 is of special interest, because the gall bladder and cystic duct with an impacted stone were excised. In one case (7) it is not certain that stones were the cause of the illness, as none were found at a second operation, though the symptoms were so typical that our belief was that the last stone had been passed just before it.
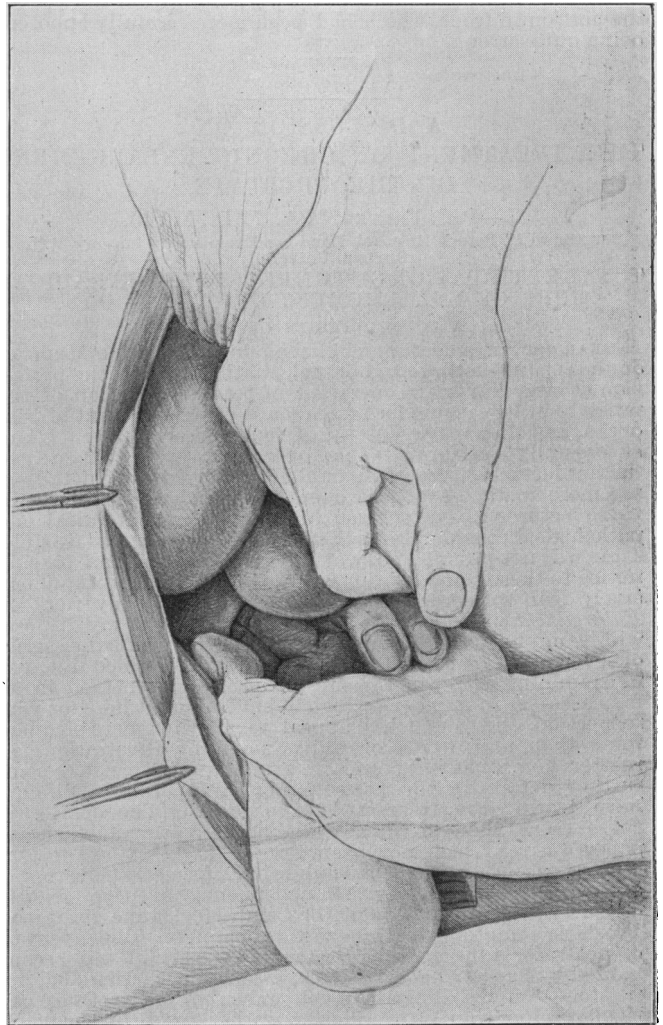

Fig. 2.

Three cases remain, and of these it is certain in 1 (Case 16), highly probable in 2 (Cases 27 and 39), that stones had been overlooked at the operation. Case 16 is of great importance in this connexion. The patient recovered from the first operation so completely and improved so materially in condition that no one suspected anything wrong. All this time, however, there was a large stone lodged in one of her ducts. The stone was of hazel-nut size. It could not have been left in her gall bladder, as that was fully slit up and explored; it could not have been in her common duct, as that was sufficiently dilated to allow of examination by my finger down as far as the duodenum and up as far as the hepatic ducts. That it had been left, and probably in a hepatic duct, was

proved by the previous operation and by the facet upon it, yet the operation "cured" the patient for nine months.

It is not possible to say that operation will "cure" all gall-stone cases, but as a rule with few exceptions it may be stated that any stones left after operation will be of small size and unlikely to cause serious illness.

Careful inquiry was made as to the presence or absence of hernia of the scar. A hernia of the scar was found in 4 of the 43 cases. In Case 1—small vertical incision, the gall bladder sutured to the skin—a hernia was present. In Case 5 the hernia resulted from insufficient suture. The patient was so ill that the wound was brought together roughly by a few through-and-through interrupted sutures. In the remaining 2 cases (24 and 39) defective suture was the obvious cause, as in both the hernia was outlined by the scars of an interrupted through-and-through suture of the posterior part of the wound, the portion in front, which had been more carefully apposed, being quite strong.

REFERENCE.
[1] BRITISH MEDICAL JOURNAL, November 3rd, 1894.

A DISCUSSION ON
THE TREATMENT OF CHRONIC ENLARGEMENT OF THE PROSTATE.

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TOTAL EXTIRPATION OF THE PROSTATE FOR RADICAL CURE OF ENLARGEMENT OF THAT ORGAN.

A FOURTH SERIES OF CASES.

A YEAR ago, in a lecture published in the BRITISH MEDICAL JOURNAL, July 20th, 1902, I brought to the notice of the profession at large my new operation of total extirpation of the prostate in its capsule for radical cure of enlargement of that organ, and then gave details of four cases in which I had successfully performed this operation. Since then two urther lectures have been published,[1] giving full details of ten more instances of this operation performed by me. In these lectures I have entered fully into the anatomical and pathological considerations that render this operation feasible. Time will not permit to-day of my giving more than passing notice to these considerations, which have been comprehensively dealt with recently in the new edition of my work on *Enlargement of the Prostate*.[2] The short time at my disposal will be most profitably employed in describing a further series of seven cases of this operation recently performed by me, in examining with you the morbid prostates removed in all my cases—21 in number—which I have brought here for your inspection, and which will appeal to you with more eloquent force than any words of mine, aided by illustrations no matter how imperfect; and in bringing to your notice some further details in the perfection of this operation, which I have learnt from increased experience. [The details of these cases, some of which were under treatment when the paper was read, have now been completed.]

CASE XV.—A distinguished public man, formerly Governor of a province of a great British dependency, aged 79, seen in consultation with Dr. Scott, of Camberley, June 10th, 1902. Prostatic symptoms for three years; completely dependent on catheter for nine months; catheterism painful and accompanied by haemorrhage at times, also orchitis; sounded, but no stone found. Prostate much enlarged per rectum, particularly on the left. Bilobed, rather hard, but movable over the bowel.

On June 23rd Mr. C. Braine, anaesthetist, Dr. Scott and Mr. Frankling assisting, I cystoscoped the patient, and saw a valvular outgrowth from the left lobe, the size of a gooseberry, projecting into the bladder. Suprapubic cystotomy was forthwith performed. The prostate being rendered prominent in the bladder and fixed by a finger of the right hand in the rectum, with the nail of the forefinger of the left hand in the bladder, I scraped through the mucous membrane over the valvular prominence, and detached it from the tumour all round. With the point of the finger I then rapidly enucleated the

left lobe in its capsule from the sheath and urethra, and delivered it into the bladder. The right lobe was similarly enucleated; and both were withdrawn from the bladder by forceps. The urethra was felt uninjured, covering the catheter. There was some oozing of blood, which was controlled by hot boracic irrigations. Drainage tube inserted and abdominal wound sutured. Mr. Braine timed the operation, which, from the moment I took the scalpel to perform suprapubic cystotomy till the wound was sutured, occupied ten minutes.

The patient bore the operation well, but was so sick from the anaesthetic that for three days he had to be fed entirely by the rectum. There was oozing of blood for twenty-four hours, which was controlled by an icebag and hypodermic injection of ergotin.

On June 29th the temperature rose to 103° F., and the right parotid gland suddenly swelled to a large size, and on July 2nd there was swelling of the right testicle. Both glands subsided without suppuration. What the cause of the swelling of the parotid was—whether chill, in connexion with rectal feeding, or as is occasionally found in operations on the pelvic viscera and abdomen—I am unable to say. I feared at first that it might be due to septicaemia, but this was obviously not the case. Urine began to pass naturally on July 16th, and the abdominal wound was completely closed on July 27th. He is now in excellent health, able to pass and retain his urine naturally.

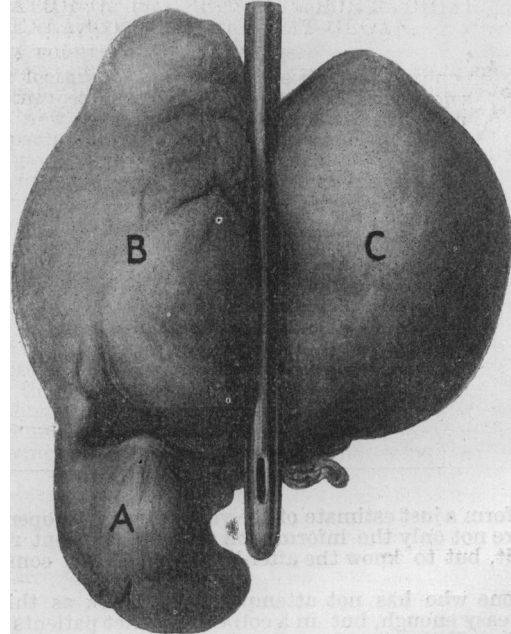This (Fig. 1) is the prostate, weighing 2 oz., with each lobe

Fig. 1.—Prostate weighing 2 oz., removed from patient aged 79; actual size. A, "middle" lobe growing from B, left lobe. C, right lobe. Catheter shows position occupied by urethra.

enveloped in its true capsule. It appears to be mainly adenomatous, but is rather hard; several small prostatic calculi can be felt in its substance.

CASE XVI.—General B., aged 67, sent by Mr. Jowers, of Brighton, June 20th, 1902. Prostatic symptoms for five years; latterly combined with those of stone in the bladder. Great frequency of micturition by day and night, with intense pain; passing blood in urine for years. The passage of the catheter, which is employed three or four times daily, causes intense pain. Patient in a very miserable condition, utterly unnerved from the pain and want of sleep; contantly using narcotics; wears a urinal in bed.

Prostate much enlarged per rectum, bilobed, smooth, soft, tense, movable; urine, alkaline, contains much pus and blood. Sounded, but no stone detected. Cystoscopy on June 23rd—Dr. Dudley Buxton, anaesthetist, Mr. Frankling assisting, and Dr. J. Anderson, C.I.E., and Colonel Coates, I.M.S., present—

[1] BRITISH MEDICAL JOURNAL, February 1st and July 26th, 1902.
[2] Published by Baillière, Tindall, and Cox, London.

revealed a large tongue-shaped "middle" lobe, and below this calculi lying in a nest.

1 forthwith opened the bladder suprapubically and removed four smooth urate calculi, weighing over 2 drachms, from a pouch behind the prostate. I then enucleated the prostate as a whole. The latter failed to separate along its superior commissure, so I tore the urethra across at the neck of the bladder, as also the ejaculatory ducts, and peeled the prostate off the urethra, which was left behind like a sleeve covering the catheter. There was very little bleeding and no shock. During the first week the patient made excellent progress, being able from the first to move about in bed. Then some mental disturbance set in, which, however, passed off in a few days. Urine passed naturally July 10th, and wound completely closed July 25th. The patient is now in excellent health, untroubled by any urinary symptoms. This (Fig. 2) is the prostate, weighing 2½ oz. The
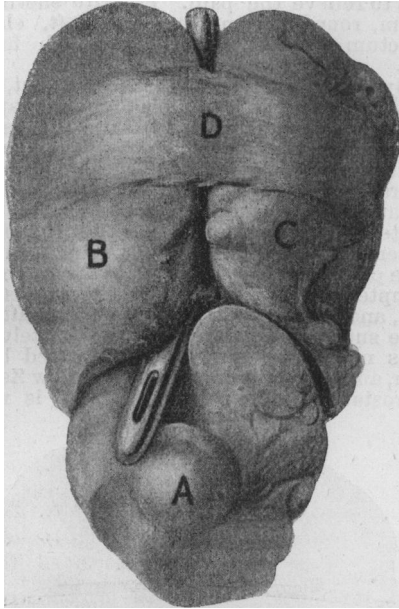
Fig. 2.—Prostate weighing 2½ oz., removed from patient aged 67—actual size. A tongue-shaped "middle" lobe growing from lateral lobes B, C, but mainly from left, B, D, band of sheath encircling lateral lobes.

so-called middle lobe (A) consists of an outgrowth from both lateral lobes (B and C), but mainly the right. A thin fibrous band encircles the whole from side to side, part of the sheath of the recto-vesical fascia removed with it.

CASE XVII.—A German gentleman, aged 73, resident of Oporto, who, on the advice of Dr. F. G. Thomson, of that place, came to me for operation for enlargement of the prostate, with stone in the bladder. The prostatic symptoms had existed seven years, and had been allowed to progress till constant overflow of urine from over-distension of the bladder was reached before catheterism was had recourse to, with the result that since the catheter was first employed—four years ago—he had passed no urine naturally. Has had repeated attacks of cystitis, with formation of phosphatic stone, for which he was operated on by a Portuguese surgeon in July, 1901. Since then has had calculi removed by crushing on two occasions. Patient so ill that he was unable to travel by rail, so he came by sea from Portugal, constant pain preventing him from lying or sitting still; urine alkaline, very foul-smelling; contains large quantities of pus and phosphatic grit; catheter used every two hours, very painful, and attended by bleeding. Prostate much enlarged per rectum, bilobed, rather hard, movable; stone felt by sound. Prolapsus ani from constant straining. Cystoscopy under an anaesthetic, July 4th, when the prostate was seen to project into the bladder in the form of a large tongue-shaped middle lobe (as in Fig. 2). One large and several small calculi were seen lying beneath this projection.

On July 7th, Mr. C. Braine anaesthetist, Mr. H. Frankling assisting, and Major Pratt, I.M.S., being present, I opened the bladder suprapubically, removed five phosphatic calculi (weighing 2½ drachms), and enucleated the prostate (weighing 2¼ oz.), entire in its capsule, leaving the urethra behind untouched. There was scarcely any bleeding and no shock. Next day the patient expressed himself as free from pain and better than he had felt for years. He continued to make excellent progress, some urine passing naturally from the third day; in fact, his condition was such that after the first day or two I had not the least anxiety about him. On the morning of July 15th I irrigated the bladder. The suprapubic wound was healthy. The patient was quite lively and sitting up in bed. He wrote several letters, and then had a hearty luncheon, followed by a cigar. Shortly after he went to sleep. About 4 o'clock he called the nurse and said he could not bear the terrible heat, complained of pain in his head, and suddenly grew faint, passing rapidly into a collapsed condition. I was urgently summoned, and arrived in time to see him expire from heart failure, the result of heatstroke acting on a constitution enfeebled from lengthened suffering. The sudden and unexpected death of this patient from heat-stroke when he was practically convalescent was a source of great grief to me, and illustrates the contingent risks to which patients of the great age to which this operation is necessarily confined are exposed.

CASE XVIII.—A. L., aged 64, admitted to St. Peter's Hospital July 7th, 1902, with prostatic symptoms of six years' standing. On December 15th, 1897, I removed a urate stone weighing 110 gr. by litholapaxy. The prostate was enlarged, and for this he attended the hospital off and on ever since. Cathether employed for one year; urine completely passed in this way for three months; urine alkaline, foul, contains much pus. Prostate much enlarged per rectum, bilobed, tense, smooth, movable. Cystoscopy on July 9th showed a large "middle" lobe. Kept in hospital, and bladder washed out daily with astringents to subdue the cystitis and render the urine sweet.

On July 16th I opened the bladder suprapubically and enucleated the prostate, weighing 2¾ oz. entire in its capsule, leaving the urethra behind unharmed. There was scarcely any bleeding or shock. The urine began to pass naturally on July 23rd, and the suprapubic wound was completely closed on July 29th, thirteen days after operation. He left the hospital on August 5th in excellent health, able to pass and retain his urine as well as he ever did.

CASE XIX.—An eminent physician, aged 66, with prostatic symptoms for ten years; the whole of the urine passed by catheter for three years; also suffering from diabetes. On entering on catheter life suffered from glycosuric urethritis, which resulted in stricture, rendering catheterism painful and difficult. In November, 1899, I dilated the stricture under an anaesthetic, since which time a large metal sound has been passed periodically to keep the canal open. Double vasectomy in February, 1900, with no benefit to the prostatic symptoms, though it prevented the recurrence of orchitis resulting from the use of the catheter. I had the advantage of the advice of several distinguished members of our profession in this case, including Sir Dyce Duckworth, Mr. Reginald Harrison, Drs. Gilbart Smith and R. Hutchinson. The patient's condition was most distressing, and during the past year he repeatedly suggested removal of the prostate, but I postponed compliance with his wish till the symptoms became unbearable. The dangers of an operation of this kind in the diabetic state were fully laid before him, but at the final consultation he stated that death would be preferable to his sufferings from catheter life, so I yielded to his appeal for operation. Cystoscopy on June 18th; "middle" lobe prominent in bladder. Prostate per rectum globular, tense, smooth, movable.

On July 17th, Mr. C. Braine, anaesthetist, Mr. Frankling assisting, and Drs. Gilbart Smith and Hugh Playfair being present, I removed the prostate suprapubically. It was found impossible to separate the lobes along their superior commissure, so the gland was removed as a whole with the prostatic urethra. There was very little shock, though there was considerable oozing of blood for twenty-four hours. Since then there has not been a bad symptom, the temperature remaining practically normal, some urine passing naturally at the end of the first week, and the suprapubic wound being

completely closed on August 7th. He drove out daily from August 9th, and travelled to Scotland August 14th—twenty-eight days after operation. He is now in excellent health, able to pass and retain his urine quite naturally. I am much indebted to Dr. Gilbart Smith for his constant advice in this case.

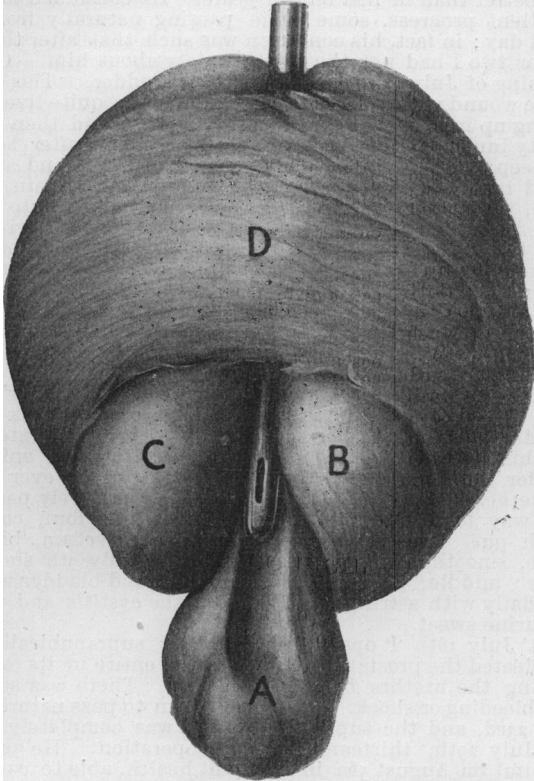This (Fig. 3) is the prostate, weighing 3 oz. The so-called

Fig. 3.—Prostate weighing 3 oz., removed from patient aged 66. A "middle" lobe growing mainly from left lobe (C). (D) Fibro-muscular band from sheath, removed with prostate, encircling lateral lobes, which are seen at (C, B) covered by their true capsule.

middle lobe (A) grows mainly from the left lobe (C). The whole is encircled by a thin fibrous and muscular band (D), part of the sheath formed by the recto-vesical fascia removed with the prostate. The lateral lobes (B, C) are seen covered by their true capsule.

I may say that this has been one of the most anxious cases of my life, owing to the coexisting diabetes.

CASE XX.—A gentleman, aged 69, consulted me on June 21st, 1902, on the advice of Major Woolbert, I.M.S. Prostatic symptoms for 14 years : great distension of bladder with overflow of urine all last winter; catheter passed in February, 1902, and 3 pints of urine drawn off. Since then the whole of the urine passed by catheter. Great difficulty in introducing the catheter, accompanied by much pain and loss of blood ; great loss of flesh ; weak heart; subject to periodical attacks of syncope for years; urine alkaline, putrid ; prostate not much enlarged by rectum, dense, fibrous, and scarcely movable ; thus, in conjunction with the symptoms, giving rise to a suspicion of malignancy. Cystocopy revealed a bilateral outgrowth, each prominence in the bladder being the size of a small plum. As there was great difficulty in passing an instrument a catheter was tied in for a month, during which the bladder was washed out daily, and the general health built up.

On July 22nd I opened the bladder suprapubically; and, after stripping the mucous membrane off the prominent portions in the bladder, easily enucleated the prostate as a whole in its capsule, the lobes opening out along their superior commissure, and the urethra being left behind intact. There was scarcely any bleeding, and the patient,

though feeble, gradually picked up strength. Urine began to flow naturally on August 2nd, and the suprapubic wound was healed August 12th. He can pass and retain his urine quite naturally.

The prostate, which weighs 1½ oz., is the smallest removed entire by me. It seems strange that a prostate of this size should have completely blocked the flow of urine. This I attribute to the fibrous sheath outside it being dense and unyielding. This case illustrates the great advantage of the cystoscope in diagnosis in cases of this kind, for there was scarcely any enlargement of the prostate felt per rectum.

CASE XXI.—This gentleman, aged 64, on the advice of Dr. Goldie of Auckland, came to me from New Zealand for the purpose of having his prostate removed. Prostatic symptoms for three years ; complete retention of urine eighteen months ago relieved by catheter, which has been employed ever since, practically all the urine passing in this way. Has used narcotics to relieve the pain. Prostate enormously enlarged by rectum, round, plump, smooth, soft, elastic, movable above rectum. Cystoscopy on July 16th failed owing to bleeding.

On July 23rd, Mr. W. Braine, anaesthetist, Mr. Frankling assisting, I opened the bladder suprapubically, and enucleated the prostate entire in its capsule, the lobes separating along their superior commissure, and the urethra being left behind uninjured. The whole operation, as timed by Mr. Braine, lasted twenty-two minutes, the enucleation of the prostate and its removal from the bladder occupying only six minutes. There was not much bleeding, but an hour and a-half after operation there was great shock and collapse from which the patient soon rallied. Since then recovery has been uninterrupted and rapid. Urine began to pass by the urethra July 31st, and the whole of it in this way after August 6th, when the suprapubic wound was completely closed. The patient is now in good health, untroubled by any urinary symptom, and shortly returns home to New Zealand.

The prostate (Fig. 4) weighs 4¼ oz , is non-symmetric-
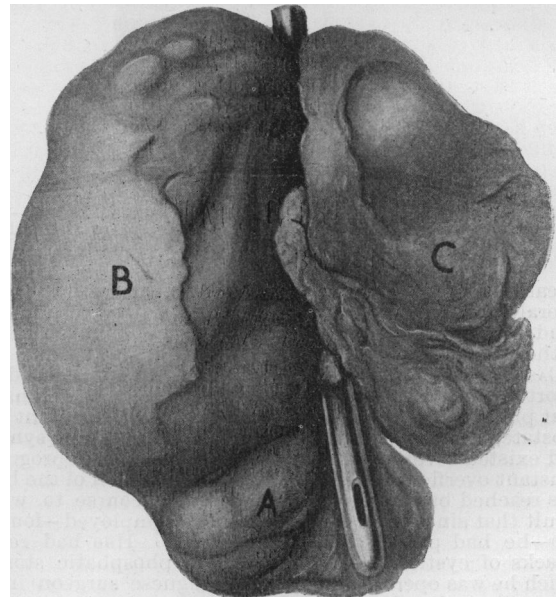

Fig. 4.—Prostate, weighing 4¼ oz., removed from patient, aged 64 ; actual size. A, "middle" lobe, growing from left lobe, B, which is much more enlarged than right lobe, C.

ally enlarged, the left lobe being much larger than the right, with a "middle" lobe behind the urethral orifice, formed by an outgrowth from the left lobe.

Besides the prostates removed in the seven instances, the details of which I have just given, I have brought here for your inspection those enucleated in my previously reported cases—21 in all. Scarcely any two specimens are alike, so protean are the shapes assumed by the gland in its morbid

enlargement. A noticeable feature of them all is that they are more or less conical, or pear-shaped, with the base of the cone directed towards the triangular ligament and the apex into the bladder, the reverse of what prevails in the normal prostate, which is the shape and size of a chestnut, with the base directed towards the bladder, and the apex towards the triangular ligament. This, no doubt, is due to the fact that, after the enlargement has advanced to a certain stage, the prostate is, for want of space beneath the pubic arch, outside the bladder, forced backwards into that viscus between the posterior margins of the sheath formed by the rectovesical fascia. And it will be observed that in many of the specimens there is a circular groove extending transversely round the enlarged organ, caused by the grip of the unyielding edge of this fibrous and muscular tissue.

These morbid specimens may be classified in three groups:

1. Those in which the lateral lobes have separated along their superior commissures only, the prostates coming away as a whole, leaving the urethra, and probably the ejaculatory ducts in most instances, uninjured.

2. Those in which the lateral lobes have separated along both commissures and have been removed separately, leaving the urethra and ejaculatory ducts intact.

3. Those in which the lobes have not separated along either commissure, the prostate being removed as a whole, after the urethra and ejaculatory ducts had been torn across, and in some instances the prostatic urethra either partially or entirely removed. In most of the cases of this type it will be observed that the prostate is encircled by a thin girdle of fibrous and muscular tissue, part of the prostatic sheath, so that in these instances not only has the prostate in its true capsule been removed, but in addition a thin layer of the sheath outside this has also come away.

In each case the prostate is covered by a thin strong fibrous membrane, the true capsule of the prostate as described by Sir Henry Thompson, which is closely adherent to the lobes, and not capable of being stripped off them save by dissection. In the cases coming under Class 3, just described, this true capsule is only partially visible, owing to the belt from the sheath partially covering the organ.

I cannot enter to-day into the pathology of these specimens, for the simple reason that, with the exception of the first 4, they have not been microscopically examined. Those 4 were found to be adenomata, and most of the others, if not all, seem to be more or less of this nature. Their structure is, after all, of minor consequence. I have preferred for the present to preserve the specimens intact, so that you may see that the prostate, whatever its nature may be, has been removed in its entirety.

I have now abandoned the employment of any cutting instrument for incising the mucous membrane over the prominent portions of the prostate in the bladder preparatory to the enucleation of the gland in its capsule. The mucous membrane is simply incised or severed through by the sharpened finger-nail, the prostate at the same time being rendered steady and prominent in the bladder by a finger of the other hand in the rectum. In the gradual enlargement of the prostate the sheath becomes thinned over it in the direction of the bladder, till eventually the prostate bursts through its sheath in this direction, and is merely covered by the mucous membrane; therefore, when the mucous membrane is scraped through by the finger-nail the capsule proper of the prostate is at once reached. Stripping the mucous membrane off the prominent portion in the bladder, and keeping the point of the finger close to the capsule, by a little force the enucleation is continued outside the bladder, the finger insinuating itself between the capsule and the sheath. If scissors or scalpel be employed there is danger of entering the capsule, and, the guiding line being lost, the finger flounders about inside the capsule, enucleating isolated adenomatous tumours instead of the whole organ in its capsule containing these tumours.

To sum up, I have now performed this operation on 21 patients, varying in age from 58 to 79 years, the prostates removed weighing from 1½ to 10¼ oz. All had entered on catheter life, and, save two or three, complete catheter life from a few months to fourteen years. All were in broken health, some of them being almost moribund before operation. Many suffered from cystitis, pyelitis, kidney or heart disease, or some other complication. In nineteen of these affections an absolute and complete cure has ensued. In one instance the patient had recovered from the operation, and was passing his urine naturally, when acute mania set in, from which he died on the twenty-fourth day. The remaining case, after progressing satisfactorily in all respects, and after I had ceased to be anxious about him, suddenly, on the ninth day, succumbed to heat-stroke. This operation is comparable to none other in surgery, owing to the advanced age to which it is necessarily confined: and in judging of the mortality connected therewith we must not lose sight of the fact that patients of this age are peculiarly prone to be suddenly carried off by disease, apart altogether from this operation. I think I may say that under these circumstances the results of these twenty-one operations are truly remarkable. They are far beyond anything I could have hoped for. I venture to submit that they tend to establish for this operation a permanent place in surgery, as affording a safe and rational means of giving complete and permanent relief from the terrible sufferings attending this disease.

II.—Professor ALEXANDER, M.D.,
New York.

PROFESSOR ALEXANDER (New York) confined his remarks to certain points in the surgical anatomy of the prostate. He demonstrated the fact that the true capsule of the prostate was derived from the pelvic fascia, and that within this and independent of it was the secondary capsule or sheath, the so-called prostatic sheath of Thompson. He pointed out, secondly, that enlargement of the gland particularly affected the lateral lobes in front of and behind the seminal ducts, and agreed with Mr. Freyer that the so-called third lobe was always of the nature of an outgrowth from one or other lateral lobe. Thirdly, he directed attention to the important distinction from a pathological point of view between the portion of the gland represented by the lateral lobes and that part which lies behind the urethra in front of the seminal ducts. The first was responsible for obstruction in enlargement of the gland, while it was in the latter that cancerous and other pathological conditions most frequently originated. When the whole prostate was removed the capsule which belonged to the pelvic fascia was not taken away with it; the sheath was, however, removed. By a study of the surgical anatomy he had been convinced that for removal of the gland the perineal route was the best. He operated through a median perineal section and preserved the prostatic urethra.

III.—Sir W. MACEWEN, M.D., F.R.C.S.,
Regius Professor of Surgery, University of Glasgow.

SIR WILLIAM MACEWEN said that he had found it necessary in some of the cases in which he had enucleated masses from the prostate by McGill's method, to make subsequently a perineal incision for purposes of drainage. This and other reasons inclined him to the view that the perineal route in operating on the prostate was the route of choice. He agreed with the view that the cause of obstruction lay in the overgrowth of the lateral lobes, and he had obtained very satisfactory results in some cases by removing the lateral lobes from the perineum without opening the urethra. He had great respect for the work of McGill on prostatic surgery, and looked upon it as in every respect thorough and of permanent value.

IV.—JORDAN LLOYD, M.S., F.R.C.S.,
Surgeon, Queen's Hospital, Birmingham.

MR. JORDAN LLOYD thought the discussion had cleared up several points which were previously obscure, particularly with regard to the question of the prostatic capsule. He thought it was clear that Mr. Freyer had performed two different operations; in some cases he had enucleated the lateral lobes, in others he had taken away the whole gland along with the prostatic urethra.

V.—PARKER SYMS, M.D.
PERINEAL PROSTATECTOMY BY A SPECIAL METHOD.

PROSTATIC obstruction to urination is one of the most common diseases of advanced age. It is one of the most painful

and distressing conditions from which man suffers. Severe cases, unrelieved, generally prove fatal.

No disease has been more earnestly combated nor more carefully studied, but until recently it has defied science to do more than to alleviate the suffering of its victims. However, surgery has finally won the battle, for in perineal prostatectomy we have found a safe and a scientific method of radically curing this dread disease.

It is not within the scope of this paper to discuss the etiology and pathology of hypertrophy of the prostate, the mechanics of prostatic obstruction to urination, nor the resulting conditions and their symptoms, so we shall pass at once to the consideration of perineal prostatectomy.

In considering the indications for operation it must be borne in mind that the size of the prostate is not an important factor, for a small prostate may cause complete obstruction owing to its peculiar shape or to its situation, while a large prostate may possibly not obstruct the outflow.

[To demonstrate this the author presented drawings from a few specimens. The first (Fig. 1) was a very large prostate which

Fig. 1.—Actual size.

presented a good deal of impediment to the passage of a catheter and eventually complete retention of urine had been but partial. The second was a very small prostate with flat lateral lobes (Fig. 2). The middle lobe was on a long pedicle (Fig. 3).

Fig. 2.—Actual size.

This middle lobe projected into the bladder and swung on its pedicle, acting as a ball valve. It caused complete obstruction to urination but no obstruction to the introduction of a catheter it is schematically shown in Fig. 4. The third (Fig. 5, p. 1497) was a specimen of large prostate, having a long middle lobe with very prominent lateral lobes. It produced complete obstruction. The fourth (Fig. 6, p. 1497) was similar in appearance to Fig. 5, not quite so large in size but remarkable for its symmetry. It produced but partial obstruction to urination.]

It must also be borne in mind that the actual amount of residual urine does not necessarily determine the degree of suffering of the patient nor the amount of danger to his life.

An operation for prostatic obstruction to be a satisfactory one must meet several important requirements. It must be founded upon sound and scientific surgical principles. It must be thoroughly practical in its application. It must be productive of the best obtainable results. It must be as free as possible from danger. It must entail upon the patient the least possible suffering. It must involve the least possible number of organs and tissues, and produce the smallest possible amount of mutilation, and it must result, in the end, in practically complete restoration of functions. It should be followed by rapid and safe convalescence and it should necessitate a very brief period of decubitus.
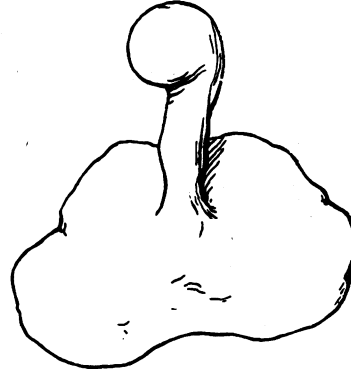

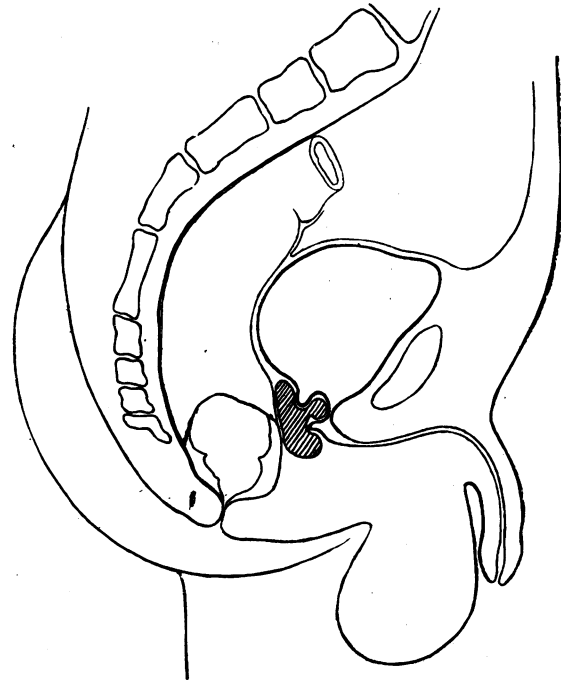Fig. 3.—Diagrammatic, showing pedunculated middle lobe.

Fig. 4.—Diagrammatic, showing pedunculated middle lobe acting as an intravesical ball valve.

In many respects the various forms of prostatectomy which involve opening of the bladder suprapubically fail to meet the above-mentioned requirements. It is a well-established surgical principle that in operating for the removal of a growth we should proceed by the most direct route, thereby doing the least possible amount of damage to important structures. The prostate does not lie above the bladder; it does not lie within the bladder; but it does lie beneath the bladder in the perineum, and it is through the perineum that we should approach it. In doing a suprapubic prostatectomy one unavoidably opens the bladder above and then opens the bladder below, thereby unnecessarily mutilating that organ in two

places, and greatly adding to the risk to the patient's life both at the time of operation and during the period of convalescence.

After a suprapubic prostatectomy has been performed we have the patient in a thoroughly unsatisfactory condition. He has a wound that is as improper as any that can be conceived of. It consists of an incised upper bladder wall, a lacerated bladder floor, and a more or less large blind pouch beneath the bladder from which the prostate has been removed. This
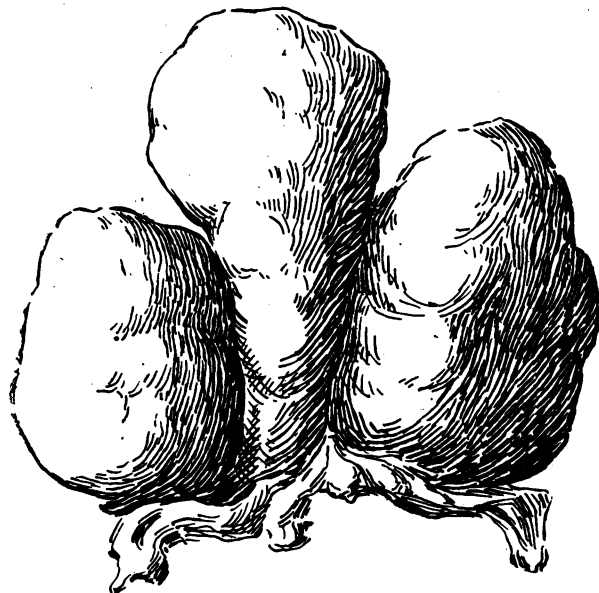

Fig. 5.—Actual size.

pocket, with its freshly-torn blood vessels and its open lymph spaces becomes at once a receptacle of putrid urine, and it is to be relieved by the most inadequate and unscientific attempts at drainage.

Fig. 6. Actual size.

The mutilation of the floor of the bladder and of its neck are often excessive, and the author believes that incontinence of urine is much more frequent as a sequel to this operation than of any other. Convalescence from suprapubic prostatectomy is prolonged, distressing, and dangerous.

When the author entered upon this field of work in 1897 he was impressed by the fact that the chief danger from prostatectomy lay in the suprapubic cystotomy, which was at that time an essential part of all well-recognized methods. He felt that the best method then in vogue was that of Alexander, who was one of the pioneers in America of perineal prostatectomy. Alexander used the suprapubic opening merely for the purpose of introducing two fingers of one hand into the bladder, and thereby pushing the prostate down. His

enucleation was done entirely below the bladder and through the perineum. The author felt that the suprapubic cystotomy was a thing to be avoided for many reasons, and he endeavoured to devise a satisfactory plan for performing prostatectomy entirely through the perineal route. Perineal prostatectomy after the method of the author is performed as follows:

The patient is placed in the lithotomy position, and carefully and thoroughly narcotized, usually with chloroform. The usual preoperative shaving and scrubbing are of course matters of routine. The urethra and bladder are thoroughly and repeatedly irrigated with boric acid solution. Green soap is used as the only lubricant. A staff is introduced, and a median incision is made through the perineum, and the full length of the membranous urethra is divided on the staff. The incision is deepened till the apex of the prostate is reached, blunt dissection being used to give as free exposure as possible. The prostatic urethra is dilated with a divulser, and the author's rubber retractor (Fig. 7, A) collapsed is introduced into the bladder. Its stylet is withdrawn, and the bulb of
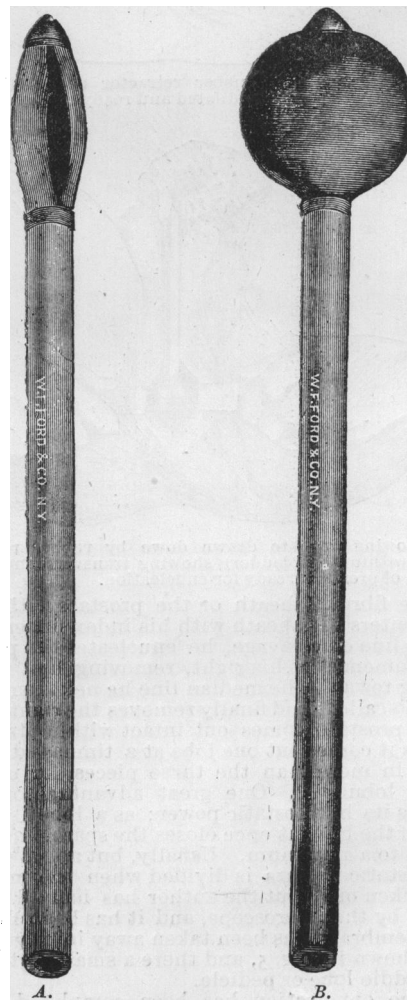

Fig 7. A, Parker Syms's prostate retractor collapsed. B, prostate retractor dilated to 2½ in.

the retractor is distended with water by means of a piston syringe (Fig. 7 B). This bulb within the bladder presents a firm shoulder at the bladder neck (Fig. 8), and when the stem is pulled upon the prostate is brought well within reach, so that the operator can enucleate its lobes with his index finger. The operator makes sufficient traction upon the retractor, turns the stem up over the pubes, and the assistant holds it firmly in place (Fig. 9). It is never in the way, it serves to keep the scrotum from the wound, and it answers its specific purpose admirably. Now the operator
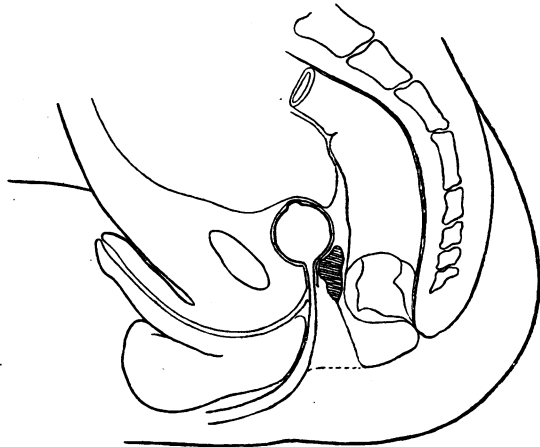
[Fig. 8.—Diagram showing rubber retractor passed through membraneous urethra ; bulb dilated and ready to make traction.
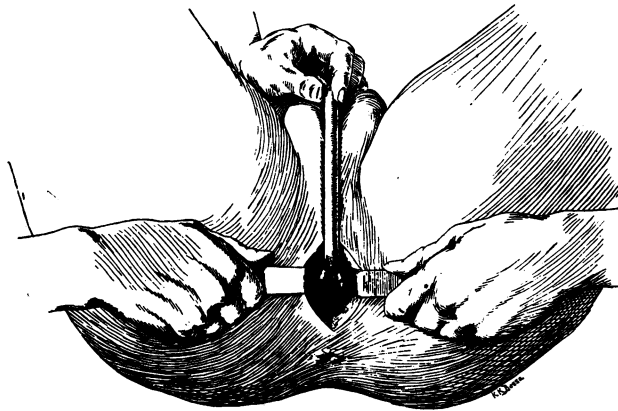

Fig. 9.—Showing prostate drawn down by rubber retractor (bulb being within the bladder) showing transverse incision through sheath of prostate, ready for enucleation.

incises the fibrous sheath of the prostate with uterine scissors ; he enters the sheath with his index finger, and, having found the line of cleavage, he enucleates the prostate. The author commences at his right, removing first the left lobe ; proceeding towards the median line he next removes the middle lobe, so-called, and finally removes the right lobe. Sometimes the prostate comes out intact within its own capsule, sometimes it comes out one lobe at a time, and sometimes it comes out in more than the three pieces, for many of these lobes are lobulated. One great advantage of this rubber retractor is its haemostatic power; as a lobe is removed the pressure of the bulb at once closes the space, and the bleeding is reduced to a minimum. Usually, but not always, the floor of the prostatic urethra is divided when the middle portion is being taken out ; but the author has had all his specimens examined by the microscope, and it has been shown that no mucous membrane has been taken away in any case except in the case shown in Fig. 5, and there a small portion was found on the middle lobe or pedicle.

After the enucleation has been completed, the ordinary perineal drainage tube is introduced into the bladder ; it should be, however, of the calibre of 35 or 36 French. This is fastened to the upper part of the external wound. The bladder is drained through this tube entirely, and no urine comes in contact with the wound itself. The wound and the space behind the bladder from which the prostate was removed are firmly packed with iodoform gauze. An external dressing is applied and the patient is put to bed. A long rubber tube is attached to the perineal drain, its distal end being submerged in a disinfectant solution, the amount of which is measured so that tally may be kept of the quantity of urine passed. Through this tube the bladder is frequently washed by siphonage. If the tube is kept carefully clear so that the drainage is not interrupted, the patient will be comfortable. The gauze packing is partially or entirely removed at the end of twenty-four hours, a much smaller piece being substituted. The drainage tube is removed on the fifth, sixth, or seventh day. As soon as the drainage tube is removed the patient is allowed to sit up and walk about. During the few days in bed, while the tube is still in, the patient is allowed to turn on his right side and to sit up in bed—in fact, to assume any position that does not interfere with the working of the tube. From the time the tube is removed the case is treated exactly as a case of external urethrotomy. Sounds are passed at proper intervals, the bladder receives the necessary cleansing and medication for the treatment of cystitis, and the wound itself is treated on general surgical principles.

The facility with which this operation can be performed will depend on the peculiarities of each individual case, and, of course. upon the amount of experience of the operator. The author finds that he is working with much more precision and celerity as his experience is increasing.

After this operation is finished the patient is in the best possible condition, with the most satisfactory kind of a wound, considering what has been accomplished. The drainage of the bladder is not uphill, but it is directly in the line of gravitation. The wound is a simple median incision of a pyramidal shape, with its base to the surface. It is straight and accessible, having no blind pouches, and it is absolutely distinct from the bladder, and is not contaminated by urine. Of course, this applies to the time while the tube is in sight ; by the time the tube is removed the surface is covered with granulations, the cystitis is very much improved, and the danger of infection is practically past.

As to results the author would say they have been all that could be reasonably expected. He has operated upon 21 patients, and has had no death immediate nor remote. His second case was incomplete for reasons elsewhere stated. All of his other cases have resulted in practical cure, that is to say, they have been able to hold their urine, not having incontinence ; and they have been able to empty their bladders, being cured of residual urine. They have been able to hold their urine from two to four hours during the day. Most of them have been able to go the night without rising ; some of them have been obliged to rise once. These 21 patients have been a fair representation of the various types of this affection. They have ranged from 50 to 78 years of age. All had cystitis except one. He was operated upon during his initial attack attack of retention. Two of the patients had bladder stones. Some of them were very feeble old men ; some of them were men in good general health. One case only suffered from shock owing to a post-operative bleeding which required repacking of the wound. This is the only complication which occurred in any of these cases. There has been no septic poisoning, no inflammatory reaction, and, in fact, with that one exception, each patient has been decidedly better the day after the operation than he was the day before.

In closing, the author wishes to reaffirm his conviction that prostatectomy done entirely through the perineal route is the best and safest method of treating prostatic obstruction. When the author first took this ground in America he was preaching a heresy, but to-day it is not so, for the American journals seldom contain reference to the suprapubic method but abound with reports on perineal prostatectomy, showing the latter to be the proceedure of choice in that land.

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VI.—Reginald Harrison, F.R.C.S.,
Surgeon, St. Peter's Hospital.

I have received permission to place on the table for your inspection seven specimens taken from my practice which may serve to illustrate some points to which I desire to give prominence, as directly arising out of the paper before us.

I do not think that the operation as described by Mr. Freyer is entirely free from criticism in its general application to advanced forms of prostatic obstruction. It would seem to me that the removal of that portion of the urethra which the prostate contains, not to say anything of an unavoidable inclusion of a contiguous part of the canal, is open to that contingency to which all lesions of the urinary passages are known to be liable. I refer, of course, to the possibility of some inconvenience arising out of the presence of more or

less cicatricial tissue in the part operated upon and its subsequent contraction. Nor is this consideration merely a theoretical one. In one of my cases of suprapubic prostatectomy (Specimen No. 4), where the deep urethra had probably been rendered tough and resisting by repeated operations for stone and long-continued self-catheterism, the separation of the urethra took place, in spite of every care in enucleating and withdrawing the prostatic mass, at the junction of the bulbo-membranous portion. Though the patient made a good recovery, and was able to dispense with the catheter, in the course of some weeks after the operation a gradual and excessive development of cicatricial tissue took place in the site of the wound which required the occasional use of a bougie.

I think, on the other hand, there is much to be said in favour of the principle upon which perineal prostatectomy is based. It is planned to open the prostatic capsule in the median line of the perineum and thus to enable the surgeon to enucleate separately and bilaterally the prostatic masses without sacrificing any portion of the prostatic or contiguous urethra or even unnecessarily opening the bladder.

Though I have not yet performed perineal prostatectomy on the lines advocated by Alexander and Syms of New York, and Albarran of Paris, I am favourably inclined, by some published though indirect experience of my own, to the further development of this proceeding where examination of the bladder with the cystoscope indicates its feasibility.

I refer to the removal of adenomata and large portions of the hypertrophied prostate in the course of median, lateral, and bilateral lithotomy. These accidents, as they were then called, were not infrequent previous to the revival of suprapubic cystotomy and the development of litholapaxy. I collected a number of cases of this kind where considerable portions of the prostate, including adenomata, were thus removed through the perineum without detriment. I also read a paper on this subject before the Royal Medical and Chirurgical Society and showed the specimens [1] now before you in illustration.

These cases much impressed me at the time, though I failed to recognize that in these casual incidents were contained the essential features of an operation for the removal of more or less of the obstructing prostate which was soon destined to prove of much value.

I should not be surprised if the lines of perineal cystotomy are again utilized for the purposes of prostatectomy on the ground that serious damage to the prostatic and contiguous urethra may thus be avoided, and for the facilities these routes offer for approaching the gland.

I would also urge that our experience in operating upon the enlarged prostate warrants us substituting in some instances a partial for an entire extirpation of the hypertrophied gland. Thus a comparatively slight operation may be substituted for a more serious one entailing the opening of the bladder. In illustration of this I would refer you to one of my specimens (No. 5). Here, though the cystoscope showed a general enlargement of the gland, the obstruction to micturition was entirely due to a pendulous adenoma hanging over the internal orifice of the urethra and blocking the passage as completely as any mechanical valve would do.

A perineal puncture of the membranous urethra on a grooved staff and the introduction of a pair of polypus forceps sufficed to effect the removal of the growth by twisting it off, and the withdrawal of two stones. The patient immediately recovered his power of normal micturition after over three years' entire dependence on the catheter and the punctured wound healed in a few days. It is now eighteen months since this was effected, and he remains quite well. Thus he got rid of his tendency to form calculi and his trouble with the catheter at the same time by a simple proceeding.

Mr. Freyer has demonstrated very clearly the power the bladder possesses of recovering its natural function after long periods of suspension. In one instance of mine, a patient who had been a slave to the catheter for over seven years, complete restoration of the bladder function followed the piecemeal removal of a fibrous hypertrophy, as shown in the specimen before you (No. 6). Though he had arrived at the age of 79 when this operation was performed over a year ago, and

[1] *Transactions*, vol. lxv.

where in addition five stones were removed from the bladder on the same occasion, he is now in excellent health and has had no return either of his stones or his prostate.

DESCRIPTION OF SPECIMENS SHOWN BY MR. REGINALD HARRISON AND REFERRED TO.

Adenomatous Enlargement of Prostate.

1. The enlargement is symmetrical, the right and left lateral lobes being almost equal in size. On the posterior aspect projects an enlarged middle lobe which partially surrounded the urethra. All three lobes are bound together by an irregular envelopment of unstriped muscle fibres and fibrous tissue. Microscopical examination showed adenomatous growth with a tendency to become cystic. Weight, 3 oz. 2 drachms. Removed by suprapubic cystotomy from a gentleman, aged 62, on November 22nd, 1901. A calculus composed of uric acid with phosphatic covering was removed from a post-prostatic pouch. Urine passed naturally in small quantities five days later. Suprapubic wound closed thirteen days after operation. July 7th, 1902. Passes urine in a full stream. No residual urine. Frequency is from four to six times in twenty-four hours.

2. Adenomatous prostate, weight nearly 2 oz. The left lateral lobe more enlarged than the right. Two small masses occupy the position of the median enlargement. Microscopical examination showed the specimen to be one of fibro-adenoma. Removed by suprapubic cystotomy January 5th, 1902, from a medical man, 61 years of age. Urine passed naturally three days later. Wound closed on the twenty-first day. June 12th, 1902: Returned from two months' voyage out and home to the Cape, in medical charge of troops. Weight has increased by 2 st. since the operation. Frequency, three times in the day, twice at night; the latter, he thinks, from habit. Good stream. No residual urine.

3. Adenomatous prostate, weight, 5 oz. Two lateral enlargements shelled out separately. No median enlargement detected. Microscopically: Adenoma tending to become cystic in places. Removed by suprapubic cystotomy from a man aged 67, on February 5th, 1902. Passed some urine naturally ten days after the operation. The wound was completely healed four weeks after operation. Two months later there was no residual urine, and the frequency of micturition was six times in twenty-four hours. This patient has not presented himself for examination since the end of May, the presumption being that he is in good health.

4. Adenomatous prostate, weight 4 oz. A collar-shaped enlargement of moderate size with much greater enlargement of the middle lobe. The urethra has been torn across during the enucleation on the anterior aspect of the prostate. The glass rod shows the position of the urethra. Removed by suprapubic cystotomy from a gentleman, aged 67, on February 6th, 1902. Urine passed naturally sixteen days after operation. On March 10th the wound was nearly closed; 4 oz. of residual urine present removed by catheter. Since the operation this patient has from time to time had trouble in passing urine. Sometimes a good stream passes, at others no urine can be passed until after the passage of a bougie. On withdrawing the bougie a good stream can be made. Apparently there is an obstruction of a valvular nature, which is overcome by passage of a bougie. There is no stricture, No. 14, English scale, passing easily. The obstruction is probably due to the damage sustained by the urethra at the time of operation.

Adenomatous Enlargement of Middle Lobe.

5. Both lateral lobes were enlarged, but did not obstruct the passage. The specimen has been bisected for microscopical purposes. In the recent state it was almost globular and pedunculated, and acted as the ball of a valve upon the internal meatus urinarius. Removed from a gentleman, aged 57, by perineal cystotomy, April, 1901. The condition was recognized by cystoscopy, and the pendulous middle lobe was easily twisted off, nothing being done to the somewhat enlarged lateral lobes. The patient left the surgical home on the fourteenth day after operation, passing all his urine naturally and with no residual. He is perfectly well up to the present date.

Multiple Adenomata.

6. Removed by suprapubic cystotomy from a gentleman, aged 79, in July, 1901. Complete enucleation in one mass was found to be impossible. The small adenomatous tumours were removed one by one until no obstructing mass could be felt between one finger in the rectum and the other in the bladder. Urine was passed naturally ten days after operation. The wound healed at the end of five weeks. Since then the patient has entirely dispensed with the use of the catheter, and at the present date is in good health. Microscopically the growths proved to be hard fibro-adenomata.

Prostatic Carcinoma.

7. Removed by suprapubic cystotomy from a gentleman, aged 62, on February 8th, 1902. On microscopical examination the growth proved to be of a mixed character. The periphery of the mass is adenomatous, whilst the centre is carcinomatous. The growth cut like scirrhus of the breast, and yielded typical "cancer juice" on scraping. As no alleviation of the symptoms could be hoped for, permanent suprapubic drainage was recommended. This has proved very satisfactory, and the patient has been able to get about during the past four months. Local recurrence took place quickly, but has grown slowly. Secondary growth has recently manifested itself in the spine about the ninth and tenth dorsal vertebrae, but the urine keeps clear and acid, and there has been no vesical haemorrhage.

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REPLY.

Mr. FREYER, in reply, congratulated the Section on the eminently practical character of the discussion. He welcomed the communications of their American *confrères*, particularly that of Professor Alexander, who had given them such well-illustrated descriptions of the anatomy of the prostate. Though Professor Alexander had proposed an alteration in the nomenclature of the capsules of the prostate, his descriptions of them were practically the same as he (Mr. Freyer)

had deduced from the morbid specimens before them, removed in his operations, and given in his published lectures, and arrived at many years before by Sir Henry Thompson, as as the result of many careful dissections. The essential point was that there were two distinct capsules—one intimately connected with the prostate, named by Thompson the "true capsule," which was removed in his (Mr. Freyer's) operation; the other, outside this, formed by the rectovesical fascia, and named by Thompson the "sheath," which was left behind in his operation. To the latter Professor Alexander now proposed giving the name "true capsule." This was objectionable as leading to confusion. He saw no reason to depart from the nomenclature of Sir H. Thompson, which was both scientific and practical. He claimed no monopoly of prostatectomy, welcoming any method by which human suffering could be relieved; but he held that his method of total enucleation of the prostate in its capsule was best, as most easily and rapidly performed, attended by the least mortality, and followed by complete and permanent relief of the symptoms—so absolute, in fact, that the surgeon could desire nothing more. Professor Alexander's perineal method was admittedly a partial prostatectomy, and he (Mr. Freyer) could not at all agree with him that the projections of the prostate into the bladder could be left behind with impunity, as they would cause obstruction; though he concurred in the view that the obstruction was mainly caused by the lateral lobes. He was surprised that Sir William Macewen in the course of his remarks had not once referred to the specimens before them, or his paper, which had been set down as the *pièce de résistance* of the discussion. He did not comprehend the reason for this omission. Sir William Macewen had expressed a regret that no representatives of the Leeds School of Surgery were present. He (Mr. Freyer) joined in this expression of regret; but their absence was no fault of his, as his paper had been duly announced in the JOURNAL of the Association. It was absurd to speak of McGill's operation, which was merely a partial prostatectomy, as being similar in scope and character to his operation, in which the prostate was removed entire in its capsule, as the specimens before them testified. Partial prostatectomy had had its day, was tried and found wanting, and practically abandoned years ago in favour of castration and vasectomy, which, in turn, had now fallen into disuse. What appeared to Mr. Jordan Lloyd as an anomaly was explainable on the elementary principle that two halves are equivalent to a whole. Mr. Freyer selected from the specimens of prostates removed by him, two instances, almost facsimiles of one another, in one of which the lateral lobes had come away separately, and in the other as a whole, united along their posterior commissure, but in each instance the entire prostate had been removed.


THE PURSE-STRING SUTURE IN GASTRORRHAPHY FOR GUNSHOT WOUNDS: AN EXPERIMENTAL CONTRIBUTION

By N. SENN, M.D., Ph.D., L.L.D., C.M.,
Professor of Surgery, Rush Medical College in Affiliation with the University of Chicago.

ONE of the important elements of success in the treatment of gunshot and stab wounds of the stomach is time. Unnecessary time lost in finding and suturing the visceral wounds is a source of immediate danger to life which should be eliminated as far as possible by means which enable the surgeon to make a quick and correct diagnosis, and by resorting to a method of suturing which closes the wound safely and securely with the least possible delay, and which leaves it in a condition most favourable for speedy definitive healing. It is well known that small penetrating wounds of the stomach often heal without operative intervention. By contraction and relative displacement of the different muscular layers of the thick wall of the stomach the tubular wound is contracted and obstructed sufficiently to prevent leakage until the canal on the peritoneal side becomes hermetically sealed by firm plastic adhesions which prevent extravasation during the time required for the repair of the visceral wound. If in larger wounds of the stomach the same degree of occlusion can be accomplished by the simplest mechanical means, then

such a procedure should take the place of the more time-consuming methods of suturing now in general use. This can be accomplished with the purse-string suture.

In gunshot injuries the defect in the stomach wall is circular, the wound margins contused, hence the deep sutures could at best furnish a barrier to the escape of stomach contents only for a short time as their hold in the necrosed tissues would be imperfect and only of brief duration. In short round wounds the circular suture is the one which will bring and hold together in permanent uninterrupted contact the serous surfaces in the most efficient manner. In the treatment of gunshot wounds of the stomach the principal object of suturing should be to close the perforation in such a way as to guard securely against extravasation, and at the same time approximate and hold in apposition a maximum
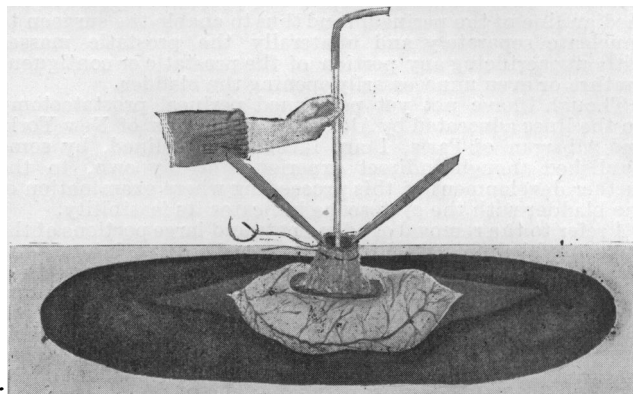
Suturing of posterior wound through anterior. Purse-string catgut suture in place.
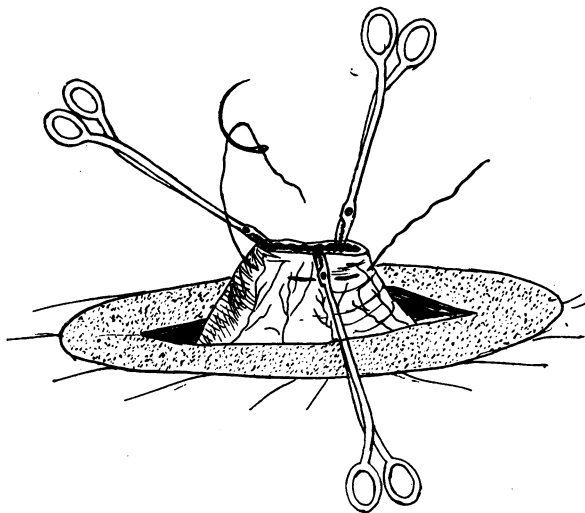
Purse-string silk suture in place.
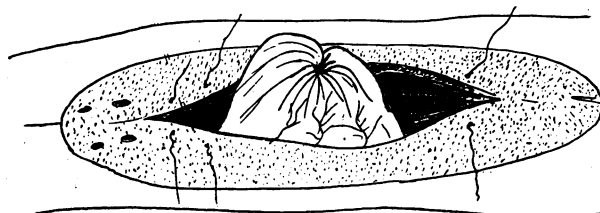
Showing result of purse-string silk suture closing anterior wound in stomach wall.

surface of intact healthy peritoneum. This is accomplished by making a cone of the injured art of the stomach, with

the apex corresponding with the wound directed toward the lumen of the organ. The purse-string suture, applied in a manner that will be described in the experimental part of this paper, will maintain this cone until the healing of the visceral wound has advanced sufficiently to render further mechanical support superfluous. The cone on the mucous side of the stomach acts in the manner of a valve, which in itself is an effective barrier against the escape of stomach contents, while the circular suture constitutes almost an absolute safeguard against leakage, and brings in contact the serous surfaces in the interior of the cone. For wounds of the posterior wall of the stomach I recommend a purse-string suture of heavy durable catgut to be applied through the anterior wound. The anterior wound is closed with a purse-string suture of silk of medium size applied to the base of the cone on the serous side. It is desirable that the circular suture should cause no necrosis of the included tissues. By using an absorbable suture in closing the posterior wound in the interior of the stomach this object is gained, as only a small part of the thickness of the stomach wall is subjected to pressure, and the tension caused by the ligature is gradually lessened by softening of its material, and is entirely removed by the absorption and digestion of the ligature in less than three weeks.

The wound of the posterior wall of the stomach is found and made accessible by inserting through the anterior wound a grasping forceps with which the posterior wall is seized at a point where, from the course of the bullet, the second wound is supposed to be located. Through a wound large enough to admit the index finger the greater part of the posterior wall of the stomach can be made accessible to sight and touch, and the perforation can be located and closed with the purse-string suture in a few moments. In doubtful cases inflation of the stomach should invariably be practised for the detection of a second and possibly a third perforation.

The following experiments were made for the purpose of demonstrating the practical utility of the purse-string suture in the treatment of perforating wounds of the stomach.

Experiments.

No. 1.—On December 23rd, 1901, a white and brown medium-sized male dog was chloroformed, and through a median incision, 3 in. in length, the anterior surface of the stomach was exposed and brought forward into the wound. A vertical visceral incision was made 1 in. in length about 1 in. above the curvature, and halfway between the cardiac and pyloric ends. Through this opening the posterior wall was seized with a forceps and drawn into the wound in the form of a cone. Around the base of this cone a purse-string catgut, No. 3, ligature was applied, taking four seizures, which included all the tunics except the peritoneum. The apex of the cone was then amputated, making a perforation large enough to insert the tip of the little finger. The anterior wound was next closed by taking five seizures ¼ in. from the wound margins with a needle armed with medium-sized silk which included all of the coats except the mucous membrane. Before the circular suture was tied the margins of the wound were deeply inverted in order to secure apposition of large serous surfaces. The abdominal incision was closed with four deep silk sutures and three superficial sutures of fine silk and the wound sealed with collodion. The dog was fed as usual, took his food with a relish, and at no time manifested any untoward symptoms. He was killed five days later, when the following conditions were found: External wound firmly united; no peritonitis; anterior wound of stomach healed, a narrow strip of omentum adherent over the encysted silk purse-string suture. Posterior wall of stomach free and wound healed. On opening the stomach small granulating points indicated the location of the wounds.

No. 2.—Small brown poodle dog. Operation the same as in the preceding case, only with this difference that the wound in the posterior wall made by the circular excision was large enough to insert three fingers, consequently more seizures were made in applying the catgut purse-string suture, and the ligature was applied after the wound was made. Before tying the ligature the peritoneum of the wound margin was seized with forceps at two opposite points and traction made so as to include as much as possible of it in the grasp of the circular suture. In applying the anterior suture the seizures are, four in number, were taken three-quarters of an inch from the margins of the visceral incision, and with forceps the peritoneum was pushed as far as possible in the direction of the cavity of the stomach with the same object in view. The dog recovered without any untoward symptom, notwithstanding he was fed on the coarsest kind of food from the time of operation until he was killed twenty days later.

Necropsy.—External wound firmly united. Firm adhesion over a point corresponding with the location of the underlying encysted silk suture. Posterior wound healed perfectly without any external adhesions. The stomach was removed and opened at the lesser curvature. The mucous membrane over the entire surface of the stomach was normal, and it was exceedingly difficult to locate the minute scars in its folds. The catgut ligature had disappeared, and the cone was reduced to the level of the surrounding mucous membrane. The silk ligature was firmly encapsulated.

No. 3.—Small black bitch. Anterior and posterior wounds were made before the ligatures were applied. The external incision was closed by

six deep silk sutures and sealed as usual with collodion. The experiment was made January 3rd, and the dog killed on the 31st with chloroform.

Necropsy.—Anterior surface of the stomach smooth and only a very circumscribed omental adhesion over the silk suture. The stomach was removed, and no mark could be discovered on the posterior surface to indicate the location of the perforation. On opening the stomach the exact location of the anterior wound could only be determined by a circumscribed thickening of the wall covered by normal mucous membrane which was thrown into radiate minute folds, the centre of which corresponded with the exact location of the wound. The posterior wound healed in the same ideal manner.
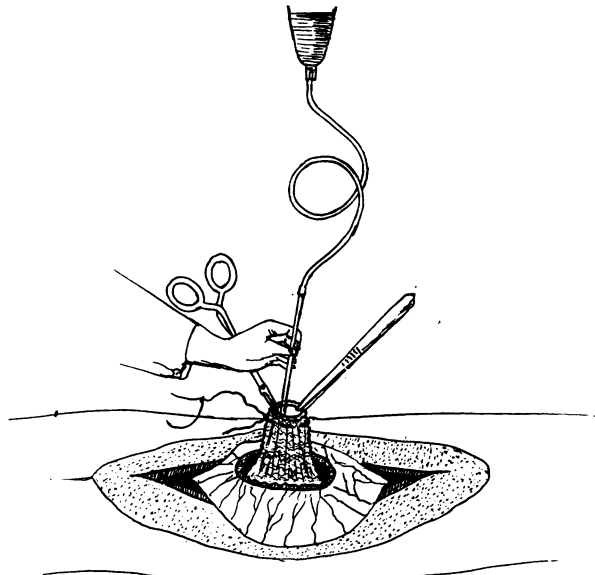

Showing irrigation of bursa omentalis through the opening in the posterior wall of the stomach.
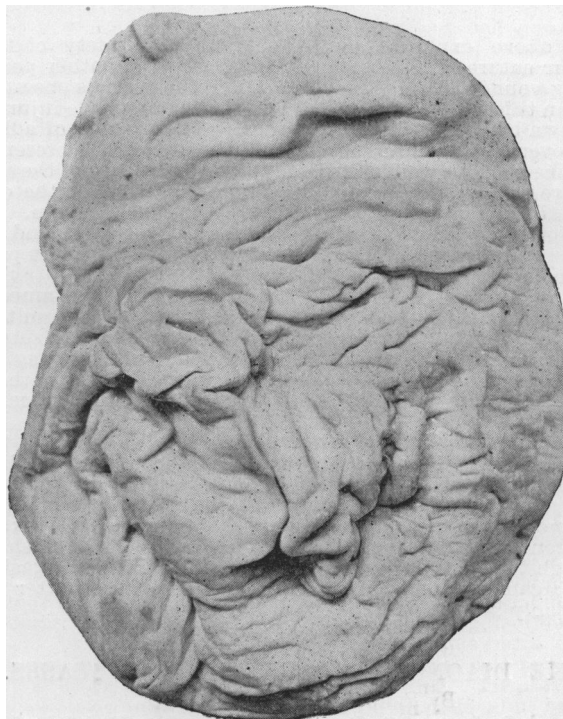
Perfect repair of mucosa four weeks after operation.

No. 4.—Small brown male dog. In this experiment the feasibility of flushing the retrogastric space was demonstrated after making wounds in the anterior and posterior walls of the stomach as large as wounds

inflicted by large calibre bullets. The nozzle of the irrigator was firmly fixed in the posterior wound by tying the purse-string in the form of a loop over it (as shown in the illustration on p. 1501). After the irrigation the nozzle was removed and the suture tied in the usual manner. Anterior wound closed with circular silk suture. The dog was killed four weeks later. *Post-mortem* findings the same as in the preceding experiment.
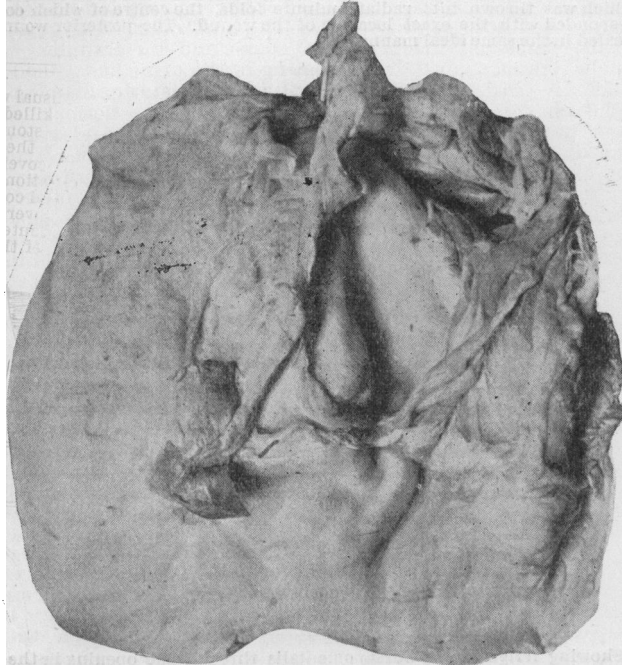
A t **∫** omental adhesions over encysted silk suture.

REMARKS.

The above experiments demonstrate the safety of the circular suture in the treatment of gunshot and other penetrating wounds of the stomach. All of the animals operated upon in this manner recovered, and the repair of the injuries as shown by the specimens was ideal. The absence of adhesions over the posterior wound and their constant presence over the anterior wound indicate that the presence of the silk ligature and the needle punctures were the causes of the circumscribed plastic peritonitis which produced them. In none of the specimens could any indications be found of necrosis of any of the inverted tissues, and included in part by the circular suture.

In the course of three weeks the continuity of the mucosa at the seat of injury was completely restored. The result of these experiments has convinced me that the circular suture compares favourably with the methods of suturing in general use, and besides has the great advantages over them in the ease of its application and the saving of much valuable time.

Suturing of the posterior wound by partial eversion of the stomach through the anterior obviates unnecessary handling of the organ and the necessity of interfering with the vascular supply incident to exposure of the posterior wound, as is done by the methods now generally practised. If extravasation into the retrogastric space has taken place, flushing through the posterior wound and a vertical slit in the gastrocolic ligament and gauze drainage through the latter are invariably indicated.

THE DIAGNOSIS OF URETHRAL DISEASES.

By FERD. C. VALENTINE, M.D.,

Formerly Professor of Genito-urinary Diseases, New York School of Clinical Medicine.

THE inestimably high distinction of being invited to appear before this most learned body evokes the natural desire to present some original work which would contribute to the advance of our profession. But, painfully conscious of too many shortcomings to produce anything of that nature, it may be permitted to reverse the intention by offering a sketch that can benefit no one more than its writer. The benefit sought is in such suggestions as the members of this Association may kindly give for improvements in the methods of examining the male urethra which are used in practice. Some extenuation of the very elementary character of this effort lies perhaps in the hope that one point or another therein may be of aid to a younger colleague.

Examination of the urethra does not involve special pathological considerations, further than those dependent upon some individualities of its structure. In outlining the methods used, these peculiarities will be touched upon.

FAMILY HISTORY.

The manner in which urethral diseases have been treated until quite recently made many a student consider this channel as hardly within the bounds of consanguinity to the organism. Experience, however, shows not only how important an organ the urethra is, but also how much its diseases are affected by hereditary and constitutional conditions. One need but call to mind the direct precautions that are required, even in a simple, uncomplicated gonorrhoea, by hereditary tendency to tuberculosis or to rheumatism. Among the less frequent hereditary tendencies that may presage serious results is haemophilia. The duration of a urethritis may be materially prolonged also by the complications due to nervous disturbances which almost invariably accompany urethral diseases, especially where the family history shows epilepsy, asthma, or any pronounced neurosis.

PERSONAL GENERAL HISTORY.

A patient with a history of serious disease which has reduced his resistance offers naturally a poorer prospect of prompt recovery from a urethral ailment than one who has maintained a good general condition. A person with syphilis, even some time after its manifestations have yielded to treatment, or one shortly after convalescence from typhoid or any other debilitating disease, cannot be expected to respond satisfactorily to treatment of a urethral inflammation.

URETHRAL HISTORY.

It need hardly be emphasized that previous urethral diseases which have left residua do not predispose to a prompt satisfactory outcome of an acute reinfection. Indeed, the residua may often provoke doubt as to whether the condition that confronts us in a new infection or a recurrence. Among the residua with which we have to contend are urethral coarctations, infiltration of the crypts, glands, and follicles, and of the stroma of the urethra itself. The involvement of the major adnexa (Cowper's glands, prostate and seminal vesicles), while not strictly within the present consideration, often contribute to the maintenance of a urethral condition, and should never be left out of consideration in seeking a diagnosis.

Physical examination entails a number of steps, each one simple enough in itself, but without which a precise diagnosis cannot be reached.

Preparation of the Patient.—Whenever possible the patient should be instructed to present himself before he has passed his first morning's urine, or at least when he has retained his urine as long as possible before the hour appointed for examination.

Position of the Patient at the Beginning of Examination.—Unless the patient is too feeble to stand, he should be erect before the surgeon while the latter sits with his back to the light. Thus syphilitic eruptions are oftentimes discovered on the patient's body, although such infection may have been denied. It is perfectly remarkable how unobserving of themselves many patients are; they are equalled in lack of personal inspection by the excess of those with whom self-examination has become an obsession. The patient, standing as before directed, drops his trousers to expose his thighs. The shirt-flap is then examined for spots which may be due to the discharge of acute or chronic gonorrhoea, or suggest prostatorrhoea or spermatorrhoea, or the linen may have urine stains from the after-dribbling of stricture or prostatic enlargement. The groins are then examined for glandular

enlargements by passing the fingers slowly down the inguinal folds. The external genitalia are then successively inspected and palpated for abnormalities of the scrotum, testicles, epididymes, cords, the prepuce, meatus urinarius externus, frenum, glans, and coronary sulcus. In any or all of these, deformities and residua of former ailments may be found. These may serve not only in the prognosis of the case, but also as guides to its treatment.

Urethral Discharge.—In acute infections of the urethra the discharge is usually copious, varying in colour according to its intensity from a mucoid translucency to a heavy greenish-yellow, blood-stained flow. Its character can be determined only by the microscope. In the absence of any visible discharge, or of even an excess of urethral moisture, some may nevertheless be made evident by expression of the urethral contents. This is performed by placing the four fingers of the left hand upon the left corpus cavernosum, and the left thumb upon the right corpus cavernosum, thus steadying the organ. The right index finger is then doubled, and its terminal phalanx pressed through the scrotum as far back as possible, and the urethra stripped forward. Some patients who have had chronic urethritis have acquired remarkable dexterity in expressing urethral moisture. With them the urethra apparently develops a habit of hypersecretion in consequence of the frequent manipulation to which it is subjected. This results in despair of cure on the patient's part, even when the microscope shows the discharge to be free from infectious bacteria. It is often difficult to persuade such patients to desist from this irritation of the urethra, and sometimes extreme measures are required for cure of this habit.

Preparation of Specimens for Examination.—Within reach of the examiner should be a number of clean cover slips mounted in cover-glass holders, a platinum loop sterilized after each use by passing through the Bunsen or alcohol flame. Previous to taking a specimen from the urethra the platinum loop should be again flamed, and with it the minutest possible quantity of the discharge or excess of urethral secretion taken directly from the meatus and smeared upon a cover glass as evenly as possible. After being so spread, the specimen should be covered for protection from air microbes and thus left to dry. The staining of separate specimens—at least one with eosin-methylene blue and at least another with carbol fuchsin—their mounting and examination need not be detailed now.

The Urine.—As suggested, it is well to examine a patient before he has passed his first morning's urine. In many cases this is necessarily a condition precedent to examination. It is evident that in the majority of cases the urethral discharge is much more characteristic in the morning, before the patient has passed any urine whatever since the preceding night. In chronic urethritis, where the morning drop is often the only manifestation of disease, this cannot be examined otherwise than after the urine has been retained for the usual sleeping hours. When the specimen of urethral secretion has been obtained as above described, the patient is ordered to urinate into two, preferably three, tubes. Experience has caused choice to be given to tubes over the ordinary beakers or glasses generally employed for the purpose. The tubes most convenient are the 12-in. ignition tubes of the laboratories. These hold about 185 c.cm. (6 fluid oz.), and present columns of urine of equal thickness for macroscopic examination and comparison. Pardon may be granted for an instant's diversion to call attention to the fact that some instrument makers of my country sell these conveniences at 75 cents. (3s.) each, while the glassware houses offer them at 16 cents. (8d.) under their proper name. It does not flatter the writer's vanity that the higher price is put upon this glassware when called "Valentine's urine tubes"—a designation invented by the dealers for revenue only. The patient is ordered to fill one-half of the first tube and to pass the rest of his urine into additional tubes—as many as necessary—retaining the very last part of his urine for a separate tube. The contents of these tubes are then examined macroscopically for colour, translucency, and the presence of "floaters." No originality is claimed for anything in this connexion except the designation "floaters," coupled, however, with the acknowledgement that this term embraces bodies that do anything but float in the urine. The

"floaters" may vary in size, coarseness, fineness, and in conduct. They are not, however, pathognomonic, though they certainly do contribute to the diagnosis. Thus we may have large and small, coarse and fine plugs from the seminal vesicles and the prostatic ducts. Long, coarse, and fine filaments that usually proceed from the urethra, as do large and small, coarse and fine flakes, and coarse and fine granules. A small comma-shaped body floating in the urine has gained a place in literature as "Fürbringer's prostatic filament," although it is often found when the prostate is normal. It then probably comes from the duct of a urethral gland. The conduct of the floaters varies in accord with their own specific gravity and that of the urine. In ordinarily normal urine floaters in which mucus and epithelia preponderate float to the top. Those containing a small admixture of pus corpuscles sink to the centre, while those consisting principally of pus, quickly drop to the bottom of the tube. To bring the latter into view, it is necessary to vigorously gyrate the tube in feeble imitation of the centrifuge. It would be unjust if even so hasty a sketch as this were not interrupted here with a word of tribute to Sir Henry Thompson, who first proposed the two-beaker test which the scientific world is glad to credit to him. Ordinarily it is assumed that the first 60 c.cm. (two fluid ounces) of urine passed wash from the anterior urethra the evidences of disease that adhere to its walls ; and that the subsequent quantities carry with them abnormal or excessive secretions from the posterior urethra and the bladder. The fact that this very general rule is subject to serious variations, and that if accepted as a law is liable to lead to error, was established by the illustrious Sir Henry Thompson when he proposed the two-beaker test. Before this learned assembly it is unnecessary to recite the additions with which Jadassohn and Kollmann strove to amplify Sir Henry's work. It may be well, however, to emphasize one point in connexion with obtaining the separate urines ; allusion is here made to the wisdom of advising the patient to reserve the very last urine for emission into a separate tube. The *coup de piston*, as Guyon so aptly designates the final expulsive contractions, is likely to contain such substances as thereby can be detached from the walls of the posterior urethra. As not even an approach to exhaustiveness is here contemplated, this interesting and important step must be left merely in outline. After recording the macroscopic appearances of the urine, a specimen for chemical and microscopic examination is made by mixing the urines. The tube containing these mixed specimens is stoppered with a plug of sterile cotton wool, and the name of the patient or a characteristic designation placed upon the tube with a pencil made for writing on glass.

Examination of the Urine.—The necessary confines of a mere sketch like this prohibit the description of the work which examination of the urine entails. It is mentioned solely to emphasize the fact that no diagnosis of a urethral disease can be made without an examination of the urine. It is especially the microscopic examination of this excretion that is of such surpassing diagnostic value. Experience of years shows that the recognition of epithelia in the urine, as taught by the late Carl Heitzmann, and as further developed by his son,[1] are of incalculable value in more precisely locating the site or sites and the depth of inflammatory invasion. I gladly avail myself of this opportunity to say of my esteemed colleague Louis Heitzman, that when his microscopic findings did not accord with the clinical manifestations, his diagnosis was proved correct by subsequent developments. This remark is based upon nearly 4,000 conjoint studies.

Exploration of the Anterior Urethra.—An acute urethral inflammation, from whatever case, prohibits instrumental ingression, unless the inflammation is due to the presence of a foreign body or growth. In chronic conditions recourse should be had to tactile exploration which may be divided, according to the instruments used, into palpation, exploration with the bougie-à-boule, and visual exploration with the urethroscope. The steps in all are necessarily performed with the patient in a recumbent position.

Position of the Patient.—He should lie upon a table adjusted to the operator's stature, so that the latter may perform most of his work while standing erect. The head of the patient should be comfortably supported with a pillow, over which for

each case a clean towel is spread. The patient is instructed to drop his trousers and raise his shirt, so that his bare buttocks rest upon a clean towel. His shirt flap is doubled up in front beneath the shirt, and a clean towel placed upon the abdomen and another over the thighs near the scrotum. His legs are extended, and the operator, standing at the right side of the table, palpates as much of the urethra as can be felt through the perineum. The pendulous portion is palpated in the manner before advised for the expression of urethral secretion. Any thickenings of the urethra, circumscribed swellings or nodules, such as manifest peri-urethral and para-urethral abscess, are then easily discovered. Foreign bodies introduced from without or concretions formed within the urethra, if sufficiently large, can also be discerned by palpation.

Preparation of the Urethra for Exploration.—Before any ingression into the urethra is at all attempted, every effort should be made to render the channel and its external approaches as nearly sterile as possible. The field of work differs from others in the body, for here no preliminary soap poulticing, scrubbing, friction with ether, alcohol, or bichloride can be employed. The purpose is approximated by cleansing the preputial pouch, the glans, the coronary sulcus, the lining of the prepuce and the meatus, each with separate pledgets of absorbent cotton soaked in bichloride solution 1 in 1,000. The object in view is then furthered by thoroughly irrigating the urethra with a hot solution of boric acid 4 per cent., potassium permanganate 1 in 6,000, or bichloride 1 in 30,000.

Exploration of the Urethra.—Nowhere in the body has the operator to deal with so sensitive an organ, or one in and through which so much local and general injury can be done. In the present consideration, and before this body, exceeding gentleness need not be insisted upon ; our younger colleagues may be reminded, purely for the sake of emphasis, that here *suaviter in modo* entirely subjugates *fortiter in re.* It may also be recalled in this connexion that no instrument is applicable unless it have a perfectly smooth and highly polished surface. This, with proper sterilization, precludes carrying infection into the urethra, as it also prevents inflicting traumatisms upon the delicate mucosa. The choice of a lubricant for exploring instruments excludes consideration of those employed for therapeutic ends. Experience has shown that sterilized glycerine is at present the best known.

Tactile Exploration of the Urethra. — Those much experienced in urethral work will agree that a rigid sound can never serve as a diagnostic instrument; its ofttimes decided therapeutic value is not now under discussion. The only instrument with which satisfactory exploration can be made is the soft bougie-à-boule, rendered softer by passing it through boiling water immediately before use. The choice of a bougie-à-boule is anything but unimportant. Its acorn should have a shoulder placed at almost a right angle to the slender shaft of the instrument. The shaft must be supple, yet rigid enough to permit its easy ingression into the urethra. An obstacle to thorough urethral tactile exploration is often found in a tight meatus and a possibly still tighter posterior boundary of the fossa navicularis; behind this a very capacious urethra may exist. The size of the bougie-à-boules used for exploration should be the largest that will with gentle pressure traverse the meatus and the posterior boundary of the fossa. In its transit through the urethra the bougie à-boule progressing to the bladder is of more use than a rigid instrument would be, unless the abnormalities are exceedingly large and thick. The amount of force to be used in propelling the bougie-à-boule is purely a matter of education. It certainly should never give pain to the patient. When the urethra is not the site of gross coarctations, large growths, or contains no foreign bodies, the bougie-à-boule will readily traverse the entire channel until the compressor is reached. A slight increase of steady pressure will cause the bougie-à-boule to traverse the compressor and enter the posterior urethra. Here its usefulness ceases, save in exceptional cases. The bougie is then gently drawn forward ; while this is done, a sensation is conveyed to the right fingers as if the acorn were passing through a tighter-growing funnel, which imparts a soft, velvety feel that terminates by a close grasp of the compressor and sometimes conveys a sensation as if this muscle

forced the acorn out of the posterior urethra. The great diagnostic value of the bougie-à-boule begins upon its withdrawal from this point. It is whipped through the canal with a quick motion during which certain definite sensations are conveyed by the obstacles which the sharp-shouldered instrument encounters on its withdrawal. In this it differs from a rigid sound, which may pass smoothly into the bladder and as smoothly out again, without revealing in the slightest degree the presence of any abnormality. It is quite common to find that a very large metal sound will thus traverse the urethra both ways revealing nothing, while a bougie-à-boule one or two sizes smaller readily exposes a number of coarctations more or less tight, dense, and broad. The experienced fingers will detect irregularities in the urethral coarctations themselves, as they also will urethral neoplasms. In strictures too tight to permit the passage of the bougie-à-boule selected, it is necessary to try successively smaller bougies-à-boules until the urethral coarctations can be traversed. When the meatus, or the fossa's posterior boundary is disproportionately tight, and not dilatable, meatotomy is required before urethral exploration is possible.

Urethroscopy (Anterior).—Ordinarily a urethroscopic tube smaller than 26 French does not give a satisfactory view of the urethral field. In exceptional cases, however, even smaller tubes are required and prove useful. The technique of urethroscopy is far simpler and easier than its description would indicate. The largest urethroscopic tube that will pass the meatus is sterilized separately from its obturator, which is then inserted into the tube. Taking the instrument by its disc between the thumb and middle finger, the index finger holds the obturator firmly within the tube. The penis is taken in the left fingers and thumb, and remembering the slight angle at which the fossa navicularis stands to the urethra, the tip of the tube is projected somewhat upwards and backwards. After the tip of the tube is within the fossa, it is elevated in a perpendicular position and gently sunk into the urethra until the compressor is reached. The third, fourth, and fifth fingers press the penis against the left thenar eminence, while the thumb and index finger of the same hand grasp the disc of the tube and hold it firmly. The right thumb and index finger then gently turn the obturator before attempting to withdraw it. Air rushes through the slit in the obturator, and causes it to recede into the tube and from its close contact with the mucosa. Its withdrawal will then produce no suction upon the urethral lining which would result were the obturator extracted without this precaution. Superabundance of lubricant or excessive urethral secretion is then removed by absorbent cotton wrapped firmly about applicators. Those easiest of employment and safest from infection are uncut matchsticks about 8 in. in length. When after successive gentle swabbings the cotton of the last applicator comes clean from the urethra the light may be inserted into the tube.[2] Naturally this is not done before its capacity for perfect illumination has been thoroughly and carefully tested. All parts of the urethra are then successively minutely inspected, while the tube containing the light is drawn slowly forward.

It would be worse than futile to attempt a description of all the urethroscopic findings in a brief paper. An effort has elsewhere been made to detail these.[3] The most exhaustive work on this subject is in Oberlaender and Kollmann's recent *Chronische Gonorrhöe der männlichen Harnröhre,* which, the authors inform me, is soon to be translated into English. Examination of the anterior urethra by no means concludes the work of which only a synopsis is here intended to be given. The posterior urethra and major adnexa demand interrogation before a diagnosis can be made.

The Posterior Urethra.—It would be to transcend the limits of this effort to consider the symptomatology of posterior urethral diseases. Therefore, an examination of the posterior urethra alone will be outlined. By touch the posterior urethra can be partly examined through the rectum. The technique thereof will be noted when discussing the examination of the prostate and seminal vesicles. As mentioned before, it is only in exceptional instances that the bougie-à-boule proves useful in examination of the posterior urethra, the only valuable diagnostic means to this end being the urethroscope. For urethroscopy of the posterior urethra, the patient is placed on a table in the median lithotomy position, his limbs supported, his buttocks raised so high

that the surgeon sitting at the foot of the table will have his eyes on a level with and a little below the middle of the ascending rami of the pubes. Observing the same technique as for anterior urethroscopy, the proper tube is then inserted as far as the compressor. Held firmly there, the tube is pressed downwards in the mesian line, gently pushed backwards, and then slightly upwards. If the tube continues to be arrested at this point the patient is ordered to take a deep inspiration followed by a thorough expiration. At this moment the tube is usually felt to glide into the posterior urethra. The penis containing the urethroscope is firmly held downward as the obdurator is withdrawn. Exploration of the posterior urethra must necessarily be more expeditious than that of the anterior urethra because of the frequent escapes of urine through the tube. For the same reason, a very large number of applicators is required; these are rapidly inserted into the posterior urethra until all the urine and all the excess of moisture is swabbed out. In the majority of cases mere contact with the lining of the posterior urethra will cause oozing of blood, which must be rapidly removed lest the light be obscured thereby. When the posterior urethra is as dry as it can be rendered, the light is inserted and the region closely examined in all its details.

The Seminal Vesicles and Prostate.—Many conditions of the major urethral adnexa may present manifestations similar to those of affections of the urinary channel. Furthermore, a urethral disease can be and often is conveyed to the above-mentioned organs. It is, therefore, necessary in all cases to examine them. The technique of their examination is conducted in the following manner:

1. Time of Examination.—Inasmuch as a great deal depends upon microscopic examination of the secretions that will be expressed from the prostate and seminal vesicles, it is well that this exploration be conducted before instruments have been inserted into the urethra. This admonition is based upon the fact that, however carefully impelled, these instruments may produce minute traumatisms to the channel, which may add small quantities of blood to the juice expressed from the prostate and seminal vesicles. The presence of blood, whose source might then be questionable, would render the results of the investigation doubtful.

2. Preparation of the Patient.—It is well to conduct an examination of the major adnexa after the patient has evacuated his bowels, as the presence of a faecal mass in the rectum may interfere with the precision of examination. It is also a wise precaution to irrigate thoroughly the anterior urethra before examination of the adnexa, lest excessive admixture of secretions from the channel obscure and render doubtful subsequent microscopic examinations. The irrigation mentioned can best be accomplished by a simple device called the auto-irrigator, whose purposes have been elsewhere described.[4]

3. Position of the Patient.—The reasons for preferring the dorsal posture for the examination are too evident for discussion. The patient is placed on the examination table, his head comfortably supported by a cushion, his shoulders no higher than his buttocks. His trousers and drawers are pushed down as far as his ankles; the legs are flexed; the left foot is placed upon its outer margin, and the heel of the right foot is rested within the hollow of the left. If the patient is very weak the knees may be supported by an assistant.

4. Preparation of the Surgeon.—The worker in genito-urinary diseases must necessarily make close filing and trimming of the finger-nails a part of his matitutinal toilet. He thus avoids having those spaces about his finger-nails which could so easily carry infection to himself and to others. As an additional precaution, and to prevent impregnation of his epidermis with minute faecal matter, it is well to coat the finger with a varnish which in no wise obtunds sensation, which dried quickly is exceedingly flexible, and is readily removable after rectal examination is completed. Such a varnish consists of: Copal, 2; venetian turpentine, 4; sulphuric ether, 100; collodion, 100; acetone, 8.

5. Rectal Palpation.—The finger, being coated, is lubricated with synol soap, a preparation introduced by Goelet, of New York, several years ago. After separating the hairs about the anus, the right index finger is extended and the others closed upon the palm. The left fingers raise the scrotum towards the pubis, and the prepared right index finger is gently inserted into the rectum. As this is being done, the elbow is lowered to the level of the table and the wrist kept in as straight a line thereto as possible. The finger in the rectum then successively palpates the cavum recti, the tissues about the prostate, the prostate itself, and the seminal vesicles. Any enlargement of these organs, any softening or hardening or nodulation thereof, is noted. While the left hand makes counter pressure above the pubes, the right index finger, by gentle but stronger-growing massage, causes these organs to give up their contents, which ordinarily are soon projected from the meatus. Minute quantities thereof are taken in the manner described for obtaining cover-glass specimens of urethral discharge.

6. The "Expression Urine."—In some cases no discharge is forced from the meatus by the manipulation above described. Then it is well to obtain the "expression urine" (Posner) by causing the patient to void his bladder as soon after the examination as possible. This urine is then preserved for examination, as also were the specimens passed before the physical examination was begun.

Painfully aware that I have consumed valuable time with a very crude sketch of small but exceedingly important matter, I submit it to this erudite body as evidence of a desire to learn from the discussion with which this humble effort may be honoured.

If a younger colleague should perchance find herein one point that is useful to him I shall be more than gratified with the effort made to present an outline of the steps experience has developed.

NOTE AND REFERENCES.

[1] Louis Heitzmann, *Urinary Analysis and Diagnosis.* New York: William Wood and Co. 1890. [2] No discussion of the relative merits of reflected, projected, or direct urethroscopic lights would be in place here. The writer naturally gives preference to the apparatus he simplified from the Nitze-Oberlaender urethroscope. which was further modified by Kollmann and Wossidlo. [3] *The Irrigation Treatment of Gonorrhoea, its Local Complications and Sequelae.* New York: William Wood and Co. [4] Surgical Asepsis of the Urethra and Bladder, *Journal of the American Medical Association,* January 12th, 1901.

THIRTY CASES OF GASTRO-ENTEROSTOMY FOR NON-MALIGNANT AFFECTIONS OF THE STOMACH.

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THE operation of gastro-enterostomy has so long since passed the region of experiment, that it is hardly necessary at this date to enter into the question of its propriety in suitable cases. Of course the object of the operation is to enable the stomach to empty its contents into the intestine in cases where, from organic or functional causes, that does not occur with sufficient readiness to prevent fermentation, and in consequence to induce a state of suffering from the irritation thereby induced in the stomach mucous membrane, and a general deterioration of health from starvation and the absorption of toxins. Of the utility of the operation in pyloric obstruction, simple or malignant, there can, of course, be no doubt whatever, and it seems to me that much benefit may be obtained in cases where the normal action of the stomach is prevented, or at least materially retarded, by adhesions, either in the region of the pylorus or over the general surface of the organ, due as in many cases to plastic peritonitis from a perforating gastric ulcer, or to pathological changes in the neighbouring viscera. It is probable, also, that in another group of cases due merely to functional disorder, where we have dilatation of the organ without obstruction at its outlet, but accompanied by the usual fermentative changes, we have in gastro-enterostomy a means of draining the organ, and thereby alleviating the misery which has been found by the physician unrelieved by any ordinary method of treatment. No doubt the operation would be most useful and most frequently practised in those cases where there are marked organic causes leading to dilatation. The establishment of the operation as a useful and reliable means of treatment will necessarily depend upon the mortality which accompanies it. I beg to bring before this Section a group of 30 operations undertaken for the cure of apparently incurable

dyspepsia, many of them with evidence of marked pyloric obstruction. The patients had been under treatment prior to operation for periods varying from 2 to 17 years, 16 of them with definite history of ulceration. At the operation it was found that 18 of these cases presented well-marked contraction of the pyloric orifice, and in 2 cases this was so extreme as practically to amount to occlusion, so that it had been found necessary to wash out the stomach two and occasionally three times a day to render life tolerable, and from the history it was evident that little or no material entered the intestinal canal. The degree of contraction was estimated by examination from within the stomach. In eight cases, the obstruction was due to causes outside the pylorus, two of these being due to adhesions, the result of peritonitis originating from old tuberculous glands behind the pylorus, these adhesions so compressing and kinking it as to interfere with the emptying of the stomach. In three cases the posterior wall of the stomach was found adherent to such an extent as to interfere with its muscular action, and in one of these the adhesions were so extensive and their contraction so considerable that the pylorus was pulled backwards and to the left side, so that it simulated a tumour of the splenic flexure of the colon, for which, indeed, it was mistaken prior to operation. In one case there was marked dilatation of the stomach without any apparent physical cause. Many of these patients were in a state of great emaciation from prolonged mal-nutrition. In three of the cases of external adhesions I had previously operated with only temporary relief after their separation—an experience which seems to be not unusual—indeed, I find, that of seven cases in which I have divided adhesions, only one remains permanently benefited, so that I am inclined to think that in such cases it is better to put the stomach at rest by the performance of a gastro-enterostomy. The symptoms presented by the individual cases were, as usual, varied and variable, as was also the amount of dilatation. In all, the misery and suffering were sufficiently great to render the patients very willing to run the risk of the operation with prospects of relief. In those cases where the trouble was not located in the pylorus itself the dilatation of the organ was naturally least, and in four of these cases did not, indeed, exist to any extent, although all the symptoms of an obstructive dyspepsia were present. No doubt the amount of dilatation in many of these cases had been kept in check by regular lavage of the stomach practised at periods varying from two months to three years. In almost all the cases pain was a prominent symptom ; and, indeed, in four cases, while there had been no vomiting, except on very infrequent occasions, the pain was so persistent and intense, and so utterly unrelieved by medicinal treatment, that an exploratory incision was advised and a physical condition found which warranted the gastro-enterostomy being performed.

Operation: Preliminary.—Careful stomach lavage was carried out in all cases for two days before the operation, plain water being used, and great care taken to empty the stomach thoroughly immediately before operation. With all the ordinary antiseptic precautions, an incision was made above the umbilicus ; in the earlier cases through the middle line, but later through the middle of the left rectus muscle. With the exception of 4 cases, all the operations have been that of posterior gastro-enterostomy, the anterior being performed in one case by selection, and in the others it was necessary by the presence of extensive posterior adhesions rendering it impossible to gain access to that surface of the stomach.

The usual method of operation has been to withdraw and turn up the omentum and colon, guarding these with large flat natural sponges wrung out of sterilized saline solution ; the posterior wall of the lesser peritoneal bag opened with a scissors cut, and this wound stretched sufficiently to allow a portion of the stomach, preferably near the junction of the pyloric with the middle third, to be drawn through, so that the opening may be situated high up—that is, towards the lesser curvature. A loop of the jejunum, readily found by looking for the termination of the duodenum, is then withdrawn and approximated to the selected portion of the stomach, and fixed to it by means of hook forceps about 2½ in. apart, so that ample room may be given for the stitching. In all cases, three rows of continuous sutures were inserted. The first, that to be furthest from the opening, being of silk ; the second, of catgut, which may absorb in from four to six days ;

and the third, next the lumen of the canal, of fine intestinal silk, the idea of the intervening catgut being to secure a zone of adhesions without the prolonged presence of a foreign body, so that the outer retaining suture may be less easily contaminated by sepsis from the necessarily exposed wound of the mucous membrane. After the first two rows of sutures have been inserted half way round that point where the opening is to be made, they are carefully guarded with sterilized gauze, and the jejunum opened in its long axis opposite to the attachment of the mesentery, and a corresponding opening made in the long axis of the stomach. These openings have generally been about 2 in. in length. All bleeding points are carefully ligatured, and while this is being done plugs of gauze inserted into both openings to prevent the escape of contents, which for the most part consists of mucus and bile ; but rarely has this given rise to any trouble, since the parts can be held up sufficiently to prevent overflow. Finally, the third row of sutures, including all the coats, is inserted quite close to the gut wound, and thereafter, second and first carried round to where they started. The opening in the omentum is then carefully adjusted round the anastomosis, and the parts returned to the abdomen ; the abdominal wound being closed in the usual way, preferably by suturing in layers, and in addition, a number of sutures transfixing the entire thickness of the abdominal wall.

Immediate After-Effects.—In no case has there been shock of any consequence, and but rarely has the temperature risen to 100°, and that only during the first twenty-four hours. Sickness, persisting for some days after the operation, has been noted as occuring most frequently in women, and in only two cases has the bilious vomiting persisted beyond the third day ; and in the last twelve cases, with one exception, there has been no bilious vomiting whatever ; a happy result which I am inclined to credit to leaving the jejunum slack by forming the attachment lower down than formerly, and probably by placing the opening in the stomach high up. In one case I performed a double anastomosis, as practised by Mikulicz, but the result was not particularly encouraging. As soon as the sickness of anaesthesia passes off, the patient is allowed water and barley water freely, and as soon as inclined, a copious supply of chicken tea and diluted peptonized milk, so that, by the fourth day, from three to four pints of liquid nourishment are being taken, and at the end of eight or ten days, light puddings and pounded meat. In one case we had a threatening of enteritis ; this patient being a lady who had been confined to bed for the greater part of two years, and in whom we found the pylorus practically occluded, so that little or no nourishment passed from the stomach into the intestine, which was found so thin as to render its suture to the enormously hypertrophied stomach wall a matter of great difficulty. Within a fortnight, however, by very gradual and careful gradation of feeding, this patient overcame the tendency, and is now a vigorous, robust woman. Two cases occasionally had bilious vomiting, one after the lapse of three months, the other after a year and a half, but this so seldom and giving rise to so little trouble, and only occurring in the morning before food has been taken, that the patients practically ignore it.

Ultimate Results.—Of these 30 cases of gastro-enterostomy for non-malignant disease of the stomach, I lost one, and that is naturally the most interesting of all, and I present for your inspection the specimen obtained *post mortem*, which shows a condition of things rendering the fatal issue a not improbable one. The patient, a man aged 54, had suffered from his stomach for seven years, and for the last eight months had used a stomach tube each day to relieve the oppression and flatulent distension. His story was that from four to five hours after a meal he had great pain near the pit of the stomach, which was relieved often by lying down, and by taking more food. He rarely vomited, and only on one occasion was there any trace of blood in it. Examination showed that the stomach was markedly dilated, passing below the umbilicus. No definite tender spots could be felt, and there was no tumour or pyloric thickening. Hippocratic succussion was manifest, but there was no peristaltic wave. A test meal of one pint of milk, half a pound of boiled fish, and a slice of toast was given, and three and a-half hours afterwards it was found that the stomach contained 7½ oz. of fluid with an intensely sour smell, due to the presence of organic acids,

there being an almost complete absence of hydrochloric acid. These observations were made by Dr. John McKendrick, who diagnosed the case as one of gastric catarrh, with distinct dilatation, probably atonic in character. He was put on a special diet sheet, with a tonic containing dilute nitric acid, nux vomica, and pepsin, with, in addition, sodium hyposulphate between meals. For a time he improved, and gained in weight, but the pain again returned. When I saw him with Drs. McGregor Robertson and McKendrick on September 11th, 1901, nothing was found on examination under chloroform suggesting a tumour or pyloric thickening. It was determined that laparotomy should be performed, and on September 24th operation revealed three adhesion bands passing from the under surface of the liver to the duodenum, tucking it up so as to practically kink the pylorus, and many scars in the stomach wall. He obtained great relief from this operation, and continued well for some time, being able to eat heartily, so much so that his wife stated he ate occasionally a whole rabbit for his lunch. At the end of the year, however, the pain returned, and with it a very great amount of abdominal distension. This pain differed from anything he had had previously; seemed to be located in the neighbourhood of the left kidney, and extended into the left iliac fossa. At the urgent request of the patient it was agreed to reopen the abdomen, which was done on December 19th, 1901, when it was found that the old adhesions were partially reunited; but, in addition, a mass was found in the posterior wall of the stomach, fixing it posteriorly. When the stomach was opened it was found that in this mass was a circular opening with firm thickened edges, and with a deep, crater-like ulcer in the centre of a large mass of tissue. An anterior gastro-enterostomy was performed, although with considerable difficulty, on account of the extreme flatulent distension of the intestines. After the operation everything went well; although the distension persisted it did not increase, nor did the pulse increase in frequency, remaining as it was prior to operation, between 80 and 90, so that on the third day he expressed himself as remarkably comfortable, and when last seen by me was reading the morning paper. The following day, however, he complained of sudden acute pain in the wound, and on my assistant removing the dressings, a small protrusion of intestine was found between two stitches about three-quarters of an inch apart. One of these was immediately removed, and the intestine reinserted, but the patient died from shock within two hours. Post mortem there was no evidence of peritonitis. The suturing had remained firm and was quite satisfactory, but that which we supposed at the time of operation to be probably a large malignant growth, rapidly extending and breaking down, proved to be, as shown in the specimen, an unusually large simple ulcer; the whole of the stomach walls being destroyed for a circular area about 2 in. in diameter, exposing thereby the inflamed and thickened pancreas, the fibrous tissue of which was evidently being digested, so that only the secreting structures remained. This, then, is the only death out of thirty cases, and I feel that, while the operation led to the fatal result, that result is to be ascribed to the complication which occurred, and which would have had the same ending had laparotomy been done for any other reason.

The sutures between which the protrusion took place were not more than ¾ in. apart, and transfixed the whole of the abdominal wall. The case is otherwise an extremely interesting one in view of the involvement of the sympathetic plexuses, with the consequent peculiar distribution of pain and intestinal paresis. In regard to the ultimate result of the cases, it is as yet too early to speak in the more recent ones, though, with the exception of two cases operated upon for very widely-diffused adhesions round the stomach, and one other where we found no organic cause for the intense gastric trouble, all the others have proved on the whole extremely satisfactory, particularly so in those who had previously suffered from marked obstruction in the pylorus itself. In 18 of these cases the patients state that they are as well as ever they were in their lives. Although there may be a natural tendency to exaggerate on their part, there is no doubt but that they have been relieved from their distressing symptoms, have materially gained in weight—in one case from 5 st. 11 lb. to 11 st. within a year after operation. Three cases state that, while there has been improvement, they still suffer from pain, although life is now tolerable. The remaining nine express themselves as very well indeed, although they have to be careful in their dietary and occasionally suffer from attacks of flatulence.

It is not within the scope of the present contribution to compare these operations of gastro-enterostomy with other operations for the relief of dilatation, but I believe that in this operation we have a means of relieving a vast amount of suffering, and what is of equal importance, of returning to the body politic many useful and valuable lives, otherwise doomed to misery and suffering; and this with an amount of risk to life much less than is daily undertaken for less serious ailments. I therefore beg to add my experience to the brilliant results already published by Mikulicz, Kocher, Robson, Barker, Moynihan, and many surgeons in this and other countries, whose results equally prove the safety, necessity, and efficiency of the operation.

In comparison with operation for malignant disease of the pylorus, it has been my experience that the operation if done early is not attended by much more risk than when done in simple cases. I have operated in very advanced cancer in four cases with the hope of alleviating the final sufferings, but the result has not been encouraging.

RENAL DECAPSULATION VERSUS NEPHROTOMY, RESECTION OF THE KIDNEY, AND NEPHRECTOMY.

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THREE operations—nephropexy, nephrectomy, and nephrotomy, including under the latter term all incisions of the renal capsule, of the kidney substance, and into the renal pelvis for whatsoever purpose undertaken, have up to the present time dominated the field of renal surgery. In comparison with the operations just named, resections of the kidney and plastic operations upon the renal pelvis and the upper ends of the ureters have been but infrequently performed.

To the above list of operations performed upon the kidneys, the writer has recently added renal decapsulation, an operation originally devised, proposed, and performed by him for the cure of chronic Bright's disease.[2][3] Whether chronic Bright's disease will come to be added to the list of surgical diseases of the kidney may still be considered sub judice. My experience up to the present time seems to indicate that such will be the case.

The object of the present communication is to call attention to some cases of admittedly surgical affections of the kidney usually treated by nephrotomy, resection of the kidney, and even nephrectomy, to the treatment of which the writer has applied renal decapsulation, with results sufficiently good to warrant a further continuance of the practice.

I am convinced that my contention that renal decapsulation, whenever it will give us equally good results, is to be preferred to nephrotomy, resection of the kidney, and nephrectomy, will be disputed by but few practical surgeons. In renal decapsulation the kidney is conserved in its entirety, and no damage whatsoever is done to its important secreting structures. As showing the necessarily deleterious consequences of even simple nephrotomy, Langemak[10] reports some experiments made by him upon rabbits. He exposed the left kidney, made two simple incisions into it, sutured the incisions immediately with catgut, and replaced the organ. The animals, seventy-five in number, were killed at intervals varying from half an hour to seven months after operation. Invariably an infarct formation was found in the kidney corresponding in size to that of the severed artery, with impairment of structure and function in the entire area involved.

Renal decapsulation possesses a further advantage over the operative procedures mentioned in the lessened danger from haemorrhage. In renal decapsulation the haemorrhage is insignificant—practically nil. A nephrectomy may often be performed without haemorrhage of any account. More than

one patient, however, has bled to death on the table, or has perished from secondary haemorrhage hours or days after nephrectomy. The same holds good of nephrotomy, which when performed through an attenuated shell of kidney substance, may be practically bloodless. Incision into the renal pelvis, however, through a comparatively healthy kidney of normal or increased thickness, is frequently attended by frightful haemorrhage, sometimes leading to death on the table, and occasionally so uncontrollable by other means that the operator in order to check it was forced to remove the kidney. It is within the recollection of many of you what profound admiration the courage of Mr. Henry Morris excited when, some twenty years ago, he was the first to dare to cut through the healthy kidney substance into the renal pelvis for the purpose of extracting a stone. The same, if not greater, danger of haemorrhage pertains to resection of the kidney as to nephrotomy.

The third reason for preferring renal decapsulation, other things being equal, to its predecessors lies in the greater simplicity of wound treatment. A nephrectomy may be done with complete primary closure and union, as I have repeatedly witnessed in my own work, although the majority of surgeons still prefer to drain. Nephrotomy and resection of the kidney involve drainage in the vast majority of conditions for which these operations are undertaken. With decapsulation of the kidney closure without drainage has been my rule, and primary union may be obtained under almost all conditions, even after decapsulating a kidney the seat of miliary abscesses, as I will relate further on. The formation of a urinary fistula, with possibly infection of the kidney requiring subsequent removal of the organ, is a danger pertaining to both nephrotomy and resection of the kidney, but not to renal decapsulation. Reasons, therefore, mainly associated with the comparative innocuousness of the procedure, the lessened danger of haemorrhage, the greater simplicity of the after-treatment carrying with it a more rapid and pleasant convalescence, and the avoidance of urinary fistula and its sequelae, lead me to prefer renal decapsulation to nephrectomy, resection of the kidney, and nephrotomy whenever it will answer the purpose equally well or better than the last-named operations.

The indications for nephrectomy have in the course of recent years been considerably limited by nephropexy, resection of the kidney, and nephrotomy. Excision of a kidney simply because it is movable is at present regarded as absolutely indefensible; nephropexy is the proper remedy. Excision of a kidney for renal haematuria not due to the presence of a tumour is equally unjustifiable ; simple exploratory incision, incision of the capsule proper, nephropexy, nephrotomy, and decapsulation have each, in a number of cases, put a final stop to the haemorrhage. The necessity and propriety of excising a kidney affected with multiple abscesses have even been questioned, notably by Lennander,[1] who has obtained good results in cases of this character from nephrotomy combined with excision of portions of the kidney substance. I shall have occasion to recur to the observations of Lennander further on in connexion with two personal experiences with cases of a similar nature treated by renal decapsulation. These experiences seem to indicate that just as the indications for nephrectomy have, in the course of time, come to be limited by more conservative procedures, notably by nephrotomy, so the indications for nephrotomy are in turn about to be limited by renal decapsulation.

Nephrotomy for the extraction of renal calculus, for the excision of renal tumours, and for the evacuation and drainage of collections of pus in the renal pelvis occupies a field all its own, a field from which neither renal decapsulation nor any other surgical procedure can displace it. I propose, however, on the basis of my personal experience, limited though it be, to question the supremacy of nephrotomy in other fields in which it has heretofore been accepted as the only proper procedure.

Before proceeding to a consideration of the applicability of renal decapsulation to some conditions hitherto treated by nephrotomy, let us consider for a moment the nature of the two operations. The reasons for preferring renal decapsulation to nephrotomy, other things being equal, have already been considered.

The incision for exposing the kidney is the same whether renal decapsulation, nephrotomy, resection of the kidney, or nephrectomy be contemplated. The patient is placed prone upon the table, with the author's kidney air-cushion underlying and supporting the abdomen. Both kidneys are thus rendered accessible to operation without the necessity of changing the patient's position. An incision is carried from the twelfth rib to the crest of the ilium along the outer margin of the erector spinae, without opening the sheath of that muscle. The fibres of the latissimus dorsi are bluntly separated in the direction of their course, without cutting. The ilio-hypogastric nerve is sought for and drawn to one side or other, out of the way of harm. Division of the transversalis fascia exposes the perirenal fat. This is divided over the convexity of the kidney until the capsule proper is reached. If possible, next deliver the kidney into the wound or out upon the skin of the back, a procedure which greatly facilitates further operative measures in both renal decapsulation and nephrotomy. When such delivery of the kidney is impossible, the rest of the work must be done at a great disadvantage, with the kidney well up underneath the lower ribs, and with the fatty capsule constantly overlapping the organ to a greater or less extent.

From this point on the operations of nephrotomy and renal decapsulation vary. The further steps of the operation of nephrotomy have so often been described that it is unnecessary to repeat them here.

In performing renal decapsulation the operator next proceeds to bluntly separate the fatty capsule from the capsule proper, the dissection being continued on either aspect and around both poles of the kidney until the renal pelvis is reached. Now and then the fatty capsule may be found so thickened and adherent, as the result of chronic perinephritis, that the scissors or knife may be required to separate it from the capsule proper. The kidney with its capsule proper is next lifted from its fatty capsule bed, and if possible delivered into or through the wound. The capsule proper is divided on a director along the entire length of the convex external border of the kidney and clean around the extremity of either pole. Each half of the capsule proper is in turn stripped from the kidney and reflected towards the pelvis until the entire surface of the kidney lies raw and denuded before the operator. In separating the capsule proper from the kidney care must be taken not to break or tear away parts of the kidney substance, which is often very friable and very firmly connected with the capsule proper, especially in the presence of chronic interstitial nephritis. I have found the smooth surface of the index finger of the rubber-gloved hand the best instrument for safely effecting separation of the capsule proper from the kidney. The stripped-off capsule proper is next cut away entirely, close to its junction with the pelvis of the kidney, and removed.

Delivery of the kidney into the bottom of or out of the wound greatly facilitates the decapsulation part of the operation, whereas if the kidney cannot be readily reached the operation sometimes becomes very difficult. In the latter event the entire capsule proper may have to be peeled off at finger's length in the bottom of the wound beyond the reach of sight. The capsule proper should invariably be peeled off in its entirety from the surface of the kidney, and excised in toto if possible. When total excision is found impossible, any remaining portions of the capsule proper are simply reflected backward around the root of the kidney, where they will curl up and stay. The kidney is dropped back into its fatty bed and the external incision is closed. Drainage, save under exceptional conditions, is dispensed with. After both kidneys have been thus operated on, the dressings are applied, and the patient is put to bed.

Decapsulation of both kidneys for chronic Bright's disease requires for its performance from half an hour to one hour, counting from the first incision to complete closure of both wounds and the application of dressings. It is advisable to keep the patient in bed, preferably upon the back, for two or three weeks after operation, according to circumstances.

Decapsulation of one kidney is, in itself, a less serious operation than either nephropexy, nephrotomy, resection of the kidney, or nephrectomy. In other words, if each of these operations were performed upon a series of 100 persons of average health and with normal kidneys, the mortality

attending renal decapsulation should be less than that of any of the other operations named. The writer[4] recently collected statistics of 846 nephropexies, single and bilateral, giving a mortality of 1.65 per cent. Under equal conditions of health, the mortality of decapsulation of both kidneys at one sitting should be less than that of bilateral nephropexy at one sitting. Personally I have anchored both kidneys at one sitting eighty times in all, with but one death. Eleven of these 80 patients suffered from chronic Bright's disease as well as from movable kidneys. Nephropexy is in reality attended with a lesser mortality than that of any other operation performed upon the kidney, for the simple reason that nephropexy, in the immense majority of cases, is performed upon healthy or approximately healthy kidneys. The mortality attending the other operations mentioned is that of the disease for which they are undertaken, rather than that of the operations themselves, and can scarcely be accurately expressed in figures.

When renal decapsulation is performed for the purpose of curing chronic Bright's disease, both kidneys should always be operated on at one sitting. The grave danger in operating for chronic Bright's disease lies in the anaesthetic rather than in the operation itself, and a patient should not be twice exposed to this danger. When operating for conditions other than chronic Bright's, decapsulation of one kidney will probably prove the rule.

Following the publication of my articles,[2][3] Claude and Balthasard[1] began an experimental investigation of the effects of renal decapsulation. They operated upon four healthy dogs. The first animal died of peritonitis, a fact which is possibly explained by the attempt to produce adhesions between the decapsulated kidney on the one hand, and the peritoneum and epiploon on the other, instead of between the rawed kidney and its fatty capsule. They thus made an intraperitoneal of what should be an extraperitoneal operation. The operation was primarily unilateral in each instance, the second kidney being operated upon in two of the three survivors twelve days after the first operation.

These experiments are, of course, too few in number to permit of deductions of wide application, and were, moreover, performed on healthy dogs. The authors indicate that they are engaged in studies to determine the effects of decapsulation upon kidneys upon which experimental nephritis has been inflicted. As a result of their experiments thus far, they reach the conclusion that the renal function is not appreciably disturbed by renal decapsulation, and that the kidney after decapsulation continues to perform its function as an emunctory of waste and toxic substances.

These conclusions are abundantly sustained by my clinical experience. During the past thirteen years I have performed nephropexy upon considerably more than 300 kidneys. Extensive renal decapsulation was one of the features of each of these nephropexies. During the past nine months I have in addition performed complete decapsulation, mainly for the cure of chronic Bright's disease, upon more than 50 kidneys. I have yet to see the first evil effect attributable to the decapsulation as such. Even the danger apprehended by some of subsequent compression of the kidney substance as a result of peripheral cicatricial contraction, has failed to materialize.

Altogether I have operated upon the kidneys of 40 patients suffering from chronic Bright's disease—23 women, 1 child, and 16 men, 6 of the latter being physicians. In 16 of the 40 more or less extensive decapsulation followed by nephropexy was the operation performed. In 4 of the 16 the right kidney alone was anchored; in 12 both kidneys were operated on.

The final results in these 16 cases I have published in a previous paper.[3] Upon the remaining 24 patients complete bilateral renal decapsulation for the purpose of bringing about a cure of chronic Bright's disease was the sole operation performed. These 24 cases have all been operated upon within the past nine months, and will not be ready for final report for a year or so to come.

The object of the present paper, as already stated, is to present a preliminary report of 6 cases in which I have performed renal decapsulation for conditions other than chronic Bright's disease. I will present the cases in brief outline, following each case with a few remarks:

CASE I. *Acute Pyelonephritis and Miliary Abscesses of both Kidneys, complicated with Chronic Bright's Disease: Right Nephrectomy and Decapsulation of Left Kidney.*—A married woman, aged 39, mother of four children. Fatty heart for a number of years past. Nephritis first discovered during her fourth pregnancy, which terminated on February 12th, 1901, with the birth of a living child at term. Sepsis, due to a sloughing uterine fibroid, continuously from that date to March 17th, 1901, when, under ether, I removed the septic uterus, tubes, ovaries, and a suppurating intraligamentous uterine fibroid by abdominal panhysterectomy. Acute croupous pneumonia, vesico-vaginal fistula due to sloughing of bladder wall, and acute right pyelonephritis with multiple abscesses of the kidney, followed the operation. Right nephrectomy, under ether, on July 9th, 1901. The kidney was riddled with innumerable abscesses, and its pelvis was filled with pus. A thick bacillus, corresponding morphologically to a species of proteus, was found in the abscess areas. Chronic parenchymatous nephritis of all remaining kidney tissue. Marvellous improvement after operation, the urinary fistula closing spontaneously within ten days. Nephrectomy wound firmly healed in three weeks. The symptoms of chronic Bright's disease, however, and pyuria persisted. Decapsulation of left kidney, under nitrous oxide and oxygen anaesthesia, on November 10th, 1901. Chronic parenchymatous nephritis and miliary abscesses throughout entire extent of kidney. Examination of a minute piece of kidney tissue removed confirmed the above macroscopic diagnosis. Primary union of entire wound and smooth convalescence. The history of the case thus far I have already reported in full.[3]

In February, 1902, under nitrous oxide and oxygen anaesthesia, I operated at one sitting for the radical cure of an abdominal and a right lumbar hernia. The entire series of operations as described above was performed at the patients' home.

Since the operation of November 10th, 1901, the patient has felt perfectly well with the exception of an exacerbation now and then of her chronic cystitis. She is up and about, enjoys life, plays her part in it, and is to all appearances a well woman. Pus, albumen, and an occasional cast are, however, still present in the urine. The kidney infection seems to be shorn of its virulence by urotropin, which she has steadily taken in large doses—as much as 8 grams daily for months at a time.

CASE II. *Acute Right Pyelonephritis with Miliary Abscesses: Decapsulation of Right Kidney.*—Married woman, aged 22, mother of one child, born in early part of 1901. Again pregnant in fourth month. On May 8th, 1902, chills and fever (103.5° F.) with severe pains and swelling in right lumbar region, and pus in urine. Right kidney enlarged to more than twice the normal size. Diagnosis: Acute right pyelonephritis.

Operation, May 19th, 1902. Tissues around kidney greatly congested; acute perinephritis. Excision of entire inflamed fatty capsule. Walls of renal pelvis thickened, but pelvis not dilated. No stone in pelvis or upper five centimetres of ureter. Kidney twice the normal size, angrily congested, bluish, a little hard. Decapsulation of kidney. Innumerable miliary abscesses everywhere upon the surface and throughout the substance of the kidney. The resemblance to miliary tuberculosis, which if present would have called for removal of the kidney, was so great that a small piece of kidney tissue was cut out and sent to the laboratory for immediate microscopical examination of a frozen section. In fifteen minutes Professor Brooks reported: "Purulent inflammation of kidney; no evidence of tuberculosis." The kidney was then anchored by sutures passed through the detached capsule proper; a few strands of silkworm were laid along the raw surface of the kidney for drainage, and the wound was closed throughout. The silkworm strands were withdrawn on the seventh day and primary union of the entire wound was obtained, a result which was somewhat a matter of surprise, since innumerable small abscesses occupied the raw surface of the kidney at the bottom of the wound. The infecting agent, judging from the history of the case, was probably the gonococcus. From the day of operation the patient has had no rise of temperature or pulse, nor any untoward symptom. Since leaving her bed, three weeks after operation, she has gone about her ordinary duties, and according to her statements has never felt better in her life. Pus, although in gradually diminishing amount, is still present in the urine. She is taking urotropin constantly since operation.

This case represents an instance of well-marked and well-authenticated pyelonephritis with miliary abscesses—the well-known surgical kidney—treated by renal decapsulation. Nephrectomy was considered the only correct treatment of this condition until the appearance of the work of Lennander[11] in 1901. Lennander reports 5 cases of acute pyelonephritis with miliary abscesses treated by splitting of the kidney throughout its entire length (nephrotomy), and resection of portions of the infected organ. Four of his cases made beautiful recoveries; one died.

Personally I have performed nephrectomy upon a number of kidneys affected with miliary abscesses, and in each instance the abscesses were found evenly distributed throughout the substance of the organ. It is difficult for me to understand how Lennander could have removed all diseased areas of infection and left any part of the kidney.

If the resultant recovery of 4 of his patients be advanced as proof that all infected portions of the kidney were removed, or, in other words, that if such had not been done the patients could not have recovered and lived, I would respectfully present in rebuttal the histories of both of my cases above outlined. In both of them kidneys fairly riddled with miliary abscesses were left in their entirety, and both patients made satisfactory recoveries. The entire subject of infection of the kidneys, it appears to me, must be made the subject of

new study and investigation, and of revision in the light of recent surgical experiences. I have but little doubt that Case II would have made a good recovery without any operation whatsoever, since the temperature and pulse were normal for two days preceding operation. Indeed, I would have postponed operation indefinitely were it not for the fact that the patient was four months pregnant, and that further serious kidney complications nearer term or during delivery were feared. As I feel satisfied that my patient would have done just as well without operation, although in that event the diagnosis would have been open to doubt, so I think it possible that one or more or all of Lennander's cases might have made good recoveries without operation. Who can tell? For the present, nephrectomy, resection of the kidney, nephrotomy, and renal decapsulation represent each in turn a progressive step in the treatment of the so-called surgical kidney.

CASE III. *Acute Haemorrhagic Nephritis: Decapsulation of both Kidneys at One Sitting.*—Married woman of 68. Severe attack of influenza in January, 1900, following by albuminuria and cylindruria, with severe and persistent haematuria. Seen March 7th, 1900. Patient uraemic; urine black with blood. Right kidney three to four times its normal size, displaced, movable 4 in., sensitive on pressure. Left kidney enlarged to twice its normal size, displaced, not sensitive. Examination of urine by Professor Brooks showed casts of all varieties in abundance, and a great deal of blood. Diagnosis of Professor Brooks: "Renal haemorrhage: tumour or stone." Clinical diagnosis: Tumour of right kidney.

Operation, March 8th, 1900, under nitrous oxide and oxygen anaesthesia. Bilateral lumbar incision. Right kidney three times its normal size, purplish-black from congestion, hardened and infiltrated with numerous extravasations of blood everywhere. No evidence of stone or tumour on careful palpation of the delivered kidney. Left kidney twice the normal size, otherwise in same condition as right kidney, with the addition of the presence of three cysts, the largest being about 3 cm. in diameter. Nephritis acutissima of both organs. The largest cyst was cut away and the two smaller were punctured. Decapsulation of both kidneys and anchorage by means of the detached capsule proper were next performed. The renal haemorrhage ceased immediately and definitely after operation. Casts and albumen in the urine, with uraemia and occasional uraemic coma, persisted during the first two weeks after operation, and then finally disappeared. At the end of three weeks patient was considered well and left her bed. On March 29th she contracted pneumonia, the result of exposure to cold draughts. Oedema of the lungs supervened, to which she succumbed on April 4th, 1900.

Examination after death showed the left kidney restored to its normal size; right kidney only slightly enlarged; both kidneys healthy in appearance. Section through both kidneys failed to disclose any evidence of pus, stone, or tumour. Microscopical examination by Professor Brooks showed practically normal kidneys.

Possibly both kidneys would have recovered full health without surgical interference. To the writer's mind the case represented an instance of bilateral acute nephritis of the most extreme type cured by renal decapsulation. It bears out the observations of Harrison[7][8], Ferguson,[6] Israel,[9] Pousson,[13] and others, regarding the beneficial effects of surgical interference in extreme and complicated cases of acute and subacute nephritis. Decapsulation, in my case, gave equally good results with nephrotomy as performed by the surgeons cited. These nephrotomies always represented a more or less extensive incision into the kidney substance, except in some of Harrison's cases. Harrison, in his earlier cases, appears to have incised both the capsule proper and the kidney substance. In his latest paper,[8] if I understand him correctly, he considers incision of the capsule proper sufficient. It is difficult, however, if not impossible, to incise the capsule proper without cutting more or less deeply into the kidney substance, unless the incision be made upon a grooved director. Incision of the capsule proper without incision of the kidney substance represents a simpler operation than renal decapsulation, and on that score is preferable to the latter. Whether the results will prove equally favourable with both operations only the future and a larger experience can determine.

CASE IV. *Intermittent Hydronephrosis of Right Kidney associated with Chronic Bright's Disease: Decapsulation and Fixation of Right Kidney.*—A married woman, aged 33. Nephritis during her first pregnancy, which terminated five and a half years ago with the birth of a child at term. Albuminuria much of the time, but no casts in the urine since delivery. Lately pain in right side, with intermittent swelling of right kidney, fever, and pus in the urine. Diagnosis: Suppurative pyelitis of right side.

April 14th, 1902, operation upon right kidney. Kidney moderately dilated as the result of hydronephrosis undergoing purulent changes. Careful examination failed to detect any evidences of stone. Kinking of the ureter, due to the displacement of the kidney, was taken as an explanation of the intermittent hydronephrosis. Decapsulation of the kidney and nephropexy were performed, and were followed by primary union.

The patient has done well since operation, and no further attacks of hydronephrosis have occurred. I feel convinced, however, that decapsu-

lation of the left kidney will eventually have to be performed to bring about a perfect cure of her chronic Bright's disease.

CASE V. *Intermittent Right Pyonephrosis and Chronic Interstitial Nephritis: Decapsulation and Fixation of Right Kidney.*—Married woman, aged 49, mother of four children. Ill with backache and pains in abdomen since her last confinement ten years ago. Suppurative pyelitis of right side for a year past. Both kidneys movable and sensitive to pressure. Subjective pain all localized in bladder and right lumbar region. Urine albuminous and loaded with pus; occasional pus and mixed casts.

Operation, April 28th, 1902. Right lumbar incision. Peritoneum opened, and the bile passages explored. Gall bladder pretty well filled with stones. At the request of her physician, who was present at the operation, and who was convinced that the cholelithiasis had never given her trouble, the gall stones were left unmolested. Right kidney moderately enlarged by pyonephrosis. Kidney substance of normal thickness, the seat of chronic interstitial changes. Exploration failed to show a stone in pelvis or ureter. Kinking of ureter due to displacement of the kidney seemed to be the cause leading to hydronephrosis and subsequent pyonephrosis. Decapsulation and fixation of kidney. Primary union and uneventful convalescence.

When last seen the patient's condition remained practically unchanged. I am sure, however, that further surgical interference will be required in her case. What shape that interference must take will depend upon developments.

I have seen and operated upon quite a number of cases of intermittent hydronephrosis associated with movable kidney, and in all of them the temporary appearance of albumen and casts in the urine was a feature of each attack of hydronephrosis. The renal changes accompanying the hydronephrosis in these cases were, therefore, probably of a congestive character, and fixation of the kidney in these cases, as in those reported by Newman[12] and others, cured both the mobility of the kidney and the dependent intermittent hydronephrosis. I shall watch with much interest the outcome in Case V, which represents an attempt to treat pyonephrosis by nephropexy, decapsulation being added mainly in view of the concomitant chronic Bright's disease.

CASE VI.—*Polycystic Degeneration of the Kidney and Chronic Diffuse Nephritis: Decapsulation of both Kidneys.*—Married woman, aged 36, suffering from chronic Bright's disease, mobility of both kidneys, chronic appendicitis, retroversion of uterus, and right inguinal hernia. On April 16th, 1902, removal of vermiform appendix through right lumbar incision, decapsulation of both kidneys, and bilateral nephropexy. Chronic perinephritis and thickening of the capsule proper on either side; total excision of both fatty capsules. Both kidneys slightly larger than normal, a trifle hard and lobulated; left kidney in addition occupied by numerous serous blood cysts, of the average size of a pea, scattered throughout the organ. Examination of a small piece of removed kidney tissue by Professor Brooks showed "the histologic features of diffuse nephritis, with parenchymatous changes most prominent." Convalescence was disturbed by an attack of pneumonia, and by a slight leakage of urine into the depths of one of the wounds, necessitating reopening on that side and healing by granulation.

On May 19th, 1902, curettage of uterus, amputation of cervix, inguinal shortening of round ligaments and radical right inguinal herniotomy.

On leaving hospital, June 20th, 1902, patient was progressing favourably. It is as yet too soon to speak of final results.

The six cases above outlined represent my entire experience with renal decapsulation, performed for other reasons than with a view to the cure of chronic Bright's disease. The cases are too few in number and the periods of observation are too brief to warrant deductions laying claim to conclusiveness in the matter. It may fairly be stated, however, that the results obtained to date are sufficiently good to call for a continuance of the practice on the part of the writer, and possibly to warrant its adoption by other surgeons.

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VALUE OF BLOOD-COUNTS IN ABDOMINAL DISEASES.

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IN bringing this subject to your notice I must immediately disclaim any pretension to originality. The principles which I hope to illustrate in this paper are perhaps known to all of us here. But the application of those principles to practical clinical use, involving, as they do, the employment of instruments and methods of scientific exactitude, may not be so familiar. And yet the results of haematological examination have been so satisfactory in the hands of those who practise it, that an endeavour to extend the use of the method seems justified. The assiduous cultivation of the faculty for observation has resulted after many years continuous exercise, in the recognition and proper appreciation of those phenomena which are discernible by our unaided senses. In that direction the road to further progress appears to me to have come to a termination. But the artificial aids wherewith modern scientific instruments and methods supplement the inherent incapacity of our senses are so numerous and of such precision that the barriers to further progress would seem for the moment to have almost disappeared.

Although the subject seems to have been more or less fully worked out in America, there are but few references to it in modern English textbooks. The article in Cheyne and Burghard's *Manual of Surgical Treatment* is the only one that I know. To Dr. Otto Grünbaum, the able author of that article, I owe the impetus which impelled me to examine cases, at first from curiosity, but latterly with something of enthusiasm. What literature exists upon the subject seems with some unanimity to be decided upon the great value of the help which a blood examination affords in difficult abdominal cases. It is perhaps fortunate that such examinations yield the most certain and positive results in cases of appendicitis, a condition where exact knowledge of the actual progress of the disease is of the utmost importance. It is of course but seldom that a clinician of long and varied experience is deceived by the outward calm which may occasionally accompany the most intense abdominal lesions. But such occurrences are known, and from them it is permissible to infer that in certain cases exact diagnosis is beyond the reach of even the most experienced. It is hoped that in such cases the value of a blood count will be most evident, but it is necessary to collect statistics from as many sources as possible before any hard and fast rules can be laid down.

The results of Cabot, Da Costa, Head, Joy and Wright, and others, substantially are identical and perhaps it is hardly necessary in a paper of this description to enter into any detailed description of their work. A description of the method employed is rendered necessary on account of the somewhat delicate manipulations which are required, and since the result obviously depends upon the accuracy of the technique.

The instruments required are :

1. Suitable microscope, best with mechanical stage.
2. Thoma-Zeiss haemocytometer.
3. Clean cover slips and slides.
4. A surgical needle.
5. Toison's fluid and Jenner's stain.

Even spreading of a blood film depends more on the cleanliness of the cover slips than upon the dexterity of the maker. I clean them by boiling for 15 minutes in a solution of potassium bichromate and sulphuric acid, washing in distilled water and alcohol, and keeping them in absolute alcohol. Toison's fluid is made up as follows : Sod. chloride, 1 part, methyl violet, 0.025 pt. ; sod. sulphate, 8 grams, aq. distill., 160 pt. ; glycerine, 30 grams. This fluid should be frequently filtered.

Jenner's stain is a solution of a salt of methylene blue and eosin in methylic alcohol. It has the advantage of fixing as well as double-staining the film.

The lobule of the ear is perhaps the most accessible and convenient situation from which to obtain the few drops of blood required. After cleansing the skin with ether, the lobule is punctured with a surgical needle. The first drop of blood which appears is wiped away. The ear must on no account be squeezed in order to force out the blood. A second drop of small size is then allowed to adhere to the centre of a cover slip. On this a second slip is rapidly placed, so that the drop of blood spreads out into a thin film between their two opposed surfaces. The two slips are then rapidly drawn asunder, and the film set apart to dry. A third drop is then allowed to run up the capillary red counting pipette to the mark 0.5. Having obtained the exact quantity, the conical end of the pipette is wiped free from blood, and plunged below the surface of the Toison's fluid, which is sucked up into the bulb to the mark 101. While doing this it is advisable to rotate the pipette on its long axis between the finger and thumb to ensure more thorough mixing of the blood with the fluid. This manoeuvre results in obtaining a dilution of 1 in 200 of the patient's blood. In cases where the leucocytosis is probably slight, the blood may with advantage be drawn up to the mark 1 in order to obtain a dilution of 1 in 100. The patient's ear may then be wiped clean, and a wisp of cotton wool applied to stop the bleeding. The rest of the examination may be performed away from the patient. The blood and fluid in the pipette are thoroughly mixed by shaking, and an india-rubber band stretched over its ends affords an efficient protection against leakage or evaporation if the count cannot be at once performed. A suitably-sized drop is then transferred to the counting chamber, and a glass cover slip applied. The corpuscles must then be allowed a few minutes to settle on the floor of the chamber. The interval may well be employed in cleaning the pipette. Some distilled water is drawn into the bulb and well shaken. This is replaced by some sulphuric acid, and the pipette again thoroughly washed with distilled water. After rinsing out with ether, a final wash with absolute alcohol is given, and the pipette dried by sucking through it some hot air. It is most essential to prevent any trace of mucus or saliva reaching the pipette. This can be efficiently done by blowing down a glass tube containing a pledget of cotton wool and a small connecting piece of rubber tubing.

During the five minutes occupied in cleaning the pipette the corpuscles will have settled in the chamber. The red cells are then seen to be of a faint yellowish colour, and the leucocytes stained a deep purple colour and somewhat highly refractile. I have been in the habit of counting three sets of sixteen squares each in obtaining the number of red cells. To insure greater accuracy more squares should be counted, and more than one drop of the mixture. For the purposes of this investigation, however, the number of red cells is of secondary importance, and I found that 48 squares counted gave a sufficiently accurate result for my purpose. The number of cells in the 48 squares divided by 6 and multiplied by 100,000 gives the number per cubic millimetre in the blood.

In counting the number of white cells the method which is generally adopted is as follows : They are easily differentiated by the purple stain and their refracting character. An objective about ¼ or a Zeiss D is used with a low eyepiece. The ruled lines on the slide are then sought and the draw tube of the microscope pulled out until the diameter of the field exactly corresponds to 8 squares. The cubic contents of the field in view can then be easily calculated by the ordinary formula for finding the capacity of a cylinder, since the depth of the chamber is $\frac{1}{10}$ mm. and each square $\frac{1}{20}$ mm. across.

Taking π as $\frac{22}{7}$ the cubic contents of the field will be

$$\frac{22}{7} \times \frac{4}{20} \times \frac{4}{20} \times \frac{1}{10} = \frac{11}{875} = \frac{1}{79.54}$$

If then we count 50 fields and find an average of 1 cell per field we find that 1 c.mm. of the mixture contains 79.54 white cells. As the dilution was 1 in 200, the number of leucocytes per c.mm. of blood works out at 15 908.

This method is quicker and more accurate than counting the leucocytes by means of the squares. The actual counting and calculation does not take more than a few minutes. Having thus found the numbers of red and white cells, the films must be stained by means of Jenner's stain, in order to arrive at a differential count of the leucocytes.

The four ordinary varieties met with are :

1. Polymorphonuclears. Irregular deeply staining nucleus with fine neutrophile granules.
2. Lymphocytes. Small with deeply staining spherical nucleus and little protoplasm.
3. Hyaline. Large pale blue indented nucleus.

TABLE I.—*Blood-Counts in Cases of Appendicitis.*

No.	Date	Sex	Age	Reds	Whites	Poly-morpho-nuclears	Lympho-cyte	Hyaline	Eosino-phile	Remarks
1	March 17	M.	38	5,050,000	62,500	85.4	5.6	8.4	0.6	Appendix gangrenous.
	April 16			3,916,000	15,150	—	—	—	—	
	,, 25			4,662,000	12,500	62.0	29.6	6.0	2.4	
2	March 31	F.	31	3,165,000	16,750	57.0	31.3	10.7	1.0	Chronic inflammation with small ulcer.
3	April 4	M.	34	3,500,000	11,000	69.0	23.6	5.2	2.2	Chronic catarrhal appendicitis.
4	April 4	M.	31	3,110,000	26,000	83.0	9.8	6.0	0.2	Stercolith with foul abscess.
	,, 20			4,083,000	23,750	—	—	—	—	Faecal fistula.
	May 3			4,064,000	10,900	—	—	—	—	Healed.
5	April 5	F.	21	4,050,000	9,375	60.8	25.2	11.2	2.8	Pain subsided. No operation.
6	April 18	M.	23	3,928,000	6,250	54.8	34.0	8.0	3.2	
	May 1			—	13,990	—	—	—	—	Temperature rose to 100°.
	,, 10			4,960,000	10,170	—	—	—	—	Operation. Much matting : no pus.
	,, 18			4,496,000	7,310	—	—	—	—	
7	March 18	M.	30 (?)	5,060,000	6,200	—	—	—	—	No operation. Colic (?)
8	April 20	M.	51	5,344,000	11,250	77.0	17.4	4.8	0.8	Appendix extensively ulcerated. No pus.
	,, 22			—	11,480	—	—	—	—	
	,, 24			—	11,060	—	—	—	—	
9	April 21	M.	13	4,883,000	14,500	69.0	17.0	12.0	2.0	Tuberculosis of appendix, with caseating mesenteric glands.
	,, 28			4,550,000	17,100	—	—	—	—	
	May 2			4,478,000	20,000	—	—	—	—	
	,, 10			4,332,000	7,900	—	—	—	—	
10	April 22	F.	16	3,800,000	9,375	60.2	31.8	7.0	1.0	No peritonitis; no pus. Minute ulcer and stercolith.
11	April 24	F.	23	4,112,000	6,500	—	—	—	—	No operation.
	May 1			—	7,950	—	—	—	—	Very slight catarrhal inflammation.
12	May 6	F.	21	3,664,000	7,150	—	—	—	—	
13	April 24	F.	28	4,366,000	25,000	85.0	8.0	6.0	1.0	Appendix long and gangrenous.
	,, 25			4,264,000	27,300	—	—	—	—	
	May 1			—	29,250	—	—	—	—	Abscess evacuated.
	,, 9			—	14,300	—	—	—	—	
	,, 6			4,032,800	14,300	—	—	—	—	
	,, 18			5,000,000	6,360	—	—	—	—	Healed.
14	May 9	F.	30	4,984,000	36,570	85.0	6.6	7.6	0.8	Appendix partially gangrenous. Patch of gangrene on caecum. No pus.
	,, 13			5,010,000	17,880	—	—	—	—	
	,, 21			4,976,000	11,450	—	—	—	—	Healed.
15	May 17	M.	9	4,432,000	18,440	91.0	3.8	5.8	0.4	General peritonitis; sero-pus and lymph. No stercolith found. Died.
	,, 18			—	19,080	—	—	—	—	
16	May 7	F.	31	4,320,000	35,900	89.2	5.6	4.8	0.4	Extensive foul abscess.
	,, 11			4,410,000	25,260	—	—	—	—	Discharge plentiful.
	,, 18			3,552,000	19,710	—	—	—	—	
	,, 30			—	8,587	—	—	—	—	
	June 11			3,950,000	10,170	56.4	33.5	8.0	2.1	Healed.
17	June 2	M.	11	5,330,000	29,520	82.6	10.0	7.0	0.4	Stercolith; perforation; abscess. Death.
18	May 30	M.	11	4,325,000	16,220	77.6	12.6	9.6	0.2	Two days after operation. Large abscess.
	June 6			4,450,000	11,767	—	—	—	—	
19	May 29	M.	24	4,233,000	13,993	83.0	12.0	5.0	0.0	Small abscess with thick walls.
	,, 31			4,150,000	8,620	—	—	—	—	Much discharge.
	June 7			4,850,000	15,902	—	—	—	—	
	,, 12			4,713,000	15,300	—	—	—	—	
	,, 23			4,420,000	21,870	80.4	9.4	10.2	0.0	Pleurisy at right base.
20	June 16	M.	21	4,558,000	11,130	46.0	42.0	7.6	4.4	Catarrhal appendix. Fleshy adhesions.
21	June 16	M.	28	5,100,000	9,540	57.8	29.0	9.2	4.0	Soft stercolith. No ulceration.
22	June 15	M.	28	5,330,000	21,300	82.6	11.0	6.4	0.0	Appendix gangrenous. Operation on 17th.
	,, 16			—	19,718	—	—	—	—	
	,, 23			—	20,670	—	—	—	—	Temperature rose to 102° on 26th. Fell on 28th. Discharge of pus from wound.
	,, 27			5,030,000	28,940	—	—	—	—	
23	June 21	F.	26	5,500,000	6,500	69.0	22.8	7.0	1.2	Old catarrhal inflammation.
24	June 22	M.	49	5,980,000	24,650	75.4	16.8	7.0	0.8	Large subcaecal abscess opened on 25th.
25	June 26	M.	55	4,500,000	18,760	84.5	5.0	9.0	1.0	No pus. Appendix gangrenous in distal half.
26	May 15	M.	32	5,016,000	32,334	85.2	7.6	6.8	0.4	Acute appendicitis with abscess.
	,, 22			4,833,000	15,266	—	—	—	—	
	,, 28			5,000,000	12,723	—	—	—	—	
	June 6			4,000,000	11,130	60.0	30.2	8.0	1.8	Healed.
27	June 28	M.	12	5,430,000	34,920	87.4	7.2	5.0	0.4	Large foul abscess. Appendix not seen.
28	June 29	M.	45	5,067,000	10,080	82.6	9.0	7.6	0.8	Large, thick-walled, foul abscess.
29	June 13	M.	23	5,260,000	18,500	80.6	10.0	9.4	0.0	
	,, 14	9.30 a.m.		5,216,000	16,220	—	—	—	—	
	,, 14	8.0 p.m.		—	18,784	—	—	—	—	Appendix found acutely inflamed. Drops of pus.
	,, 15			—	—	—	—	—	—	
	,, 27			5,500,000	19,080	79.4	11.0	9.6	0.0	Much recent peritonitis, with matting. Small pocket of pus.
30	June 30	F.	14	4,567,000	28,280	84.2	9.8	7.6	0.4	Much recent inflammation round appendix. No pus.
31	June 14	M.	34	4,900,000	14,987	84.6	8.2	6.6	0.6	
	,, 26			—	11,250	66.0	23.0	9.0	2.0	General peritonitis. Death.
32	June 28	M.	40(?)	4,900,000	41,340	91.2	3.2	5.6	0.0	Acute appendicitis. Sero-pus. Mucous membrane gangrenous.
33	June 11	M.	28	5,800,000	23,530	86.8	7.2	5.6	0.4	Temperature rose to 102°. Bronchitis.
	,, 12			5,617,000	25,125	—	—	—	—	
	,, 14			5,150,000	19,920	—	—	—	—	Discharging.
	,, 23			4,900,000	11,560	—	—	—	—	Healthy granulations.
	,, 29			4,620,000	9,850	70.0	19.0	8.0	3.0	General peritonitis. Sero-pus not offensive. Right tube and ovary acutely inflamed.
34	June 27	F.	11	3,916,000	29,259	92.0	3.6	4.4	0.0	
35	April 22	F.	21	3,300,000	25,750	75.6	19.0	5.0	0.4	Large pyosalpinx removed.
	,, 23			—	31,000	—	—	—	—	Discharge. Faecal fistula.
	,, 27			3,384,000	21,150	84.0	10.0	5.4	0.6	
	May 8			3,760,000	17,170	—	—	—	—	
	,, 18			4,000,000	14,620	—	—	—	—	Wound healed soundly.
	June 5			4,230,000	8,900	52.2	33.4	10.8	3.6	Sero-pus not offensive. Pelvic peritonitis. Right ovary acutely inflamed and suppurating.
36	June 12	F.	24	4,057,000	29,910	92.6	4.8	2.4	0.2	

4. Eosinophiles. Nucleus (often double) pale blue. Large eosinophilous granules.

Basophiles are so rarely met with that I have not taken them into account.

Five hundred consecutive leucocytes are then counted, half on each film, and the percentages arrived at. In the few cases where the haemoglobin was estimated, Haldane's method was employed. Having thus arrived at a result of the blood examination what help can we draw from it? The basis of the matter is the fact that an increase of leucocytes accompanies acute inflammation. Typhoid fever at once occurs to our minds as an exception. Putting that aside, leucocytosis is a sign of acute inflammation, provided that:

(a) Resistance of patient is capable of reaction.

(b) Intensity of infection is capable of exciting reaction.

The outcome of these factors means that a large leucocytosis will be provoked where the patient is in a high state of resistance and the infection severe, while a patient in a low state of resistance will, under the same circumstances, exhibit but a feeble leucocytosis. The balance of these factors may later on be of value in determining the prognosis of a case. I am not prepared to state that any definite relation exists between the amount of the leucocytosis and the intensity of the infection.

The pathological question of the source of the leucocytes is of great interest. Whether, as Virchow and Ehrlich believe, their excessive number is due to stimulation of those organs which produce them, or whether, as von Limbeck and Jakob hold, the chemiotaxic substances generated at the site of the lesion sufficed to draw them from their lurking places in the viscera and throw them into the peripheral circulation, is a subject beyond the scope of this paper. But it is a subject which I think is of importance, since if we knew more of the place and conditions of the birth of the leucocytes, it is possible that we might find ourselves able to influence those conditions in such a way as to excite a leucocytosis at will, an arrangement which might be a valuable therapeutical measure.

If, however, bearing in mind the two factors I have mentioned, we work upon the hypothesis that a leucocytosis is the expression of Nature's effort to counteract the toxaemia, a clear grasp of the general principle will be obtained.

In describing the effect on the blood generally, it will be best to take each element in turn. I have not devoted any particular attention to the red cells or the amount of haemoglobin.

Da Costa, however, who investigated this question, came to the conclusion that in the average acute case there was a loss of half a million red cells and 30 per cent. of haemoglobin. The thickness of the fibrin network is, I believe, generally increased, but I cannot speak on this point from my own observation. The number of blood platelets is also increased; although I never counted them, my impression is that I have seen more of them in cases with a large leucocytosis. The greatest alteration is found in the white cells. The normal number may be taken as 7,500, of which 60.75 per cent. are polymorphonuclear, 20 to 30 per cent. lymphocytes, 4 to 8 per cent. hyaline, 1 to 3 per cent. eosinophiles. The great increase of the total number is, of course, the most prominent feature of the blood picture; almost equal in importance is the increase of the polymorphonuclear element; and, thirdly, the diminution of the eosinophiles and lymphocytes. The hyalines about keep their place. The polymorphonuclears and hyalines are the most active phagocytes in the blood.

It was found on taking the averages of the acute and of the more or less chronic cases in the table that the leucocytosis of the 22 acute cases averaged 27,990, of which 84.9 per cent. were polymorphonuclears and 0.4 per cent. eosinophiles. Of the 14 subacute and chronic cases (I take the pathological condition as the basis of classification) the average leucocytosis was 10,614, of which 63.1 per cent. were polymorphonuclears and 2.1 per cent. eosinophiles. The average count of 5 acute cases after operation and just before leaving the hospital was whites 10,500, polymorphonuclears 60.1 per cent., eosinophiles, 2.5, or a condition almost exactly similar to the chronic cases (Table II).

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TABLE II.

		No. of Cases.	Whites.	Polymorpho-nuclears.	Eosinophile.
Acute	Before operation	22	27,990	84.9	0.4
	After operation	5	10,500	60.1	2.5
Chronic	... ...	14	10,610	63.1	2.1

There are certain special factors which have to be taken into consideration. First, the influence of age. An analysis of the 22 acute cases gives the following results:

TABLE III.

Age.	No. of Cases.	Whites.	Eosinophiles.	Poly.
Up to 20	6	26.100	0.30	85.8
20 to 30	8	24.320	0.35	83.9
30 to 40	5	39.610	0.32	86.8
Over 40	3	21.160	0.80	80.8

The number of cases is of course too small for these results to be of much value, but so far as it goes the table shows that leucocytosis is most free between the ages of 30 and 40, and diminishes after 40.

The physiological influence of age on leucocytosis is marked in the early months of life. At birth the number averages 18.000, sinks to 12,000 at the sixth month and reaches the normal about the fifth year. The normal percentage of polymorphonuclears in infants is from 28 to 40 per cent. Marked leucocytosis also accompanies the later stages of pregnancy. An increase of 2,000 to 3,000 leucocytes may occur after a large meal or exercise in a healthy adult.

Reference must be made to cases where there is little or no leucocytosis, although the lesion is severe. First, there is a class of case in which the toxaemia is so intense that the reaction of the patient is overwhelmed. This class of case must, I think, be rare. Case 15 (Table I) may perhaps be regarded as an example, as the lesion was very acute and extensive, and the patient a pale ill-nourished boy of 9. Secondly, a thick wall of inflammatory material surrounding a collection of pus may prevent the escape of the toxins which in some way cause the increase in the number of leucocytes. But in these cases valuable information may be gained from the differential count, a high percentage of polymorphonuclears indicating the possible severity of the lesion. Case 19 is a good example of this. The leucocytosis was only 14,000 on admission, but 83 per cent. were polymorphonuclears. The count sank to 8,600 in two days, but on operation a small thick-walled abscess was discovered. In Case 31, however, where the blood picture was much the same, no pus was discovered, but the parts were the seat of considerable recent inflammation.

Other cases which I might refer to are Cases 8 and 13. In the former, a spare man of 51, the leucocytosis never rose above 11,500, and yet although there was no pus, there was most extensive ulceration of the appendix. The clinical symptoms seemed to accord with the result of the blood examination.

Case 13 is interesting. The girl came in, in no very serious condition from the clinical point of view. The leucocytosis was 25.000 with 85 per cent. polymorphonuclears; next day it was 27.000, and on operation a long and gangrenous appendix was removed. The temperature fell, the wound healed, the bowels were open, no pain was felt. The clinical picture was in all respects highly satisfactory. Yet nearly a week after the operation the leucocytosis was 29,250. The evacuation of a deep collection of pus a few days later explained this apparent anomaly. Perhaps Case 25 may be noticed as an example of the influence of age.

There are a few interesting points in Table IV (p. 1514). In Case 1 the somewhat high eosinophile count wa probably

TABLE IV.—*Showing Blood Counts in various Abdominal Affections.*

No.	Date	Sex	Age	Reds.	Whites.	Poly-morpho-nuclears.	Lympho-cyte.	Hyaline.	Eosino-phile.	Remarks.
1	May 2	F.	11	4,800,000	12,400	54.0	31.8	7.4	6 8	Tuberculous peritonitis, with fluid. Ascaris lumbricoides passed.
	" 10			4,640,000	7,950	—	—	—	—	
2	April 23	M.	16	3,244,000	10,500	70 0	23.0	6.4	0.6	Tuberculous peritonitis, with fluid. Chest clear.
	May 6			3,840,000	7,632	—	—	—	—	
3	May 23	M.	7	3,500,000	8,270	52.0	35.0	12.2	0.8	Tuberculous peritonitis, with fluid. Chest clear. Hb. = 60 per cent. Colour index, 0.85.
	" 29			4,003,000	8,580	—	—	—	—	
4	Feb. 2	F.	17	—	20,000	75.0	20.0	4.0	1.0	Tuberculous(?) infection of mesentery, with pockets of pus.
5	April 17	F.	25	3,983,000	22,000	—	—	—	—	Suppurating tuberculous gland in front of kidney.
	" 23				16,500	60.0	25.0	11.0	4.0	
	May 3			4,600,000	13,650	—	—	—	—	
6	April 21	M.	13	4,883,000	14,500	69.0	17.0	12.0	2.0	Tuberculosis of appendix, with caseating mesenteric glands.
	" 28			4,550,000	17,100	—	—	—	—	
	May 2			4,478,000	10,000	—	—	—	—	
	" 10			4,332,000	7,900	—	—	—	—	
7	June 28	F.	30	4,400,000	7,310	62.4	23.6	8.2	5.8	Haemoglobin 84 per cent. Colour index 0.95. Hydatid cyst.
8	May 20	M.	35	3,880,000	18,440	78 4	11.2	9.0	1.4	Suppurating hydatid of liver.
9	May 7	M.	25(?)	5,000,000	22,950	—	—	—	—	Perforated gastric ulcer. Count taken six hours after sudden onset of abdominal pain.
10	June 7	F.	35	3,815,000	20,350	77.4	16.4	6.0	0.2	Haemoglobin 48 per cent. Colour index 0.75. Small abscess in connexion with carcinoma of stomach.
11	May 6	F.	57	3,760,000	14,300	80.2	11.0	8.0	0.8	Mass round uterus. Amputation of breast 10 years ago. Inflammatory or malignant (?).
	" 11			3,910,000	10,100	—	—	—	—	
12	May 12	F.	28	5,032,000	10,230	65.6	24.0	8.4	2 0	Question of infective cholecystitis (?).
	" 17				6,300	—	—	—	—	
13	Feb. 22	F.	16	3,240,000	23,000	70 0	10.0	15.4	4 6	Question of malignant endocarditis with splenic infarct or sub-phrenic abscess. No necropsy allowed.
	March 10			3,500,000	25,000	76.6	16.0	6 6	0.8	
	" 27			3,940,000	28,125	—	—	—	—	
	April 4			—	25,000	—	—	—	—	

caused by the presence of worms. In the first 6 cases, which were tuberculous in character, the number of lymphocytes is rather high. Cases 7 and 8 are high in eosinophiles, which is said to be the distinguishing feature of the blood in hydatid cases.

Case 9 is particularly interesting. The man was seized with sudden abdominal pain about half-past one. He came in in a very collapsed state and remained so for three hours; he then vomited slightly twice, and there was a streak of blood in the vomit. The pulse rose from 80 to 100. The abdomen was rigid but not tender, and there was some diminution in the hepatic dullness. At 6.30 reaction began to set in. At 7.30 I counted his blood, but unfortunately omitted to make any films. There was, however, a leucocytosis of 22,950. The abdomen was opened at 8.15, and free fluid and a little gas found; there was no lymph, but the peritoneum was infected. A perforation of the stomach was found. The interest of this case is the fact that the leucocytosis occurred with such rapidity.

In conclusion I must express my indebtedness to the medical and surgical staff of St. George's Hospital for their kindness in placing their clinical material at my disposal. I hope that the tables I have placed in your hands will serve as an illustration of the value and the shortcomings of blood examinations in abdominal diseases. And if I may be allowed to express an opinion, I think that we cannot regard a leucocytosis as an absolute and infallible indication of the presence of pus; but as an indication of toxaemia its value appears to me very great. Although I do not think it possible at present to fix any definite relationship between the amount of the leucocytosis and the intensity of the toxaemia, yet the broad fact remains that an increasing leucocytosis is, other things being equal, the most scientific means at our disposal for gauging the increasing virulence of an appendicular infection. On the other hand, a decreasing leucocytosis is evidence of decreasing virulence or walling off of the toxic products.

I cannot do better than sum up the practical moral in the words of Da Costa: "The surgeon who attempts to use the blood count in appendicitis as a definite pathognomonic sign will soon run afoul of diagnostic disasters, but he who regards it as only a symptom invariably to be correlated with other equally, if not more, important clinical manifestations, cannot fail to find this method of inquiry of signal value in routine clinical surgery."

UNION OF INTESTINE.

By E. STANMORE BISHOP, F.R.C.S.Eng.,
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THE methods by means of which divided intestine may be reunited have received much attention during the past decade. Much ingenuity and skill have been devoted to the question, and there can be no doubt that our resources in this direction have greatly increased since in 1885 I collected all the then known plans. They may now be divided into four great classes:

1. Simple suturing by Lembert, Lembert-Czerny, Halsted's, or my own methods.
2. Suture on instruments, as Laplace's, Lees's, or O'Hara's clamps, removable after the suture is almost completed.
3. Mechanical clamps which are intended to remain, as Murphy's button, or Frank's coupler.
4. Suture upon absorbable material, usually decalcified bone.

It is worth while noting that in the first class, whilst the Lembert suture probably still holds the first place, the dread which existed of through-and-through suturing appears to be passing away. Thus, Allis, in the *Annals of Surgery* for March, advocates sutures which pierce the entire walls, and other writers speak of them with none of the certainty of leakage which possessed the minds of those who discussed the question fifteen years ago, when I first advocated a suture which penetrated all the coats. Jobert[1] in 1829 pointed out that all sutures, unless absorbed *in situ*, tend to find their way into the lumen of the gut, and subsequent experience has only proved the truth of this statement. A similar method to my own has lately been warmly adopted in America.

Mechanical clamps possessed a great attraction for surgeons at the time when Murphy's button was introduced. This button appeared to present such a ready and safe means of union, it was so easily and quickly applied, and the cases presented by Murphy himself and his followers were so convincing, that it is little wonder that for a time it held the field; but at present there are signs of a reaction. Cases have been recorded of pressure necrosis which has not stopped at the line of union,[2] of others in which the appliance has refused to pass onwards when its work was done,[3] and still others in which, having been used to unite stomach and intestine, it

has dropped back into the stomach, from which it has been removed either by a second operation or at the necropsy.[4] At the best it is a heavy foreign body, with no possibility of absorption, and no operator can feel completely at ease until it has once more made its appearance outside the body. I believe that its rapidity of application will always preserve for it a place in cases where the element of time is of the first importance, but when this is not the case, the later risks which the patient must run quite, to my mind, overbalance any increased facility in application.

The other class of mechanical clamps, namely, those used as temporary supports for suturing, and which are intended to be removed as soon as they have served that purpose, have the, I think, fatal defect that they do not protect the line of suture during the period of union. If this were possible, they would possess greater value than is at present the case, for their use undoubtedly simplifies and renders more exact the process of suturing. Moreover, they help greatly to prevent undue manipulation of the gut.

The tendency at present seems to be to revert to simple suturing, but suturing alone is somewhat difficult. Its difficulties are mainly in the direction of completeness and accuracy. It is very easy to leave some point unguarded, or not sufficiently secure. Allis's[5] vulsellum forceps are very useful to prevent this, by producing, as he says, a preliminary "basting" of the structures together, after which suturing becomes more easy and certain. But not only is such suturing difficult, it is also slow, and rapidity is of great importance in these cases. The main objection, however, to this as to the last class lies in the fact, that after the suture is made the line of union is exposed at once, before any plastic changes have taken place, to the passage of faecal material over it. This can be and is obviated by the use of absorbable bone bobbins.

Of these bone bobbins, there exist at present three forms. Jessett's, Allingham's, and Robson's. Before discussing them it is worth while to consider what are the characteristics of a good appliance of this kind.

First. It should be easy of introduction.

Secondly. It should be perfectly simple, and require no elaborate technique.

Thirdly. It should be resistant until union of the parts over it are soundly united, and when once this has taken place it should be absorbable or capable of easy passage onwards.

Fourthly. The purse-string sutures which fix the intestinal ends upon it should approximate the two ends of gut by the same movement as that by means of which they are fixed.

Fifthly. When in position, it should present the folds of intestine which have to be united by a second line of suture in such a way as to facilitate that suturing.

Sixthly. It should be of such a size or shape as to protect the line of suture during the stage of plastic union.

Now if the present forms of bone bobbins are examined, it will be seen that Robson's fulfils only the first, second, third, and sixth indications. Jessett's, the first, third and sixth. Allingham's, the second, third, fourth and sixth; none of them fulfil all.

Jessett's bobbin is in two pieces. It is easily introduced into the lumen of the gut, but its fixation requires time. Each half has to be fixed separately to its respective bowel end, and then they have to be sewn together. The fixation itself requires some practice before it can be done neatly and rapidly.

Allingham's bobbin is the only one which fulfils the fourth indication, which is, I think, a very important one. Purse-string sutures, which can be rapidly placed, are carried round each end of the bowel; the bobbin is slipped into each, and the sutures tightened. The surface of the bobbin is so inclined from each extremity to the centre that the tighter these sutures are pulled the nearer they approximate each other, and this pressure between the sutures and the undecalcified portion of the bobbin beneath can be made so great as to cause pressure necrosis of the rim formed, which will separate when the outer union is complete, and passing on with the remains of the bobbin, will leave the lumen of its normal size—a great advantage if it can be obtained.

But the trumpet-shaped ends do not fulfil the first indication. They are distinctly difficult to introduce, unless they are so small in the centre as to markedly diminish the lumen

of the gut at the line of union. If the centre is equal to the normal size the line at which the outer edge of the bobbin touches the circumference of the gut is apt to be unduly stretched, and under the tension so produced pressure necrosis at this point may be produced—a result which would be disastrous.

Mayo Robson's bobbin is fairly easy to introduce, and is a good support, but it makes no effort to fulfil the fourth indication, and can hardly be considered a serious effort to combine all the advantages possible in such an appliance.

In devising the bobbins which I show you, I have endeavoured to combine the advantages of Jessett's and Allingham's bobbins. It is always much easier to improve upon ideas originally evolved by others, and I freely confess my indebtedness to them both. As you will see, they have the bevelled conical-shaped ends which belong to Mr. Jessett's pattern, and which give them ease of introduction, whilst in the centre they have the central groove, only shorter, peculiar to Mr. Allingham's, and which enables them to fulfil the fourth indication, an indication which I believe to be most important. But I do not think that any one form of bobbin is suitable for all emergencies or situations. As you see, I present three forms all with the same principle, but modified for definite purposes. The first one is intended for ordinary enterectomy, end to end suture. It is easy to see the method of its application. The second is intended for ileo-colostomy or gastroenterostomy. This shape is simply one of the former tubes of which one end has been truncated. The truncated end is slipped into the colon or stomach as the case may be, whose walls are drawn tightly into the groove by a purse-string suture previously placed around the intended opening; the
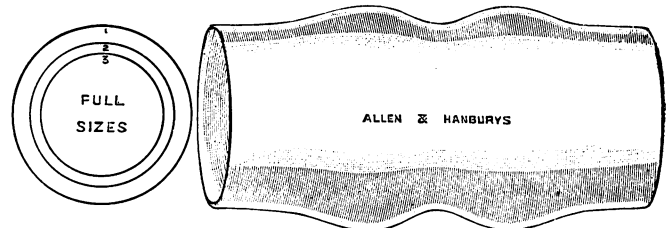

Fig. 1.

long end is introduced into the ilium or jejunum, the end of which is similarly fixed in the same groove. A layer of Lembert sutures are then carried around uniting the folds so formed, and the operation is complete. This form is also very useful in colotomy or in drainage of the gall bladder. The
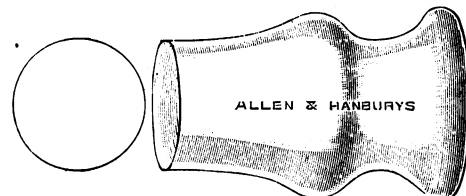

Fig. 2.

truncated end is fixed into either viscus, and a drainage tube is drawn over the end and fixed in the same way as the small intestine would be in ileo-colostomy.

The third model is intended for use in pylorectomy. The central idea is precisely the same. The method of application of this idea varies, however, somewhat. In removal of the pylorus, we have two unusual factors with which to deal. First, the wounds made are very unequal in size, and, secondly, the gastric juices are much more destructive of plastic lymph than the intestinal or biliary secretions. Therefore, I have had the gastric end widely flared, especially above, since experience has shown that leakage more often takes place at the point where the vertical joins the circular suture than elsewhere. The size of the stomach wound permits of its easy introduction, and when once the lower end of the gastric opening is closed around the groove outside the flange, it will be found that the remaining lips of the wound have become approximated. A purse-string suture is carried round the
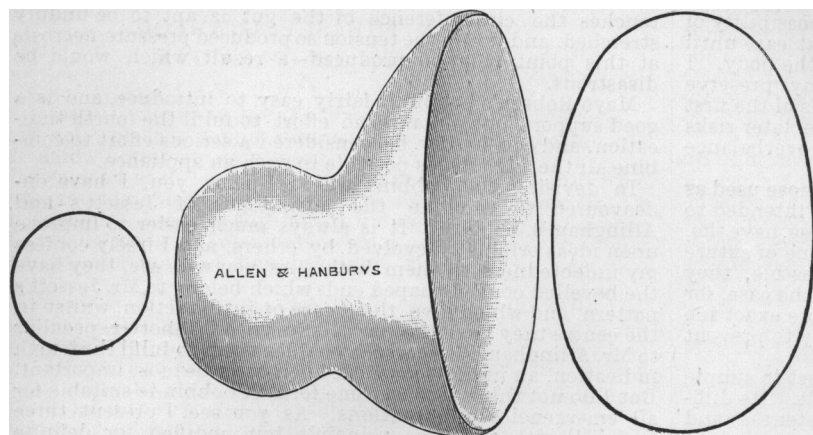
Fig. 3.

duodenal end entirely, another opening upwards is carried around the base of the gastric wound, the two ends of the thread emerging at a level which can be determined by temporarily placing the bobbin in position and fixing the two edges of the wound above tightly into the groove by a pair of Kocher's forceps. When this suture is in place, Kocher's forceps and the bobbin are removed, the posterior edges of the duodenum and lower portion of the stomach united through half their circumference. The bobbin replaced, and the purse-string sutures tightened up and tied; the anterior edges are then united, and the vertical wound, the edges of which will be found lying in apposition, sutured. There can be no doubt as to the extent of the suturing required. The union is then complete. The entire flange later dissolves under the action of the gastric juice, leaving only the groove, which, becoming loose, passes on down the gut. Even if it fell into the stomach, that would be a matter of little moment, since, ultimately, it would dissolve and be eliminated.

In all these bobbins the entire appliance is decalcified with the exception of a narrow portion of its circumference immediately in the centre of the groove, upon which the purse-string sutures are tightened and which supplies the resistance necessary.

CASES.

The method has been used in four cases, of which the following are summaries:

Case of removal of adenoma from sigmoid flexure. Previous colotomy; 14 days later removal of 3 in. of gut, reunion over bobbin; one month later closure of artificial anus. Recovery.

Case of strangulated hernia. Gangrenous gut. Removal of 8 in. small intestine. Reunion over bobbin. Ring of bone much eaten away and incomplete; three weeks later found in stool. Recovery.

Case of carcinoma of sigmoid; removal of 6 in. of large intestine. Reunion over bobbin. Recovery from operation, but death three weeks later from exhaustion. Necropsy. Union of bowel; disappearance of bobbin except central ring.

Case of pylorectomy showing need of bobbin. Removal of movable adenomatous pylorus. Reunion by Lembert suture. Yielding of suture on fifth day at junction of vertical and circular line. Formation of sub-diaphragmatic abscess. Death on sixteenth day.

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[1] Malad. du Canal Intestinal, 1829, vol. i, p. 74. [2] Dawbarn, Annals of Surgery, 1901, vol. xxxii, p. 305 : Marston, quoted by Bernays, Annals of Surgery, June, 1902; Jayle and Beaussonart, Rev. de Gynée, Mai-Juin, 1902, p. 470. [3] Cawthorn, New York Med. Journal, 1895. [4] Allis, Annals of Surgery, 1902, vol. iii, p. 352. [5] Loc. cit.

CASE OF RESECTION OF STOMACH : PATIENT WELL EIGHTEEN MONTHS LATER.

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

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THE following case of resection of stomach has not been previously reported. It was so nearly complete, there being only a small portion of the dome of the stomach left, that it might almost be classified as a case of complete gastrectomy. The interesting point about the case is that the patient remains well eighteen months subsequent to operation.

Mr. ——, builder, aged 38, was sent to me on March 18th, 1901, by Dr. R. O. Petrie, of Bridlington, with the following history:

He had since childhood always complained of flatulence and had suffered from indigestion, though he had only been ill for two years, during which time he had suffered from fatigue with some loss of strength but no pain. Six months ago he began to have pain every morning which started in the epigastrium and passed over to the right side of the abdomen. There was no pain immediately after food, but it always came on before the next meal, when food gave relief. He vomited for the first time a week before seeing me. At that time he had an attack of diarrhoea which was thought to be due to a chill. He had never been constipated. There had been great loss of flesh during the past twelve months amounting to two stones, his weight when seeing me being 9 st. 1 lb. He looked ill and cachectic. He was quite sure that he had never vomited blood and that he had never seen blood on the motions.

On examining the abdomen a tumour could be easily seen and felt, occupying the epigastric region, and extending from the left costal margin nearly as far as the right. On distending the stomach with air the tumour was pushed downwards, but there did not seem to be much dilatation. The tumour had a wide range of mobility, could be made to pass to the right and left side of the abdomen, and could be pushed up under cover of the liver, and down below the margin of the ribs. During manipulation the tumour hardened under the hand, when it was very distinct, but when the stomach muscle was relaxed, the growth was less prominent. There was no free HCl in the stomach contents. An operation was proposed and consented to, and in the presence of Dr. Petrie I opened the abdomen by an incision through the right rectus. The tumour at once came into view, and proved to be a firm, nodular, malignant growth involving nearly the whole of the stomach from the pylorus to the oesophagus, the only portion of the organ apparently free being a little of the dome near the left of the oesophageal opening. There was no ascites, and no enlarged glands could be felt nor could any secondary growths be seen.

As it was clearly useless to perform any lesser operation, and as the tumour was so mobile, gastrectomy was decided on.

The duodenum an inch beyond the pylorus was clamped by long forceps covered with rubber tubing, the lesser and then the greater omenta were divided between ligatures, and as there were no adhesions the large tumour was then drawn down and the oesophagus and dome of the stomach were clamped by two forceps applied from the left and right side respectively. The stomach was then cut away by scissors, and after all visible vessels had been ligatured the clamps were released and a few other bleeding points taken up, but throughout very little blood was lost. The duodenum was brought across the spine and fixed by an external celluloid thread and an internal catgut suture around a decalcified bone bobbin to the margin of the stomach remaining around the oesophageal opening. The duodenum and cardiac end of the stomach seemed to hold together with very little tension. The operation had been effected without soiling the peritoneal cavity, as the parts had been isolated throughout by sterilized gauze. The abdomen was closed in layers by means of continuous catgut sutures, and the patient was returned to bed in very good condition.

He was allowed to take a little liquid nourishment with plasmon after twenty-four hours, and, after a week, light custard pudding. Nourishment of more consistency was then given, and within the month he was taking minced meat and other ordinary foods. A breaking-down haematoma at the week-end delayed healing for a fortnight, but otherwise recovery was uninterrupted and he was able to return home before the end of April.

On August 27th I received a letter from Dr. Petrie to say, "Mr. —— continues well; I saw him to-day, and he has become considerably stouter."

In November, 1901, he called to see me in Leeds. and I failed to recognize him : he looked healthy and fat, and seemed to be vigorous and well. He had gained 2 st. in weight. He said that his digestion was very good if he did not attempt too large a meal. He gave the following as his ordinary diet chart:

7 a.m.—Breakfast cup of boiled milk and one tablespoonful of brandy.

Breakfast.—One egg boiled or a little bacon, bread and butter, one cup of tea.

11 a.m.—Breakfast cup of boiled milk, with one teaspoonful of plasmon.

Dinner.—Varying as follows: Lean of a mutton chop, little fish, chicken, or pigeon, with a little cauliflower and bread, always milk pudding, chiefly rice.

3 p.m.—Breakfast cup of boiled milk and one teaspoonful of plasmon.

Tea.—Bread and butter or a little toast, one cup of tea.

8 p.m.—Cup of milk and one teaspoonful of plasmon.

Supper.—Nearly one pint of boiled milk and bread.

In April, 1902, over a year after operation, he was seen by the matron of the surgical home where he stayed when in Leeds, and she reported him as looking in robust health and of normal weight.

The tumour removed was a nodular softish growth, involving almost the whole of the stomach, including the pylorus and extending from it to the cardiac end, where a small mar-

gin of healthy stomach wall remained. It weighed 1 lb. immediately after operation. Unfortunately the specimen, which was sent to a pathological laboratory to be mounted and reported on, was mislaid and cannot be found. It is impossible, therefore, for me to say whether it was sarcoma or cancer, but from the absence of enlarged glands, from the rapidity of growth and from its freedom from adhesions I suspect that the growth was a sarcoma.

It was undoubtedly malignant and was invading the stomach walls generally; the growth was breaking down on its visceral aspect and the stomach cavity contained some grumous material thrown off from the growth. The pylorus was invaded, but the line of section in the duodenum and at the cardiac end of the stomach showed a healthy appearance, and a free portion existed between the growth and the cut margin.

Since Péan performed the first pylorectomy in man in 1879 and Billroth the first successful one on February 28th, 1881, removal of part of the stomach for malignant disease has made such rapid progress that there is now no part of the organ that cannot be taken away with good prospect of success.

The term pylorectomy will probably be discarded, as although the disease may begin at the pylorus, it has usually extended well beyond it on the stomach side before the case comes under the notice of the surgeon, the operation for the removal of malignant disease is usually therefore a partial gastrectomy, and the case I have described is a very extensive operation of the kind just falling short of being a complete gastrectomy.

I have brought the case forward first because it is, I think, of sufficient interest in itself, but principally because I think it illustrates an operation that may be performed with much greater facility and safety than complete gastrectomy.

It is a fact that the dome of the stomach is frequently free from disease and can be safely left when the rest of the stomach is removed. This is easily explained by a reference to Cuneo's diagram of the lymphatics of the stomach, which shows the dome free from glands and lymphatic trunks. Should such a state of affairs be found, it simplifies the operation very much as the duodenum and remnant of the stomach can be made to meet over a decalcified bone bobbin very much more easily than the oesophagus and duodenum or even the jejunum can be directly joined as in complete gastrectomy.

Although there have been 12 cases of complete gastrectomy reported with only 33 per cent. of deaths, yet I know of several other fatal cases unreported which would, I feel sure, bring up the mortality up to 50 per cent. or more.

That partial gastrectomy is well worth doing is shown by Kocher's extensive experience, 57 operations with 5 deaths. Eight of the patients were considered cured, one being alive and well ten years later and others at less periods after operation.

I am quite certain from my own experience also in a number of cases, where after the removal of considerable portion of the stomach apparently complete restoration to health has occurred, even when an exploration reveals the impracticability of effecting a complete removal of the disease, gastro-enterostomy as a rule affords very marked relief to all the symptoms and a considerable prolongation of life at small risk. I have no hesitation therefore in supporting Professor Osler's view that where cancer of the stomach is suspected an exploratory operation ought to be advised with a view to the complete removal of the disease at an early stage. But I would also add, that even when a distinct tumour can be felt an exploration may be well worth advising, as even in such advanced cases as the one I have related it may still be possible to take away the growth or to perform gastro-enterostomy, or even if neither of these operations be available the operation of jejunostomy may still afford some prolongation of life.

What we require in these cases is an early diagnosis, which in case of doubt must be made by an exploratory operation, and a complete and thorough removal, bearing in mind the tendency to extension along the lesser curvature. Under such circumstances we may look forward to even greater ultimate success than at present attends operations on the breast and other external parts.

THE REMOVAL OF DEFORMITIES OF THE NOSE BY THE SUBCUTANEOUS INJECTION OF PARAFFIN.

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THE introduction of solid paraffin under the skin for the removal of deformities of the nose is an operation which is not yet described in textbooks on surgery. It is a somewhat recent innovation, and, as I have had considerable experience in the use of paraffin wax for this purpose, I thought it might be of interest to some members of this Section were I to relate the methods employed and to show some of my results.

In all of the cases on which I have operated there was very evident external deformity of the nose, chiefly due to the loss of some portion of its framework. In some the deformity was caused by the destruction of the septal cartilage alone, while in others there was extensive destruction of both cartilage and bone. In two-thirds of the cases the deformity was caused by syphilitic necrosis, in the others it was the result of injury.

CASES.

The following cases illustrative of a variety of deformities of the nose which can be successfully treated by paraffin injection are the first six cases on which I operated, and are here shown in the order in which they were operated upon.

Fig. 1.

Fig. 2.

In the first case (Fig. 1) there was loss of the whole of the septal cartilage and a portion of the perpendicular plate of the ethmoid. In addition a large part of the alveolar process

Fig. 3.

Fig. 4.

of the superior maxilla had been removed some years previously in a state of necrosis. The resulting deformity con-

sisted of falling in of the nasal bones and a deep sulcus beyond their lower borders, with uptilting of the point. The upper lip in like manner had fallen in from lack of bony support. After operation the shape of the nose was restored and the lip brought forwards (Fig. 2).

In the second case (Fig. 3) there was a form of saddle-nose caused by extensive destruction of both the cartilaginous and bony septa. After operation the nose was of the Roman type, in every way improving the appearance of the face. (Fig. 4.)
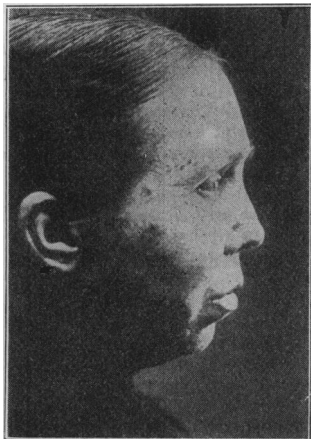

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.
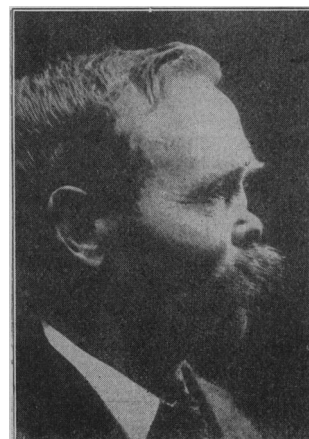
Fig. 9.
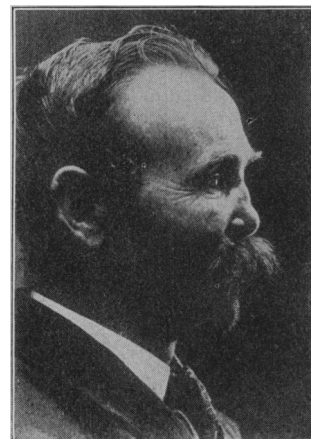
Fig. 10.

In the third case (Fig. 5) there was a loss of the septal cartilage alone, which, however, was completely destroyed, and the deformity consisted of a falling in, and a broadening out of the nose below the level of the nasal bones, with tilting up of the point. After injection the deformities noted were completely removed. (Fig. 6)

In the fourth case (Fig. 7) there was a saddle-shaped nose in a young girl, the result of a severe blow. The injury had been followed by an extensive septal abscess, and subsequent necrosis. The shape of the nose was greatly improved after injection, but as a small depression remained a second injection was made two days later, which resulted in a well-shaped nose. (Fig. 8.)

In the fifth case (Fig. 9) there had been extensive intra-nasal necrosis in early life. The resulting deformity was of a fairly common type—deep depression with flattening below the nasal bones and tilting up of the point. As an additional difficulty in this case, the skin was bound down to the lower border of the nasal bones. The injected paraffin filled up the depression and lowered the point of the nose most satisfactorily. (Fig. 10.)

In the sixth case (Fig. 11) there had been extensive necrosis affecting not only the septum, but the nasal processes of the superior maxillary bones. As a result the nasal bones were sunken and flattened out, so that the site of the bridge was absolutely flat and the tip of the nose was sharply tilted upwards. The skin in this case was in addition thin and tense, increasing the difficulties in the attempt to make the nose a prominent feature of the face. With two injections, however, quite a good bridge was made, which in every way improved the appearance of the face (Fig. 12).

Fig. 11.
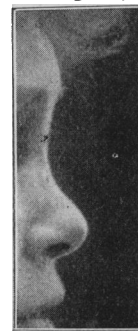
Fig. 12.

PREPARATION.

In performing this operation every antiseptic precaution must be observed. The skin of the nose, forehead, and cheeks should be prepared twelve hours before operation by cleansing with spirits of turpentine followed by rectified spirits of wine, and that by carbolic solution 1 in 40, and a carbolic dressing should be worn overnight. Immediately before operation the skin should again be well cleansed and washed over with carbolic solution 1 in 20. Fifteen minutes before operation I paint a band of celloidin across the nose at the level of the eyes, and continue it down on each side of the nose, following the line of junction between the nose and the cheek. As this dries it contracts, and, acting in a measure like a tourniquet, it helps to prevent the paraffin, while in a fluid state, from passing into the cellular tissue beneath the eyes.

Paraffin.—The paraffin which I have used has a melting point varying from 104° F. to 108° F., and is sterilized by heat.

Syringe.—The syringe employed is a 10 c.cm. glass serum syringe, which can be readily sterilized by boiling.

The patient may or may not be anaesthetized; in many cases there is a distinct advantage in having the patient under an anaesthetic. A local anaesthetic is, in my opinion, inadvisable. The paraffin is made fluid by immersion in boiling water. The syringe, previously warmed in the flame of a spirit lamp, is then charged with the paraffin, the quantity taken up varying from 6 c.cm. to 8 c.cm. It is well to have a good body of the liquid in the syringe to prevent rapid cooling, and at the same time it is advisable not to have the syringe too full.

Needle.—The needle is then adjusted and the air expelled. And now comes the chief difficulty—namely, to prevent the paraffin solidifying in the needle. All who have tried to do this operation understand the tantalizing nature of this difficulty. After trying several means to overcome it, with varying success, I devised the following plan, which has been in every way successful, and has accordingly greatly simplified the procedure. The proximal half of the ordinary needle of the serum syringe, including the collar, is bound round with cotton thread for purposes of insulation. Then a piece of fine platinum wire is wound round the needle and its collar, over the thread, each end of which is soldered to a separate copper wire. When these two copper wires are fixed to the terminals of a storage battery furnished with a rheostat, the platinum wire surrounding the needle may be heated and the temperature raised or lowered as desired (Fig. 13).
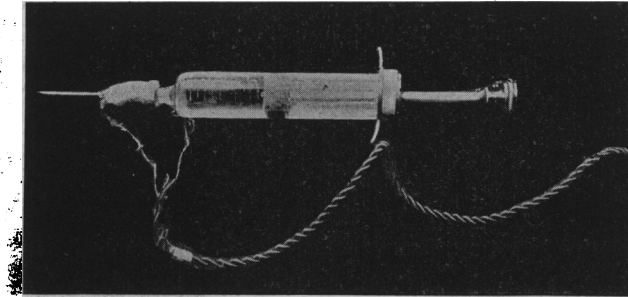
Fig. 13.

A layer of moist carbolized gauze is then wrapped around that portion of the needle so prepared, so that when the wire is heated by the electric current the needle is surrounded by what is practically a steam jacket. By this means solidification of the paraffin at the point of the syringe or within the needle during the performance of the operation may be prevented, and consequently the injection can be made less hurriedly and more accurately than without it.

Injection.—In making the injection I pass the needle through the skin as near to the middle line as possible, and well under the skin. The fluid is then slowly injected, and as it enters the subcutaneous tissues it is guided and moulded by my own fingers. At the same time pressure is applied by the fingers of an assistant around the nose and at the inner canthus of the eyes to further ensure that the fluid injected will be confined to the nasal region.

Quantity.—The quantity required varies; but in all cases it should just be sufficient to remove the deformity. If a larger injection be made the employment of force is necessary for its introduction. The greater the distension the greater is the risk in spreading the paraffin beyond the confines of the nose before it solidifies, and of its "wandering" or migrating after it has hardened. As soon as "the sufficient quantity" has been injected, and before the withdrawal of the needle I apply a piece of gauze soaked in cold sterilized water over the nose, and then withdraw the needle. This causes the paraffin to set instantly, and so prevents the escape of any of it through the puncture opening.

RESULTS.

Immediately after the injection the skin of the nose is somewhat tense and white, but within a few hours a reaction takes place, and the part becomes red, with dilatation of the superficial vessels. This redness may persist, as it occasionally does, for several days, then it slowly subsides and disappears entirely.

So far as my experience goes, I have had no case in which the paraffin has, after setting, spread towards the eyes or the forehead; but in all my cases the paraffin has remained stationary and inert, and its presence has caused neither septic nor inflammatory mischief.

Sufficient time has not elapsed to prove whether this means of restoring the shape of a nose which has become deformed will be permanent or not; but, even although the paraffin did become absorbed in time, the operation can be repeated.

Fully nine months have passed since my earliest cases were done, and still the nose remains as shapely as it was two weeks

after injection, and there has been no evidence of absorption or of migration of the paraffin.

PARAFFIN IN THE TISSUES.

To ascertain in what manner the paraffin is distributed in the tissues after injection, I injected some into the female mamma one week prior to the amputation of that organ for malignant disease. After removal of the breast, careful sections were made, and examined by Dr. A. R. Ferguson and myself. These were stained with prussian blue, which, while it stains the fat deeply, does not appreciably affect the paraffin, and thus the latter stands out in bold relief, and its distribution is easily followed. In section the paraffin appears almost entirely in the deeper parts of the subcutaneous fat. It is distributed throughout this layer in blocks of varying size, the largest being, perhaps, about the size of a pea. These masses, which are either distinctly lobulated, or more irregular, with rounded processes, occupy apparently in every case a position between collections of adipose vesicles, which are displaced by them. It is inferred that the paraffin has made its way along the lines of the connective tissue trabeculae between the fat-containing cells (Fig. 14).
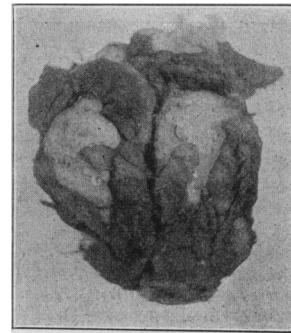

Fig. 14.

From the fact that the infiltration of the paraffin is definite and tolerably intimate, it is difficult to believe that its position would subsequently alter to any extent, although its absorption is possible.

I have previously injected molten paraffin into various parts of the artificially-warmed cadaver. In each instance the paraffin solidified *en masse* either deep in the cellular tissue or in the muscles—an altogether different result from that obtained when the paraffin is injected into the living subject.

CAUSES OF FAILURE.

The several complications which are said to have followed on the performance of this operation are in my opinion due to one or other of the following causes:

1. To insufficient antiseptic precautions.
2. To the want of suitable apparatus.
3. To the injection of an excessive quantity of paraffin.
4. To insufficient digital pressure around the nose while the paraffin is being injected.

The first two causes are apt to result in local inflammatory mischief, while the two latter favour the escape of the paraffin into the loose cellular tissues in the near neighbourhood of the nose.

CASE OF COMPLETE EXCISION OF THE
URINARY BLADDER.

By A. W. MAYO ROBSON, F.R.C.S.,
Senior Surgeon to the General Infirmary at Leeds; Emeritus Professor of Surgery in the Yorkshire College of the Victoria University; Vice-President Royal College of Surgeons of England.

ALTHOUGH before performing this operation I had never seen a case of complete removal of the urinary bladder, or heard of one having been done in England, yet I felt sure, from an anatomical point of view, that it was feasible. I have since learnt that the operation has been performed by Bardenheuer and Gussenbauer, and that Paulick of Prague and Clado had each a successful case performed at twice, the ureters being first transplanted, and the bladder removed later.

It must necessarily be a formidable procedure, and one not to be undertaken except in an extreme case, where every other means has been tried and failed.

In the following case, as the notes will show, everything possible was done before resorting to this extreme measure.

The patient, Mrs. S., aged 42, was sent to me from a neighbouring hospital in January, 1900. She was then extremely ill, with a pulse of 120 and a high temperature, and she was suffering from incontinence of urine. A tumour could be felt reaching well above the pubes. The history given was that she had been admitted to the hospital in question on account of the passage of blood in the urine, which for a long time had been offensive. At times the haemorrhage had been very excessive. A large mass of growth had been felt through the dilated urethra.

I found the urethra patulous, readily admitting the index finger, and the whole of the inside of the bladder could be felt to be occupied by growth which it was clearly impossible to remove through the urethra. I therefore opened the bladder above the pubes, and removed a pedunculated tumour the size of a large apple from the left side of the base of the bladder, and another from the right base, temporarily packing the bladder with iodoform gauze, after thoroughly douching it with hot boracic lotion containing hamamelis. The patient made a good recovery, and was able to return home within the month. She rapidly regained control of the bladder, soon regained her lost colour, and three months later was in very good health.

In September of the same year she passed blood on two occasions, once after a long bicycle ride, and on the 29th of that month I removed several small tumours through the dilated urethra by means of forceps, again giving her relief.
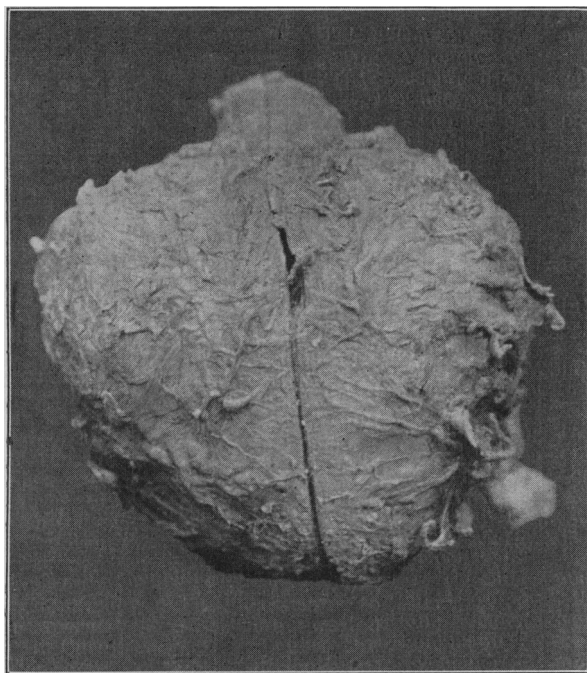
Fig. 1.—Complete removal of urinary bladder.

In September, 1901, she returned with very free bleeding, and was again blanched. I passed the finger into the bladder through the urethra and found the growths to be universal, but I felt it my duty to make an attempt to remove it if possible, and to this end I made a transverse incision above the pubes so as to thoroughly expose the interior of the bladder, the patient being in the Trendelenburg position. By means of forceps and a sharp spoon I cleared the bladder once more, and the patient made a rapid recovery, was able to do her home duties and to enjoy life. In January, 1902, Mrs. S. again came to see me. The bladder could be easily felt above the pubes, and bimanually a considerable tumour could be recognized. She was suffering severely from haemorrhage, and was again beginning to be blanched. I told the patient and her husband that on the last occasion the whole of the lining of the bladder was involved in the growth, and I felt sure that now it would be absolutely impossible to remove it except by complete removal of the bladder and transplanting the ureters. The serious nature of the operation was explained to the patient and her friends, and they decided to defer it as long as possible. This, as the sequel will prove, was unfortunate.

On February 17th I had a letter from Mr. S. to say, "You will be rather surprised to hear that my wife is much better and is eating well. Since she saw you she has got rid of the pain in her back, and is taking outdoor exercise. The bleeding is, however, still continuing."

The patient did not return till early in April, and then came prepared for the operation about to be described. The urine passed was offensive, and appeared to be almost pure blood, and the patient was in a very much worse condition than when I saw her in January; but it was felt that nothing short of radical treatment offered any chance of relief.

On April 4th, 1902, the operation was performed at a surgical home in Leeds. The patient was anaesthetized with ether and placed in the

Trendelenburg position. A vertical incision 4 in. in length was made in the middle line of the abdomen extending to the pubes, and this was supplemented by a transverse incision about 3 in. in length immediately above the pubes. The recti muscles were divided at their insertion into the pubes, and the bladder and peritoneum exposed. The peritoneal cavity was opened, and the bladder was found to be freely movable and forming almost a solid mass. The removal of the organ was then commenced first by stripping the peritoneum off the fundus and posterior aspect. This was continued until the uterus was reached, the organ being separated readily from it and the vagina. The stripping was continued on either side of the bladder, the superior and inferior vesical arteries being clamped and divided as they were reached. The ureters were then exposed and divided close to their entrance to the bladder. The tumour was then displaced backwards and separated from the posterior aspect of the pubes. This was fairly easily effected, but there was considerable haemorrhage from a large number of small vessels, which had to be taken up and ligatured separately. The bladder was then separated from the anterior vaginal wall mainly by blunt dissection with the fingers. The dissection was continued until the bladder was attached only by the urethra. This was seized in pressure forceps and divided. The whole bladder was then removed.

There were a great many small vessels which required ligature. The patient lost comparatively little blood, but at one time there would be as many as twenty-five pressure forceps within the wound. No. 6 Jaques's catheters were now inserted into the divided ureters, and secured in position by catgut stitches passing through the wall of the ureter and through the rubber tube. A speculum was passed into the vagina by Mr. J. F. Dobson, who was assisting me, and a small incision was made in the anterior vaginal wall in front of the cervix uteri on the right side on to the speculum.

A similar incision was made on the left side. The rubber tubes and ureters were then passed through the openings thus made, and secured in position by two or three sutures of catgut. The peritoneum was now closed by a continuous catgut suture. The divided recti were brought together with interrupted sutures of catgut, and the skin wound closed by
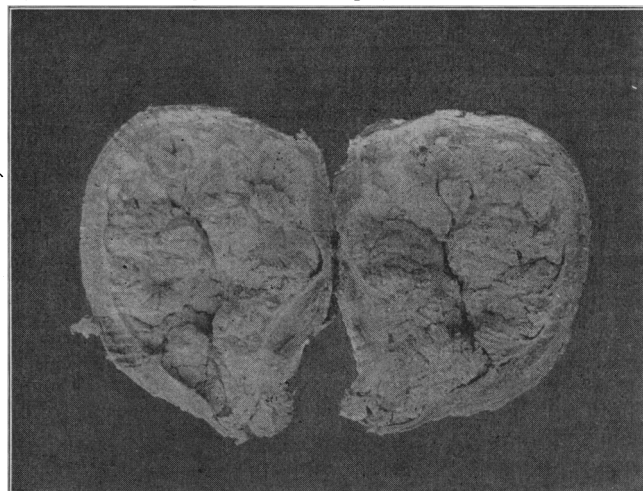

Fig. 2.—Section of bladder removed by operation.

silkworm-gut sutures, the space behind the pubes being drained by two rubber tubes, and a strip of iodoform gauze brought out through the lowest part of the vertical incision. The ureteral tubes passed out of the vaginal orifice into two bottles, the urine from each kidney being separately collected.

The whole operation occupied about one hour and a-quarter, and the patient was put to bed in very fair condition. Ten minims of liq. strychninae had been given before the operation, and 5 minims were administered subcutaneously when she was put to bed, 3 pints of saline fluid were given by intravenous injection, and another pint was administered by enema, after which the pulse was good, and she speedily regained consciousness. She had comparatively little pain, and her temperature kept normal for the first week from the time of operation. Normal urine passed freely from the right ureter, but that from the left was offensive, bloody, and scanty from the first. It was, therefore, quite clear that the left kidney had already become affected, and, as might have been expected, some pain was complained of in the left renal region.

In the course of the second week, although there were no abdominal symptoms nor any other sign of peritonitis, the patient's breath began to have a urinous odour, and though her temperature varied little from the normal, the pulse became rapid and feeble, and she died uraemic on the thirteenth day.

It was interesting to note perfectly normal urine passing into the bottle connected with the right, and offensive urine into the bottle connected with the left kidney. Had the patient been in a condition to bear it I should have cut down on the left kidney and opened it, but after giving the matter careful consideration I felt that it would only hasten the approaching end if I did a further operation.

Had the patient recovered it was my intention to try to convert the vagina into a pseudo-bladder, and to make use of the urethra which had been left in situ.

THE RADICAL CURE OF FEMORAL HERNIA.

By Jas. HENDERSON NICOLL, M.B.,

Professor of Surgery in the Andersonian College, Glasgow, etc.

HERNIAE in general fall, in the matter of radical operative treatment, into two classes—namely, those which may be cured by any operation, and those which tax the principles of the most ingeniously devised methods.

Of femoral hernia in particular this is perhaps especially true. The less severe forms, on the one hand, are readily cured by the most informal procedures, and in such cases it happens from time to time that radical cures result from the cicatrization produced by operative measures carried out for the mere relief of strangulation, and in no way intended to serve as the means of radical cure. In these slighter cases any of the simpler forms of operation may be depended on to effect a cure. Mere ablation of the sac or of its lumen by any method is frequently effective. The "purse-string" suture of Cushing, Fortunato,[1] Curtis,[2] and others, popularized by Coley,[3] Kocher's operation, and the more or less similar suture operations of Bassini,[4] Franz,[5] Fabricius,[6] Bottini,[7] and others may all be relied on to secure the permanent disappearance of the hernia.

The more severe forms of femoral hernia, on the other hand, have the reputation of being unusually difficult of cure. The effect of this reputation is evident in two directions. In the first place, it must be held responsible for the impression, very general with surgeons, that all femoral herniae are cured by operation less easily than inguinal. The following extract from a well-known work on operative surgery might readily be reinforced by the published opinions of others to the same effect: "We are met here" (in the radical operative treatment of femoral hernia) "by a difficulty less present in inguinal hernia—that is, that of closing the canal satisfactorily, owing to the scantiness of some of its immediate surroundings and the importance of others." In the second place, the sense of the magnitude of the difficulty to be overcome in the radical cure of femoral hernia has been so weighty as to induce surgeons of large experience to propose operative measures sufficiently unique. Thus, the canal is to be plugged by the healing in of glass balls, of wire gauze, or even (Chaput[8]) of transplanted costal cartilage, or closed by operating from within the abdomen after preliminary laparotomy, or by way of the inguinal region (Ruggi,[9] Nasi,[10] Parlavecchio[11]). Buonamici[12] closed the canal by making use of the fascia transversalis, and Gordon[13] by displacing the conjoined tendon of the internal oblique and transversalis muscles from the inguinal to the femoral region. Flaps of bone and periosteum have been turned over from the os pubis (Trendelenburg, Kraske,[14] and others) while musculo-fascial flaps have been turned up from the pectineus (Watson Cheyne,[15] Saltzer,[16] Prokupin,[17] and others) and from the adductor longus of the thigh (Schwartz[18]).

The following method of operating I originally adopted for the more severe and unfavourable cases of femoral hernia only, but have come to regard the precision of the closure effected by it as sufficient inducement to extend its practice to all cases. The use of the sac to form a buttress on the abdominal aspect of the ring, and the closure of the canal by restoring its boundaries to their natural relations (and not by the transplantation of neighbouring structures) are ideas familiar in the operative treatment of hernia, and rendered classic by Macewen in his operation for inguinal hernia. This restoration may be accomplished in femoral hernia with a degree of precision and completeness not, I believe, attainable in any other form of hernia, inasmuch as of the four boundaries of the femoral ring or canal, two only, the anterior and the external, are displaced by the descent of the hernia, the posterior (pubic ramus) and the internal (Gimbernat's ligament) being incapable of displacement. By fixing the anterior boundary (Poupart's ligament) to the posterior (the ramus of the os pubis) an absolute closure of the femoral ring to the extent desired is readily attained. There is nothing, therefore, novel in the principles involved in the two parts of the operation. The technique alone demands description, and it is as follows.

OPERATION.

This consists of two parts:

(A) *Obliteration of the Sac*, also of the peritoneal depression over the abdominal aspect of the ring, and the substitution of a buttress over the internal aspect of the ring:

1. Expose the sac, and clear it from surrounding tissues (the skin incision may be vertical or transverse).

2. Open the sac longitudinally in its middle line and clear of contents.

3. Separate it from parts surrounding its neck, including the transversalis and iliac fasciae for 1 in. round the abdominal aspect of the ring.

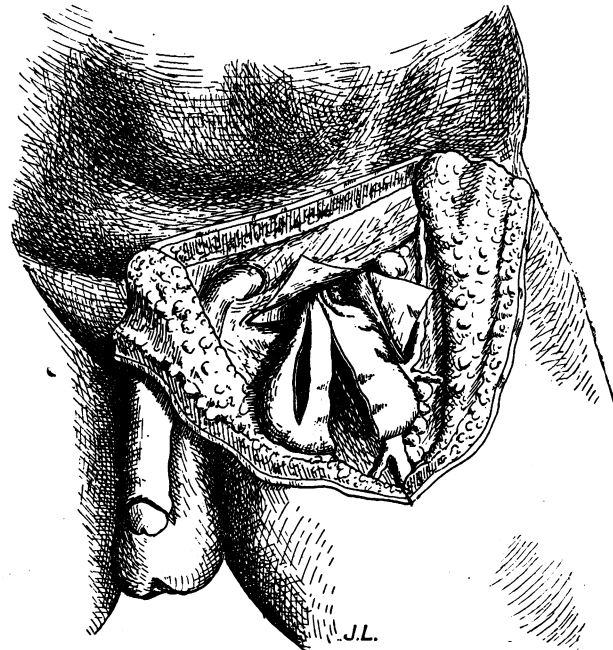4. Bisect the sac longitudinally from fundus to neck (Fig. 1).

Fig. 1.—Sac emptied, detached from surrounding parts, including internal aspect of abdominal wall for 1 in. round femoral ring; split longitudinally, and one-half incised for passage of the other.

5. Make an aperture in one-half near the neck (Fig. 1).

6. Interlock the halves by putting the other through the aperture (Fig. 2). In certain cases it lies better if previously twisted one-half turn on its longitudinal axis.

7. Reduce the whole sac through the femoral ring into the extraperitoneal space previously cleared for it by detaching its neck from the abdominal aspect of the ring. The sac thus lies bunched up within the abdomen, between the peritoneum and the transversalis and iliac fasciae over the internal aperture of the femoral canal.

Where the sac is unnecessarily large, part of it may be cut away before reducing it through the canal.

(B) *Closure of the Femoral Ring*:

1. Carry an incision (bone-deep) from the femoral vein along the pubic ramus to the region of the pubic spine. This divides the pubic portion of the fascia lata, the origin of the pectineus, and the periosteum. Its length will depend on the extent to which the femoral vein has been displaced outwards by the presence of the hernia, and will vary from a 1 in. to 1½ in.

2. Detach the periosteum to a limited extent, and retract it.

3. Drill the bone near its upper edge in two places, ½ in. to 1 in. apart (one drillhole may be made to suffice.) Any bone drill or punch may be used. In the illustration (Fig. 3) the simple hand drill, and the tongue-depressor used as a protecting spatula, are those I commonly employ.

4. Pass through one of the apertures a loop of stout catgut, or other absorbable ligature (Fig. 3). This may be passed by threading in the eye of a curved surgical needle, or by pushing it through, simply doubled on itself. It is, however, more easily passed by threading it in the eye of the bone drill or in the eye of an ordinary surgical probe. For the purpose

I employ a special probe in which the eye is small and placed very near the extremity of the handle (Fig. 4). The advantage of that shape and position of the eye will be obvious to those familiar with drills for wiring fractures, or to any one in his first performance of this operation. With such a probe the operation is of the simplest, without it some difficulty may be experienced in passing the sutures through the one aperture and withdrawing them through the other. The probe should be of the ordinary pliable type.
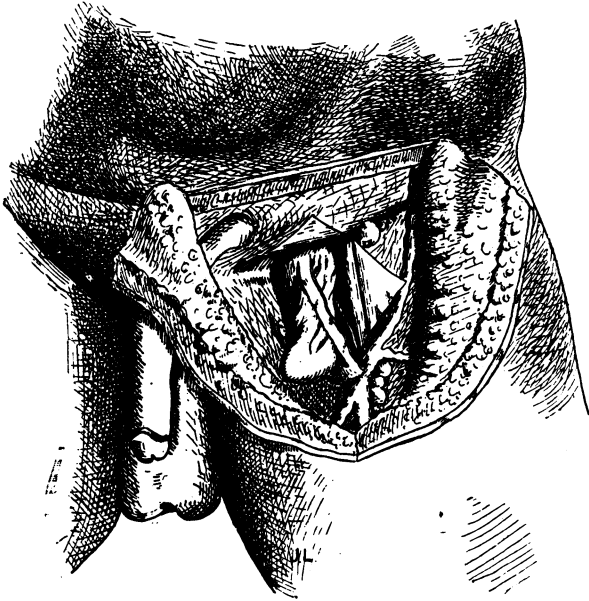
Fig. 2.—Sac ready for reduction, with halves interlocked. (The situation of the aperture in the sac in Figs. 1 and 2, and the relative positions of the two halves of the sac in Fig. 2, are not, in the interests of semidiagrammatic clearness in the drawings, quite those of actual practice.)
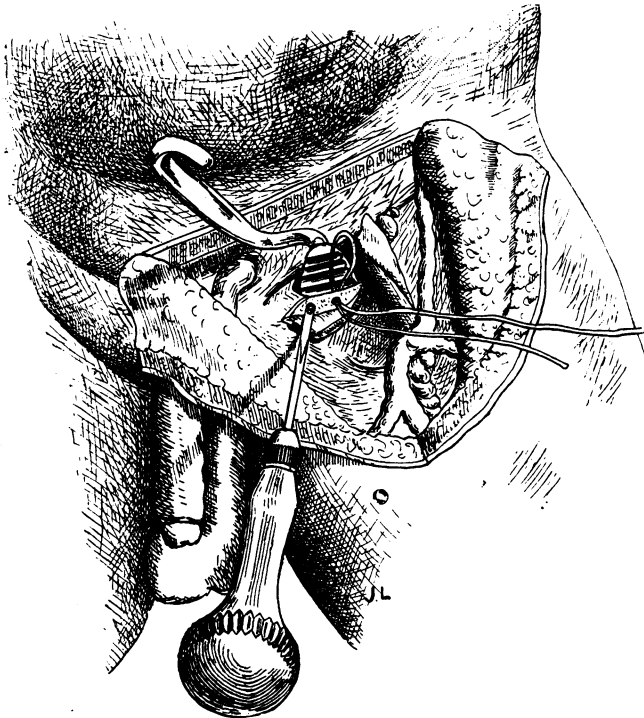
Fig. 3.—Closure of ring; drilling of bone; looped catgut suture passed through first drillhole.

5. Divide the loop of ligature. Thread one end in a large curved surgical needle and pass it as a mattress suture through Poupart's ligament. Unthread it from the needle. (Fig. 4).

Repeat this with the second end, carrying it through Poupart's ligament at a higher level (Fig. 4), avoiding the deep epigastric artery to the outer side, and, in male patients, the spermatic cord above. (In very large herniae the loops, instead of being placed the one directly above the level of the
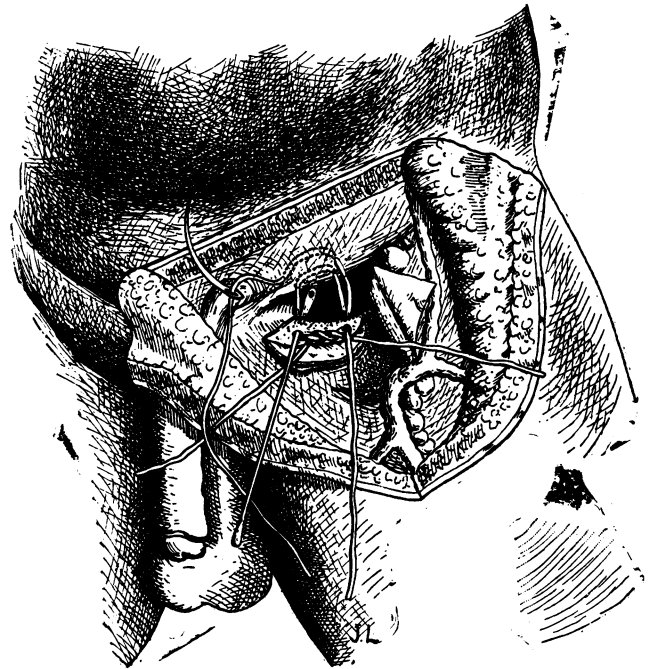

Fig. 4.—Closure of ring; placing of the loops in Poupart's ligament, and return of the ends through second drillhole. (One loop tied loosely to indicate action in pulling Poupart's ligament down to postero-superior aspect of ramus of os pubis).
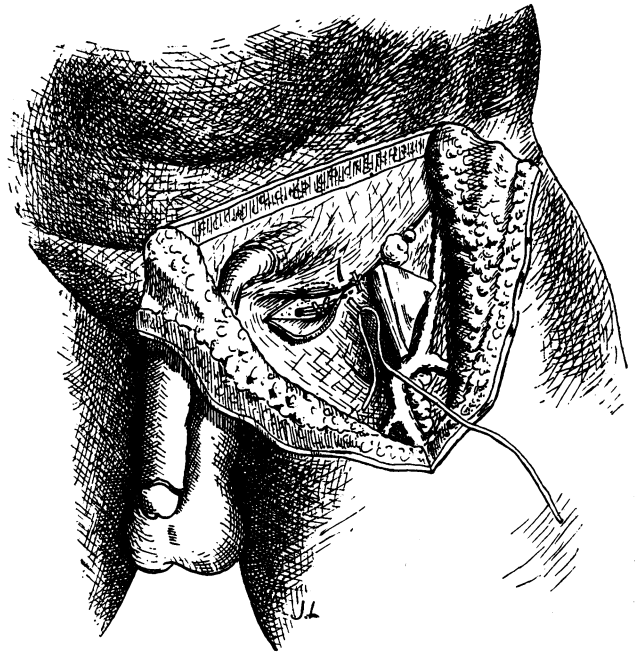

Fig. 5.—Closure of ring; bone sutures tied; completion of closure by suture of fascia lata and pectineus to the fixed Poupart's ligament.

other, as figured, may be made to diverge in the ligament so as to " gather in " the margin of the aperture.)

6. By means of the probe (into the eye of which the ends are threaded) withdraw both through the second drillhole in the bone (Fig. 4). It is in this part of the operation that the special probe is of particular advantage.

7. Tie the ends of each loop separately over the front of the bone, thus bringing Poupart's ligament down to the postero-superior surface of the bone and fixing it firmly in contact with that surface, constituting what is in effect an extension outwards of Gimbernat's ligament, and absolutely closing the femoral ring to whatever extent may be desired, due regard being had to the amenity of the femoral vein. The degree of occlusion is regulated by the position of the sutures in Poupart's ligament, not by the tension with which they are tied. This latter does not vary, the knots being tied in all cases firmly to bring the ligament into contact with the bone. (Figs. 4 and 5.)

8. To make the closure doubly secure complete the operation by uniting, by interrupted catgut sutures, the detached margin of the pectineal origin and the pubic portion of the fascia lata to the " anchored " Poupart's ligament (Fig. 5.)

Remarks.—The operation is easily performed. The first portion is simple by comparison with some of the known methods of dealing with the sac, while the second is no more difficult than many of the methods of suture employed in the closure of hernial apertures.

Method of Treating the Sac.—The manœuvre of returning the emptied sac through the canal of a hernia is not new. While descriptions of such operations may be found far back in surgical records, the practice was first put upon a formal footing by Sir William Macewen, and to his advocacy is due the general recognition of the great value of the buttress formed over the abdominal aspect of the ring by the puckered-up sac. Macewen, as is well known, puckers up the sac by a " gathering " suture which, passed through the hernial canal and out through the parietes, is made the means of puckering up the sac on the abdominal aspect of the ring. Variations of the technique by which Macewen's object is attained have been introduced by other surgeons (vide, for example, the operations of Davis [19] and Packard [20]), and the method described above is but one of these variations.

The absence of all sutures in the sac has three advantages:

1. The obvious saving of time.

2. Avoidance of the recognized risk of strangulation, and consequent sloughing, of the tied-up sac in the grasp of the ligature.

3. The facility with which the entire sac may be placed within the abdomen.

A suture emerging from the neck of a large sac may, while pulling the neck within the abdomen, by anchoring it to the parietes, leave the bulky fundus blocked in the canal. The absence of a suture permits the interlocked sac to be pushed as far within the abdomen as may be desired.

Against these advantages there is to be placed, I believe, only one disadvantage, and that a minor one, involved in the absence of suture, namely, that the fixing of the sac in position depends on the tying of the sutures closing the ring, and not upon a special sac suture, and that, therefore, it is necessary, particularly in cases where the patient has "strained" between the placing of the sac and the tying of the ring sutures, to verify and, if need be, adjust the position of the sac before tying the sutures closing the ring. Once tied, these sutures close the ring absolutely, and no prolapse of the sac into the canal is possible. In femoral hernia I have never seen any tendency of the sac to prolapse before closure of the ring, but have seen it in several cases of inguinal hernia. The explanation may lie in the fact that the inguinal rings are much more freely affected by "straining" or deep respiration than is the femoral.

Method of Closure of the Femoral Aperture.—In looking into the literature of the subject I find that Roux [21] has been also carrying out in the closure of the ring the idea of attaching Poupart's ligament directly to the bone, though employing a different method to attain that end, namely, the use of a ∩-shaped metal nail driven through the ligament into the bone. And it is somewhat surprising that a further search (so far as the regrettable decease of the invaluable *Index Medicus* permits such to be made) should reveal no other

references to the utilization of so conveniently placed a *point d'appui* as is offered by the pubic ramus for the closure of the femoral ring on the classic principle of restoring its boundaries to their correct, or to an over-corrected, position.

The method above described, and which I had been practising for some time before I learned of Roux's independent work, is, in my probably too partial opinion, preferable to that adopted by Roux, for these reasons:

1. Roux's operation involves the introduction of a metal foreign body. The subsequent removal of this, if desired, involves a second operation, with the risk of detaching the ligament from the bone in withdrawing the nail. Its permanent retention, on the other hand, involves the chance of the loosening of the nail by absorption (possibly necrosis) of the bone as occurs not infrequently with wire sutures in fractures. Should this occur, and the nail become dislodged from the bone by the natural pull of Poupart's ligament or otherwise, a state of matters is established in which every movement of the thigh or abdomen would menace the femoral vessels and the peritoneum with puncture by the points of the nail.

2. The method of suture employed in the operation I have described brings Poupart's ligament down to the postero-superior surface of the bone, attaching it there in the region of the ilio-pectineal line on the plane of Gimbernat's ligament, constituting virtually an artificial extension of that ligament. The effect of such an attachment, as a study of the anatomy of the region will show, is to occlude the femoral aperture at its extreme upper (inner) end (the plane of Gimbernat's ligament), thus shutting its mouth, instead of closing its throat as the attachment of Poupart's ligament to the superior or antero-superior surface of the bone does.

3. By varying the position of the two mattress loops of ligature, or by making them diverge, in Poupart's ligament it is easy to effectually close the largest femoral ring without exerting pressure on the femoral vein. The tension of the femoral sheath may be regulated with precision.

" Statistics " are not submitted. The operation was originally practised only for unfavourable or severe cases, though now employed in all. The intention to publish statistics of recurrence after hernia operations inevitably introduces the temptation to believe certain of the more severe cases unfit for operative treatment.

To the skill and kindness of Dr. John Lindsay, of Glasgow, I am indebted for the sketches forming the illustrations.

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RODENT ULCER: ITS PATHOLOGY AND TREATMENT.

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[ABSTRACT]

IN discussing the pathology of this disease I purpose confining my attention to what I may call clinical pathology—pathological phenomena observable during the progress of the disease, some of which have not been noticed, as far as I am aware, at least in textbooks. If this disease is to be treated on a scientific basis, we must ask pathologists to tell us what rodent ulcer is.

Is rodent ulcer an epitheloma of the skin pure and simple? The answer to this question is not forthcoming, and there are certain characters which appear to distinguish it from the latter.

1. Rodent ulcer is essentially a local disease, and does not show metastases either by infecting contiguous lymphatic glands, or manifesting itself elsewhere beyond the seat of
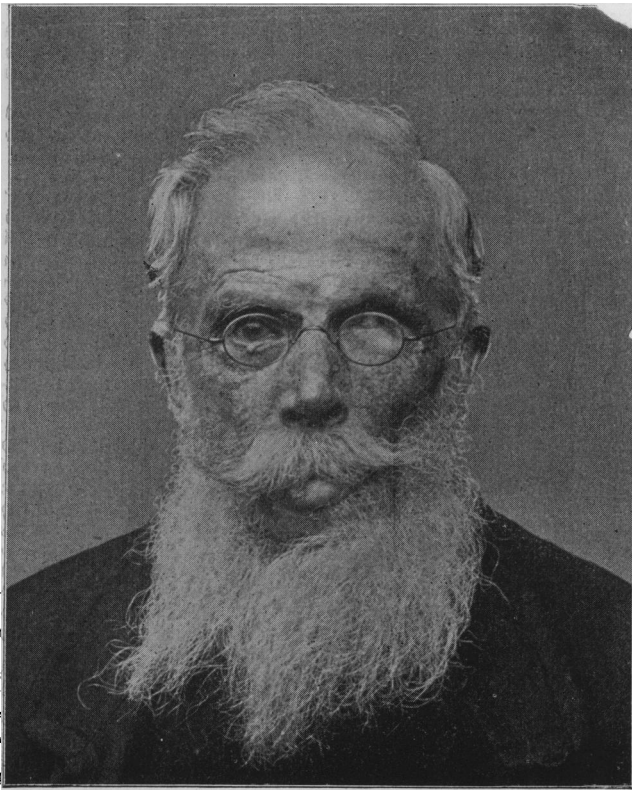
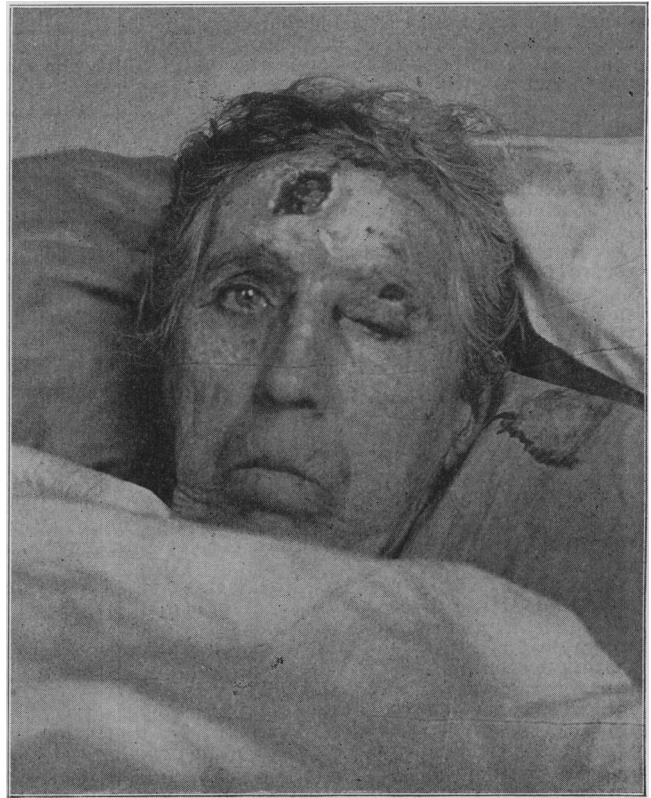Fig. 1.—Shows patient two years after treatment (Case I).

Fig. 3.—Shows patient at time of operation (Case II).

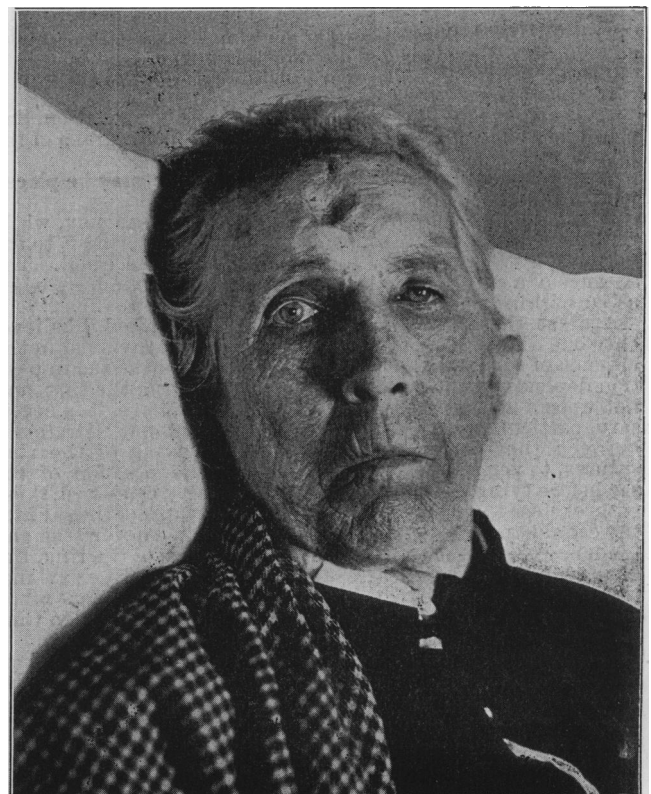Fig. 2.—Shows patient one year after treatment on readmission to hospital (Case II).

Fig. 4.—Shows patient after operative and formalin treatment on discharge from hospital, July, 1902 (Case II).
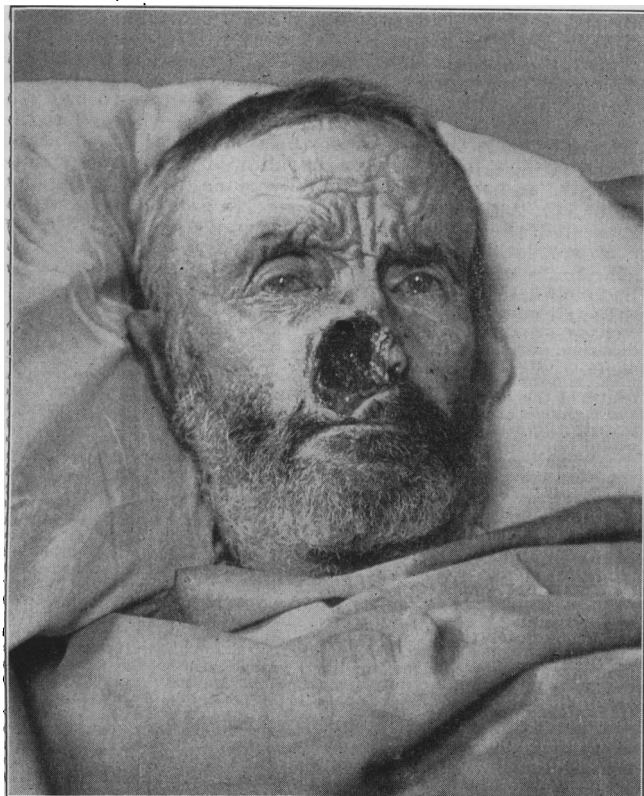
Fig. 5.—Shows patient on admission to hospital before treatment (Case III).
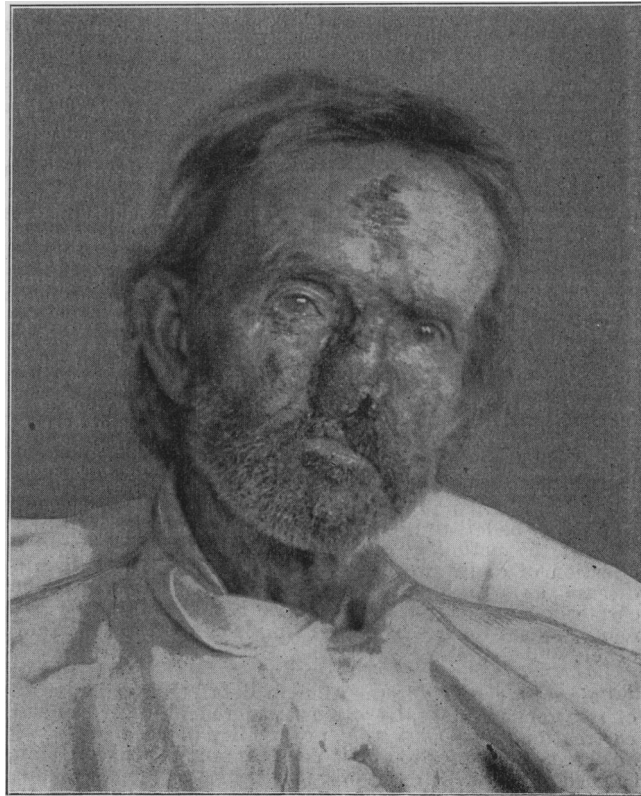

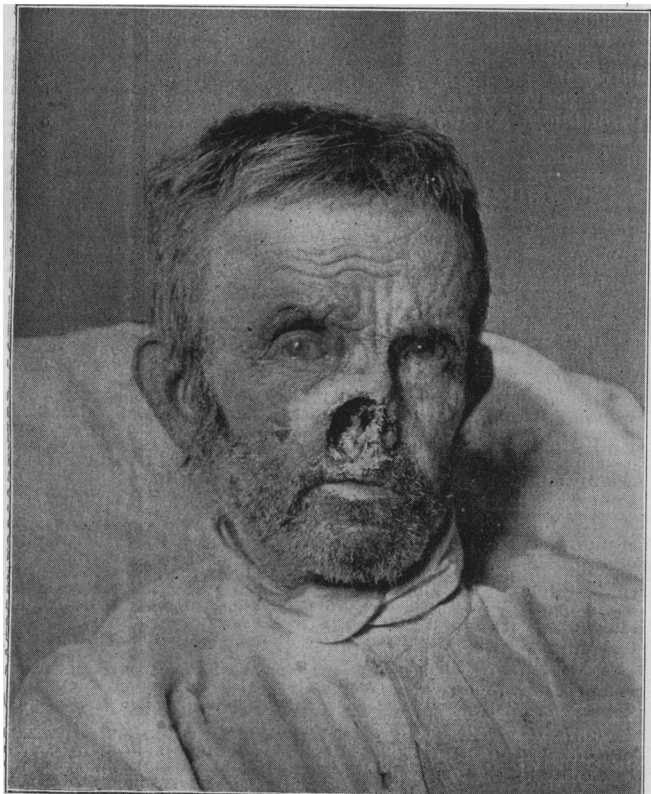Fig. 7.—Shows patient after plastic operation (Case III).

Fig. 6.—Shows patient two months after treatment commenced (Case III).

primary infection as occurs in all other forms of the carcinomata.

2. Even when left to follow its own free will untreated, it shows a marked tendency at some part to take on a reparative process, whilst progressing slowly but steadily in another direction.

3. During its progress—this, I may remark, is the result of my own observations—it shows a marked tendency to avoid hair follicles, and will almost go out of its way, so to speak, to follow another course.

Why this is so, if it be conceded, I can offer no opinion, unless perhaps it has a predilection for some particular tissue or cells.

I only know of one case, recorded, I think, by Sir James Paget, where rodent ulcer attacked the hairy scalp. The deeper layers of the cuticle are, as the disease progresses, attacked prior to the superficial or epithelial layer—as any one will readily perceive in removing with a scoop or curette the diseased margins, the deeper being soft and friable—a contrast to lupus for instance ; whilst the outer layer seems unaffected, giving rise presumably to the term "folded in," applied to these margins.

4. The exudate, which is so common an accompaniment as to be almost looked upon as pathognomonic of the disease, seems to me to have a tendency to produce a form of auto-infection. This statement, unsupported by proof, will, I have no doubt, not commend itself to many here or elsewhere ; nevertheless, I would ask you to look upon it as worthy of some consideration until such proof is at hand. This proof may, I hope, be furnished by inoculation with the exudate.

We may observe how the tendency is to extend downwards along the very course or channel this exudate follows. It is true there are exceptions to this rule ; that this course is not always diseased, and often when so, undergoes a process of repair ; but where the exudate is liable to accumulate, as towards the inner canthus of the eye, we almost invariably find a nidus of infection if the case is one of long standing ; possibly from its liquefying or macerating action on the tissues.

Again, is it not possible that the unsatisfactory results of

scraping or curetting alone are, in part at least, due to an auto-infection, the diseased portion infecting the raw surface? What the cause of this exudate is I am not quite prepared to say, but would suggest that the exciting cause is, or contains, the same " materies morbi " as causes the disease, acting as an irritant on the vessels, *plus* the same cause as gives rise to exudates elsewhere; for example, into serous cavities—namely, altered state of vessel wall, stases, want of external support, etc. Whatever be its cause, of one thing I am convinced, that the presence of this exudate is one of the best possible proofs that diseased tissue is still present.

5. All surgeons will, I think, agree that caustics or irritants, for example, nitrate of silver or zinc chloride, applied to truly carcinomatous growths, produce a very injurious effect by stimulating the cells to increased activity, and markedly exaggerate pain, whilst if the same be applied to rodent ulcer, the effect is in many cases to retard the growth. This one fact alone should justify one looking upon rodents as distinct from the carcinoma.

6. I need only mention the marked difference in the rate of growth between truly malignant neoplasms and rodent ulcer.

Histologically also there are differences; but the time at my disposal will not permit me to say more than that these had better be left to the pathologist.

Until the pathology of the disease is placed beyond the question of doubt, we might—whilst still looking upon the disease as closely allied to the genus carcinoma—more correctly consider it as intermediate between the truly malignant diseases on one hand and simple or specific ulcer on the other.

TREATMENT.

Before proceeding to mention in detail the particular form of treatment I adopt, let me ask: Is rodent ulcer amenable to treatment without the probability of recurrence? My answer to this question is " Yes," as much so as any simple or specific ulcer. This answer I give not under the belief or impression that there are not other means of treatment which, if adopted with a firm belief in their beneficial properties might, and I am sure would, prove efficacious, but I submit the treatment I am about to mention has some claim to recognition. The results may, I hope, justify my conclusion.

I shall first briefly mention some of the recognized means that may have been adopted with a fair amount of success. These may be divided into operative and non-operative. Of the operative the electro-cautery or thermo-cautery is, I consider, the best. Removing the diseased portion with the knife or curetting is, *per se*, by no means reliable or satisfactory; but, on the other hand, cautery, though giving good results, is not always applicable. Of the non-operative, chlorate of potash, salicylic collodion, zinc chloride, silver nitrate are, I think, best. You are aware that of late the Finsen and *x* rays are greatly in request, and may ultimately take their place as recognized adjuncts to others; but so much time and trouble are required, and so many exposures necessary, that I fear they can never, except in isolated instances, become practicable as routine treatment. Besides, they are beyond the reach of the general surgeon or practitioner, by whom only in many instances early treatment is possible, and, of course, early treatment must give the best results.

The treatment I adopt in case the ulcer is not very large or easily accessible is, in the first instance, pure formalin; if a second or third application seems necessary later, formalin glycerine 30 to 50 per cent. with or without tannin.

In case the patient objects to be anaesthetised, I first use a local anaesthetic, either cocaine, eucaine, or, better still, acöine, giving a hypodermic of morphine five or ten minutes after using the application if the pain is very severe. After this the patient is generally asleep in fifteen to twenty minutes.

In cases where the disease is of long standing and likely to involve bone or be accompanied by the extensive destruction of tissue, or if not readily accessible, as in Cases II and III, I prefer to anaesthetise the patient and remove by knife or curette all diseased tissue and apply as a styptic either powdered tannin or suprarenal gland extract to stop oozing and facilitate the formation of eschar, and then use formalin or formalin glycerine, keeping the patient fully under the anaesthetic for

about five minutes afterwards. When the formalin is applied it should not be allowed to evaporate. If pure formalin be used in the first instance I rarely find a second or third application necessary, unless to some isolated patches, but I should strongly recommend any person not to hesitate to use it as often as may be necessary to remove all diseased tissue. Herein consists the success of the treatment. The blackish slough which forms should be allowed to separate spontaneously, and may be assisted by some non-irritating ointment, etc. After, or very often before, this slough or eschar has separated, the granulations will sprout up and, if healthy, grow vigorously. The rate of growth of the healthy margins is sometimes marvellous. In Case II fully two square inches had completely covered in about fourteen days.

I shall now briefly give notes of cases treated:

CASE I.—M. G., male, aged about 70 years. The ulcer was of five years' duration, during four of which he had been treated at intervals by an eminent City surgeon. I saw him for the first time in June, 1900. The ulcer, the surface of which was about one square inch, extended from the centre of the forehead to the root of the nose and the inner canthus of the right eye along the fronto-nasal junction. He had been advised by several medical men to have it removed by the knife; to this, however, he would not assent. After rendering the part anaesthetic by a mixture of cocaine and eucaine, I applied a piece of gauze, just large enough to cover the ulcer, soaked in pure formalin, allowed it to remain for a few seconds, then covered over with a small portion of oiled silk, and applied a bandage. In about twenty minutes he was able to walk to his home, about a quarter of a mile distant. He informed me on his next visit that he spent the evening and the greater part of the night walking up and down his bed room floor to try and keep the pain under control. I saw him afterwards at intervals of three or four days, and applied some simple ointment on each occasion. In about two weeks the eschar separated, and soon after I applied a second application as before, but to a portion only, and to one or two spots where the margin seemed indurated a third and fourth application. After this it was left to heal, a process that was completed about the second week of July (a period of six weeks). He attended to his duties as an attendant in a library during the entire time of treatment. In this case I did not use morphine. I much regret that a photograph of this and the following case was not taken before treatment.

The accompanying photo, Fig. 1, which was taken one month since—June of this year, just two years after treatment—shows a very slight scar with not the slightest sign of recurrence; in one portion the scar tissue seems replaced by what looks quite normal tissue. I may remark that the general scars on the cheeks and face are the result of a burn received when a child.

My reason for trying formalin in this case was the hopeful results I had previously obtained in another case of inoperable carcinoma of the neck. Previous to this I had not heard of its being used successfully or otherwise in cases of rodent ulcer.

CASE II.—Mrs. B., aged 65, was sent up to me from the country by Dr. McQuaid, of Co, Cavan, she was admitted into Mercer's Hospital, July, 1901. The ulcer of over fifteen years' duration was situated on the forehead, and extended from ¼ in. from the margin of the hair to the root of the nose. About 2 in. by 1½ in. from the lower margin of the ulcer a disease track about ⅛ in. wide, extended along the root and side of the nose to the inner canthus of the left eye, engaging a small portion of the upper eyelid behind the ciliary margin. An isolated patch was situated on the nose near its base. She declined to be put under a general anaesthetic. I applied the same treatment as above on two or three occasions, substituting formalin glycerine with tannin on the second and third occasions to minimize the pain. There was a good deal of headache, some occasional rises of temperature and oedema of the eyelids after each application. About the end of the second week a considerable portion of the frontal bone came away with the eschar, leaving the meninges exposed. I then strongly urged her to allow me to examine the diseased bone under an anaesthetic, but she persistently refused. She left hospital on August 10th, 1901, the entire wound having completely covered over, but a small portion of indurated tissue remained over the eyelid and along the side of the nose. She had promised to return should the disease recur, which she did in May 28th of the present year (Fig. 2 which was taken on her return, May, 1902).

I was agreeably surprised to find the wound on the forehead still healed with no sign of recurrence of the disease, except a small patch at the margin of the eyelid. But beneath the scar tissue covering the cavity left by the removal of diseased bone could be felt and seen a small puffy, fluctuating swelling, and the edge of the bone projecting and giving the feeling as if another portion of it had become semi-detached. This time I was able to persuade her to allow herself to be anaesthetised, otherwise she was informed no further treatment would be undertaken. Accordingly on the following day under anaesthetic I laid open the scar for about three inches, exposed the bone, and opened the dura mater and evacuated about 1 oz. of clear fluid, resembling the exudate previously referred to. The bone was then scraped where it appeared unhealthy, the edges nipped off by a bone forceps, pure formalin was applied to the bone and the incised edge of the dura mater, the wound dressed and allowed to heal by granulation; this took some time as it was ¾ in. deep by 2 in. in diameter either way. The photograph, Fig. 3, will give a fair idea of the extent of disease at the time of operation. The wound healed by granulation. The infected patches which returned on the nose and upper eyelid have also completely healed. I have no doubt she is quite free from any recurrence. Photograph (Fig. 4) was taken in July and shows wound healed.

CASE III.—This patient presented himself at the out-patient department of Mercer's Hospital, May 29th of this year, a pitiable sight; he had sought admission elsewhere, but was told nothing could be done for him. He gave the following history: About five years since noticed a small pimple on the side of his nose, which itched and annoyed him occasionally, causing him to pick it with his finger nails; it continued to

spread. He was treated first at a dispensary in Limerick for six months, next at St. John's Hospital of the same city as an extern for about a similar period. He states he was treated by nitric acid in the first instance, but subsequently was treated for lupus and scraped. Later he found his way to Dublin, and was treated at Richmond Hospital where he was "scraped"; returned again to Limerick, was again treated as an out-patient at St. John's Hospital and continued so until he returned in May to Dublin.

The accompanying photograph Fig. 5 gives a fair idea of his condition when I saw him. As the appearance to the naked eye closely resembled lupus I decided before beginning treatment to have a section examined histologically; this Professor McWeeney was good enough to do, and pronounced it a typical case of rodent ulcer. You will observe that the greater part of the upper lip, including the portion of bone underlying the cartilages of the nose and soft parts covering them, had disappeared, except a flap on the left side; the bony framework of the nose was extensively involved; the disease appearing to have extended to the posterior nares and upper part of pharynx I told him that his case seemed well-nigh hopeless, but if he was able and willing to suffer pain and left himself unreservedly in my hands I would try what could be done. This he accordingly did.

Like the other patients he would not consent to be anaesthetised, so I used a spray, containing equal parts of formalin and glycerine and tannin, to the nasal cavities; this Pure formalin to lip and edges of wound, having previously applied a solution of acöine. The pain seemed intense, I gave him a hypodermic of morphine a few minutes after, he was soon free from pain and asleep. A few days afterwards a further application was necessary. He was anaesthetised with ether, the diseased portions including the bones—as far as could be reached—thoroughly scraped, the indurated edges trimmed with a knife. A solution of suprarenal gland extract applied to stop oozing, then pure formalin applied as before mentioned. The inhaler was again applied for a few minutes and he was then dressed and retired to bed.

As this was the first time I had used formalin with an anaesthetic, I had some serious misgivings as to the result, formalin being so volatile and ether no less so—and both coming in contact—nor had I previous knowledge or experience to guide me, but the results were all I could desire; by the time he had recovered from the effects of the anaesthetic there seemed to be no pain. That patient, although 65 years old and very feeble and infirm, showed not the slightest unpleasant or dangerous symptom. Case II, referred to above without any ill effect, was under ether three-quarters of an hour. This case is still under treatment, but almost quite well, except for the deficiency which exists.

It may be asked what special action has formalin in such cases. My opinion is that the nucleus of the cell with which it comes in contact is destroyed—disintegrated if you will—and so mitosis stopped; hence proliferation of these cells ceases; that it has some such effect even on truly malignant growths I have very little doubt, without in the least degree interfering with or impairing normal cells, but rather assisting the formation of scar tissue.

To summarize briefly: I have tried or seen almost all other methods of treatment that have been adopted, but do not consider that any other recognized method will give as good results. The scar tissue that forms is smooth, does not contract, and soon comes so closely to resemble normal tissue as to be almost indistinguishable (see Photograph 1).

Formalin is practically non-toxic. This I have proved—at least to my own satisfaction—by injecting 25 minims of pure formalin into a large inoperable carcinoma of the neck without producing any injurious effects.

The time required for treatment varies, of course, with the extent of the disease, but may be put down as from one to two months. when the wound is allowed to heal by granulation: much less time might be required if a plastic operation were done. The extreme pain which in the first case I found to be a very serious obstacle can be readily overcome by anaesthetising the patient.

How formalin stops all proliferation in diseased or tissue malignant growths. without destroying the vitality of normal cells, may seem incomprehensible; that it does so I am fully convinced. The answer is easy if we admit a parasitic origin, without it difficult.

Since writing the above the author desires to say that he has had very encouraging results in the treatment of truly malignant growths.

THREE CASES OF HOUR-GLASS CONTRACTION OF THE STOMACH, TREATED BY OPERATION.

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THE following are the details of three cases of hour-glass contraction of the stomach treated by operation.

CASE I.—E. B., aged 37, a forewoman in a clothing shop, had suffered from indigestion since the age of 15. This indigestion was at first of very indefinite character, and consisted principally of pain in the pit of the stomach and in the middle of the back, with occasional nausea. But eight or nine years before I saw her the symptoms gradually became much worse, so that on two occasions the stomach pump was used, but without good result. About a year before operation postprandial vomiting began. This came on about three hours after a meal, and on two occasions it consisted of several ounces of pure blood. She had twice been in a hospital, where she had obtained temporary relief. Of late she had been rapidly growing thinner, and during the last five months had lost 2 st. in weight. Three weeks before I saw her she came under the care of Mr. W. B. Hope, who recognized that there was some stenosis of the upper digestive tract, and sent her to me for operation.

She had then become much emaciated, and complained of pain coming on directly after food and radiating from a spot about 1 in. below and 1 in. to the left of the ensiform cartilage. There was no obvious tenderness on pressure. Pain was also felt over the tenth dorsal spine. She was sick from three to four hours after every meal, bringing up partly digested food. The vomiting was rather welcomed than otherwise on account of the relief which it gave her.

On examination the area of stomach resonance did not appear to be increased, and it was not possible to make out any peculiarity in the shape of that organ. On listening with the stethoscope after water had been given no gurgling could be detected, but splash sounds were loud and easily obtained. A diagnosis was made of gastric ulcer situated probably at the pyloric end and giving rise to stenosis. Owing to the persistent and intractable character of the vomiting and to the rapidly increasing emaciation an operation was advised. The abdomen was opened by means of a 3 in. vertical incision, an inch and a-half to the left of the middle line. It was at once seen that an hour-glass contraction existed, and that it was situated about the middle of the length of the stomach. Both the sacs into which that organ was divided were dilated but to no great extent, the upper being much the greater of the two. The contraction was very pronounced. It appeared to be of the nature of a congenital malformation, for no fibrous bands were present and no puckering was visible. On the lesser curvature, about ¼ in. to the cardiac side of the contraction, was a congested area which marked the site of a small superficial ulcer. An incision was made across the contraction 4 in. in length, so that it cut across this red patch. Before completing it the finger was introduced in order to feel the size of the contraction, when the opening was found to be so narrow that it would with difficulty admit it. There seemed to be no contraction of the pylorus though the pyloric ring felt unusually hard. The contents of the stomach were washed out. They consisted of half-digested bread and milk, which she had taken nearly four hours before, and among this was mixed a quantity of currants, grape skins, and other débris. The longitudinal incision was now turned into a vertical one. No mechanical appliances were used to keep the opening patent. About eighteen fine silk sutures were used after the manner of Lembert.

The patient was only sick once after the operation. Two large rectal injections of hot water were given during the first eighteen hours, and then hot water by the mouth. About thirty hours after the operation, food was given in the form of decoction of raisins; on the next day cream and water were added, and at the end of the week dry biscuits. Fatty, starchy, and sugary foods were selected during the first fortnight. A nitrogenous diet was then gradually added, until, four weeks after the operation, the patient was taking food of all kinds, some of it being such as she had not ventured to take for more than fifteen years. The operation was carried out 2½ years ago, and the patient seems to be cured of her dyspepsia, but has occasionally "bilious" attacks which last for about twenty-four hours, and are attended with headache and vomiting.

CASE II.—Miss L., a governess, aged 38, had suffered from dyspepsia for so long as she could remember. During the last six or seven years it had been gradually getting worse. She had at different times consulted several doctors, but without permanent relief. I first saw her eighteen months ago. To me her appearance as she came into my room was highly suggestive of obstructional dyspepsia. She was slightly sallow and anaemic, and had that half anxious, half weary expression which one has noticed before under similar circumstances. On questioning her, I found that there was hardly any abdominal pain, but what she most complained of was a sense of fullness over the upper part of the abdomen, which was greatly relieved by vomiting. This vomiting set in, as a rule, from three to four hours after meals. The vomiting was almost always watery in character, and contained neither froth nor food. There was a decided excess of hydrochloric acid. Usually 4 or 5 oz. were brought up. On making an examination, there did not appear to be any marked increase of stomach resonance; and no tumour could be felt at the pylorus. There was a very evident splash sound. On inflating the stomach by first giving sodium bicarbonate and then citric acid after the manner advocated by Mr. Moynihan, a conspicuous alteration took place. The outline of the lower border of the organ appeared to sweep without a break and with its usual curve from the splenic flexure to the left hypochondrium, cutting across the middle line about 2 in. above the pubes. Notwithstanding that this evidence was against the view of the case being one of hour-glass contraction, a diagnosis was made of stenosis of the stomach, due either to that cause or to some growth at the pylorus. As the patient had undergone so much medical treatment and was eager that something should be done for her relief I advised operation. After Dr. Abram had given ether a vertical incision of 3 in. in length was made in the middle line. A contraction was found which divided the stomach into two sacs of very unequal size, of these sacs the upper one was by far the larger. It was evidently much dilated, for on being withdrawn its voluminous walls fell together in folds. It was this dilated upper portion of the stomach which had been inflated by the gas. The lower sac would probably not have held more than 3 oz. or 4 oz. There was no scar nor adhesion nor any sign of ulceration. The contraction appeared to be of congenital origin. It was too narrow to admit a larger finger than the little one. The pylorus admitted the finger with ease. On washing out the upper cavity no undigested débris of food escaped as in the last case. This was probably owing to the very careful habits of the patient, who had scrupulously avoided all but the most digestible foods for many years. The constriction was treated as in the last case, and the after-treatment was similar. Recovery took place without a bad symptom and one month after the operation the patient was taking pork, cheese, cucumber, and other indigestible foods without producing indigestion. But this patient also, like the last one, suffers from severe bilious attacks. She had been subject to them at long intervals for many years. When she had fully recovered from the operation they gradually became worse. Now they recurred about once a fortnight and caused much distress. They began with a severe headache and ended in repeated attacks of vomiting. Nothing but watery material was brought up. In spite of them the patient has increased remarkably in general well-being. She has lost her sallowness and has become ordinarily plump and can take any food with impunity.

CASE III.—This case has already been incidentally referred to in an article written for the *Guy's Hospital Reports* (vol. liii, p. 103) on the subject of operations for imperforated ulcers of the stomach, but the hour-glass contraction was of such a remarkable character that it deserves to be treated of on its own merits. The patient was a domestic servant of the age of 32, who had suffered from symptoms of gastric ulcer since the age of 18. The history of her life since the latter date was, in the main, one of long periods of dyspepsia

of nausea, vomiting, pain, and bleeding, one or other of which was never absent, though there were occasional periods of comparative ease. Her aspect was one of extreme dejection, and she had been under treatment by so many doctors and with such little success that she despaired of ever being well again. Her work had been so often interrupted by the necessity for rest that, were it not for the philanthropy of a former mistress, she would have been unable to obtain a livelihood.

The symptoms of the previous three or four years had apparently been those of obstruction at the pylorus, for one of her most harassing trials was the vomiting of enormous quantities of liquid. These vomiting attacks followed a regular sequence : First came a period during which she felt comparatively well and could eat food, then came a period of epigastric pain and anorexia, ending at last in copious vomiting and relief. The fluid brought up was not often mixed with undigested food. It sometimes contained a black sediment. During the three months that she was under my observation I found that it frequently contained blood, though never in large quantities. One symptom which much puzzled me at the time was an occasional gurgling, which was very distinct and very different from the usual intestinal gurgling. It seemed to bear no relation to position, or to fullness or emptiness of the stomach.

I found that the patient was best when in bed and fed almost solely by the rectum, but that whenever mouth feeding was resumed, were it only with milk and thin farinaceous foods, the pain and vomiting were certain to recur. Large doses of bismuth certainly relieved the pain, but had no effect on the vomiting. After treating this patient for some three months without making any real headway, she was told that her only hope lay in an operation, and to this she consented with alacrity. I thought at the time that she was suffering from stenosis of the pylorus, and that the ulcer which caused the stenosis was still unhealed. But at the operation a much more complicated condition was found.

In the first place, the stomach was so bound down by adhesions that it was impossible to explore more than a few inches of its outer surface. Secondly, it became evident, on cutting into it, that there was no obstruction at the pylorus, but that the stomach was hour-glass shaped, the upper part being much larger than the lower (see figure). The stenosis
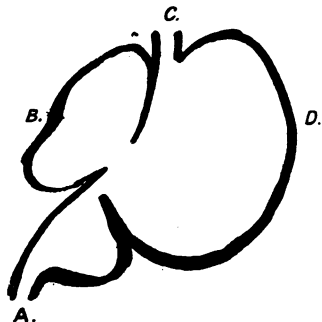
A, pylorus; B, subdiaphragmatic pouch; C, oesophagus; D, cardia.

in fact occurred between the two compartments, and was so complete that one could only force one's finger into it, and then with difficulty. The septum between the two divisions of the stomach was found to be so steep that it seemed impossible that any food could ever have found its way through the opening except when the upper cavity was full, or when it was squeezed through the opening during the act of vomiting.

On turning the finger upwards a third anomaly was found. This at first appeared to be a third compartment to the stomach, lying between the lesser curvature and the liver and diaphragm, for on bending the finger into this part it ran into a cavity which was far too extensive to be explored, except at its junction with the stomach. It appeared pretty certain that an ulcer had at one time existed at this spot, that it had perforated and ultimately formed an adventitious cavity into which the contents of the stomach had probably made their way during vomiting, and perhaps on other occasions. No active ulcers could be found. It was noticed that the intestines were very small and thin walled. The stenosis was dealt with after the manner devised by Heinike and Mikulicz. The incision permitted all four fingers to be introduced through the passage. The first part of the stomach was then explored for ulcers, but none were found. It was, however, so distended that only a very small part of it could be touched with the fingers. The wound in the stomach was sutured with horse-hair, but the tissues cut through were so stiff and cartilaginous in consistency that there was some fear lest leakage should occur, though the wound seemed to be well closed; a small drainage tube was therefore used.

The patient soon recovered from the operation and after two days was fed from the mouth. On the fifth day there was a little vomiting and the vomit contained some altered blood. The patient was kept on her right side, so as to facilitate the passage of food into the intestines. No vomiting of any quantity now occurred, but there was slight emesis now and again, and the vomit always contained small quantities of blood. Pain was still felt after food, but to a less degree. The wound healed well, and sixteen days after the operation the patient was allowed to go home. She was improving rapidly, was taking food well, but was still giving rise to anxiety by the continuance and character of the vomiting. Owing to this cause, though she was allowed to sit up, she was kept at rest, and food was restricted to easily-digested slops. Bismuth was also given. She continued in this condition until exactly a month after the operation, when I was hurriedly sent for, and found that she had suddenly felt faint, and a few minutes afterwards had vomited large quantities of black vomit. Haemorrhage continued despite all efforts to stop it, until she died on the next day.

On examination after death it was found that the external wound had healed completely, but that the wound in the stomach was still unhealed in one part. This was where the cicatricial tissue was thickest. Three

very chronic-looking ulcers were found in the dilated first part of the stomach. The adventitious sac which existed above the stomach had partially filled since the operation, but was still perceptible. The source of the haemorrhage was apparently the unhealed part of the wound which had been made in the septum between the two stomach cavities, though no actual source of haemorrhage could be found. The contraction itself seemed to be of the nature of a malformation, for no scars of ulcers could be detected upon it, and it appeared to be too uniform to be due to cicatrization. Very little blood was found in the intestines. The body was much emaciated.

REMARKS.

The ideal operation for the treatment of hour-glass contraction of the stomach is one which removes the deformity and restores the organ to its natural shape. This must, of course, be almost impossible because the risk to the patient of carrying out such an extensive plastic operation would more than counterbalance the good to be obtained from it. Perhaps the nearest approach that is feasible towards this ideal is the simple and effectual method of Heinike and Mikulicz. This was the operation which was carried out in these three cases. Properly performed, this operation should be as effectual as the complete restoration of the stomach to its normal shape. To ensure success the transverse incision must be of such a length as that when it is turned into a vertical one most ample room is left, not only for the passage of the stomach contents, but for future contraction.

It is of equal importance that those two frequent complications of hour-glass contraction, namely, gastric ulcer and stenosis of the pylorus, should also be dealt with. In the second of these two cases, though the contraction was of extreme degree, no ulcer could be found, and in none of them was there any stenosis of the pylorus worthy of the name. This is remarkable because of the frequency of this complication, and especially in view of the fact that in two of the cases there appeared to be slight dilatation of the lower sac of the stomach.

The operation which was done in these cases seems to me decidedly preferable to any operation which has for its object the short-circuiting of the upper pouch of the stomach into the intestine. Such a procedure has its own special dangers, and leaves the stomach even more deformed than it was before. It is true that no evil appears to result from this distortion, but it cannot be said that we have complete knowledge on this subject. I have not heard that any observer has followed up any number of these cases in order to ascertain what eventually becomes of them.

In regard to the mortality of the operation, Mr. Mayo Robson has collected together 13 cases, of which 11 recovered. I am indebted to Mr. Moynihan for his valuable paper on the same subject.

TWO CASES OF URETHRECTOMY FOR TRAUMATIC STRICTURE.

By J. Lynn Thomas, C.B., F.R.C.S.,

Surgeon to the Cardiff Infirmary; Consulting Surgeon to the Hamadryad Hospital, Porth Hospital, Bridgend Hospital, and Cardiff Provident Dispensary.

Excision of traumatic strictures is not quite so popular an operation amongst surgeons as it deserves to be, and I think that the after-treatment as described by the authorities whom I have consulted may be simplified without risk and also with great advantage to the patient's comfort. The operation in the two cases in which I have performed it was carried out in the following manner :

The healthy corpus spongiosum urethrae was completely severed on each side of the stricture; the exsected stricture and its mucous membrane were thoroughly removed. The edges of the dorsal surface of the corpus spongiosum were first brought together by means of interrupted catgut sutures passed right down to the mucous membrane—carefully avoiding penetration of it—in such a manner that the knots were on the periphery of the corpus spongiosum, and never within or next to the canal. I consider this manœuvre of importance in diminishing the risk of extravasation of and the infection of the suture holes by urine. After completion of the anastomosis of the corpus spongiosum urethrae, the fascial layers were laid over it by buried sutures, the skin was approximated by its own sutures, and a collodion dressing applied. No drainage and no instrumentation of the bladder

was performed afterwards, the patients being allowed to empty the bladder voluntarily. In my first case I tested hydrostatically the integrity of the anastomosis by forcing water into the bladder by means of a glass syringe placed in the meatus. No instrument of any kind was passed into the bladder for at least six months after the operation, and then only to test the patency of the canal.

Freyer, in his highly practical book, *Stricture of the Urethra and Hypertrophy of the Prostate* (second edition, 1902) states on page 57 that "the edges of the upper aspect of the urethra are first approximated by means of two or three catgut sutures passed through the mucous membrane and submucous tissues, and tied within the canal." I believe that this plan is open to adverse criticism on account of a foreign body being left within the canal, and also on account of the holes made in the mucous membrane. Later on Mr. Freyer says: "A gum-elastic cylindrical catheter, No. 12 English scale, is then introduced through the meatus as far as the bladder and secured there," and "should not be removed for three or four days, when it is replaced by another of similar size. This second catheter should be removed on the third or fourth day. A steel dilator is passed once a week at first, and then at more distant intervals." I believe that the tying in of a catheter is quite unnecessary, and can be only productive of harm by causing local and general irritability, as well as by encouraging sepsis. I also fail to appreciate the use of a steel dilator at the period suggested. Hurry Fenwick, in his *Epitomies of Urinary Surgery*, quotes Vignard's opinion about the details of the after-treatment of resection of the urethra for traumatic stricture, namely: "Drainage is not necessary in most cases, but a retention catheter should be left in for six days." I would venture to quote the opinion of Manley on this subject, as I consider that it is a distinct step in advance of the foregoing in the after-treatment of urethrectomy. In Vol. XVII of the *Annals of Surgery*, pages 184 and 186, he states about his first case: "Had our man not had incontinence of urine, I believe it would have been better to have catheterized intermittently than to have established drainage." In his second case Manley drew off with the catheter "the patient's urine as often as appeared necessary."

Considering the present success following the careful performance of resection with anastomosis of portions of the alimentary canal by means of a needle and suture, one cannot help thinking that it is a retrograde step to drain the bladder in cases of resection with anastomosis of the urethra, the conditions being infinitely more favourable against the immediate and continuous contact of septic material with the restored lumen of the urethra than it is with that of the intestine.

I will briefly relate the main features of my two cases.

CASE I.—A middle-aged man was sent to me in 1897 by Mr. J.H. Davies, J.P., Port Talbot, with an impermeable traumatic stricture situated near the junction of the penile and perineal urethra. He was operated upon in the manner described above, and the excised portion of the urethra (a complete cylinder) measured ¾ in. on its upper, and ⅛ in. on its inferior surface. He was at the infirmary for a fortnight. I examined him with the aëro-urethroscope nearly two years afterwards, and a narrowing of the canal at the site of the operation was seen, which would admit No. 11 English bougie without any trouble.

July 29th, 1901.—Mr. Davies reports on this case that he has examined the patient during this month, and that he is urinating normally, and has not had any trouble since the performance of the operation five years ago.

CASE II.—Operation January 2nd. 1902. A man, aged 58, had a traumatic stricture further back than in Case I, and was sent to me by Dr. Shepherd, who failed to pass anything through the stricture. He was then treated by another medical man, who got a full-sized instrument into the bladder, but this was followed by rigors.

When I operated upon the patient I found that a false passage had been made by the side of the stricture, outside the bulbous portion of the urethra. The stricture was in the bulbous portion of the urethra, and I excised 1 in. of the urethra, and anastomosed the corpus spongiosum urethrae. There was no catheter or drainage used on account of the large size of the canal. The wound healed by first intention. The first time an instrument was passed was on July 15th. The meatus would not allow the passage of a larger instrument than No. 25 bougie (French) (that is a fraction over No. 13 English), and it passed into the bladder without the slightest obstruction. A result eminently satisfactory.

MODIFIED VULLIET'S NEPHROPEXY SIMPLIFIED BY THE USE OF A SWIVEL-TENOTOME.

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SINCE Mr. Henry Morris alluded to Vulliet's nephropexy in his instructive Hunterian Lectures in 1898 I have performed the operation ten times. The result of the operation with regard to the fixation of the kidney appears to be in my cases very satisfactory, but whether it is superior to other methods I am not prepared to argue. Vulliet's nephropexy, in a word, is the fixation of the kidney by means of a detached strip of the tendon of the erector spinae, passed through the parenchyma of the kidney, returned and fixed in the small separate incision made by the side of the first lumbar spine.

My first three cases were followed by haematuria, a condition to be avoided if similar ends can be reached without damaging the secreting renal tissue. In my second operation, whilst forcibly tugging at the tendon in order to detach its upper end, the lower one unexpectedly gave way, which of course was too short for the purpose, and it necessitated the separation of another slip of the erector spinae tendon; this accident and the occurrence of haematuria made me modify the technique of the operation. Opportunities of trying different appliances for dividing the tendon were afforded me by my friends, the late Professor Alfred Hughes and Professor Dixon. I found that this can be done by means of the instrument represented in Fig. 1. It is simply a small swivel fixed to a long delicate handle. The
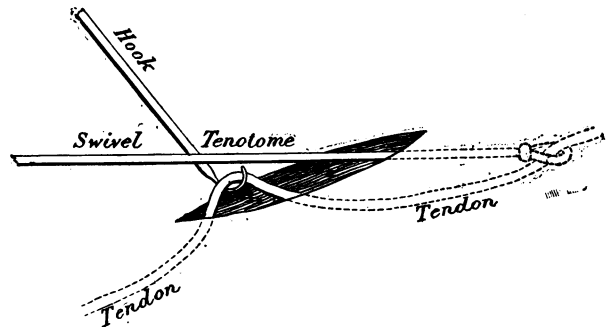

Fig. 1.—Skin incision through which the tendon is hooked up, and the swivel tenotome slipped on to it.

method of using it is shown in the figure. After isolating the fasciculus of tendon, and hooking it up, the swivel is slipped on and forcibly pushed upwards, whilst tension is kept up by the hook; when the swivel reaches up to the region of the muscle-fibres, the tendon slips out, after two or three short movements of the swivel; the whole performance takes but a few seconds. Fig. 2 shows the manner in which the operation is completed. After exposing the fibrous capsule of the kidney through an oblique lumbar incision, two longitudinal parallel incisions are made through the capsule, one near the outer border of the kidney, and the other external to the hilum; the capsule of the kidney is then freed from its parenchyma by means of a blunt instrument passed between the two incisions. The tendon of the erector spinae, which has been pushed into the wound, is split, and the ends are passed from without inwards under the separated capsule, and their ends are pushed back separately into the wound near the spine. A few sutures are then passed through the capsule and the fascia lumborum at the points marked x in Fig. 2; these sutures prevent the perirenal fat from slipping round between the decorticated kidney and the fascio-muscular wall. The wound is then closed from the bottom by suturing the different fascial layers to each other, and if the patient is stout by another layer of buried sutures in the subcutaneous fat. No drain is used. It is very desirable to close the wound carefully by layers of buried sutures, in order that the loin may be quite strong afterwards. When the wound is closed by *en masse* sutures, the support in the loin between the skin and the kidney seems to be quite inappreciable after a few years.

As a striking example of the difference between the two methods of closing such wounds, there are two women in a town near Cardiff in whom both kidneys are fixed by Vulliet's method; one was performed by a London surgeon some years ago, and the other by myself. The condition of the loins in the one where the wound was closed *en masse* is similar to the condition of the abdominal wall in post-operative hernia; the wide scar can be invaginated right through the wall, and the kidneys palpated in their fixed position. In the other case the loin is quite firm, with a narrow linear scar.
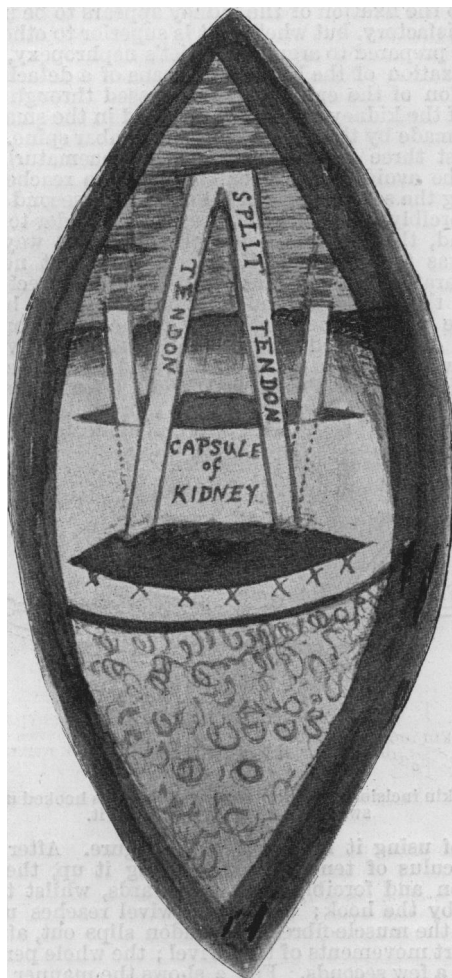

Fig. 2.

I venture to think that the modification which I have described of Vulliet's nephropexy has the following advantages:

1. It retains the principles involved in Vulliet's method, whilst leaving intact the renal secreting tissues.

2. It possesses also the advantage of the decortication method of fixing the kidneys.

3. The swivel tenotome simplifies the freeing of the tendon.

A SERIES OF CASES ILLUSTRATING THE COMPLICATIONS OF GALL-STONE DISEASE.

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DURING the last few years I have had under my care a series of cases which illustrate very well the various complications which may arise from gall-stone disease. These cases may be placed in tabular form, and thus show examples of:

1. Impaction of stone in the cystic duct, followed by hydrops, empyema, and cysto-duodenal fistula.
2. Sloughing of the gall bladder from phlegmonous cholecystitis.
3. Perforation of the gall bladder and formation of a fistula between it and the stomach.
4. Impaction of stones in the hepatic and common ducts.
5. Impaction of stones in the common duct.
6. Impaction of stones in the ampulla of Vater.
7. Primary carcinoma of the gall bladder.

1. Impaction of stone in the cystic duct may result in the sudden enlargement of the gall bladder, a tumour of the apparent size of a billiard ball forming in twenty-four hours. If the bladder be then opened bile-stained fluid is found, as in Case I. If the stone remain impacted for some weeks only clear fluid may be found, no bile being present, as in Case II. If infection occur the gall bladder may contain thick turbid bile as in Case III, or pus, as in empyema of the gall bladder (Case IV).

CASE I.—Miss G., aged 51, seen with Dr. Johnson, of Bawtry, July, 1899. The history was that forty-eight hours before I saw her there was a sudden sharp attack of abdominal pain and vomiting, which wa : attributed to a dietary indiscretion. Pain had increased, vomiting had been serious, and at the end of twenty-four hours a tense, rounded swelling was felt in the abdomen.

On examining the patient I found a smooth, hard, ovoid swelling at the ninth costal cartilage, which was clearly a distended gall bladder. It was tender on pressure, and manipulation caused a sense of sickness. I opened the abdomen, found the gall bladder full of bile-stained fluid and a stone impacted in the cystic duct. The stone was worked back into the gall bladder and removed. No other stones were found. The patient made a quick recovery and has since remained perfectly well.

CASE II.—Mrs. S., aged 30, seen July, 1900, with Dr. Waugh, Skipton. There was impaction of stone in the cystic duct, followed by hydrops of the gall bladder.

The patient has suffered from pain in the right hypochondriac region for several years; on a few occasions has been jaundiced and the motions have been "like drab paint." Four weeks ago a severe attack of pain followed by jaundice, which lasted seven days. Soon after the attack subsided a lump was felt beneath the ribs on the right side; the swelling has gradually increased in size, has become exquisitely tender. On several occasions has had severe attacks of vomiting.

The tumour was diagnosed as a distended gall bladder. On opening the abdomen a large, fully distended gall bladder, equal in size to a large lemon, was found. The surface was injected, and there were many adhesions to the omentum, stomach, liver, and abdominal wall. These were separated and the larger ones ligatured. The gall bladder was aspirated, about 8 oz. of thin clear mucoid fluid removed, and the gall bladder then incised. A stone impacted in the cystic duct was gradually pushed backwards into the gall bladder and removed; it was almost as large as a nutmeg and was solitary. The gall bladder was drained for eleven days. Recovery was uninterrupted.

CASE III.—Mr. C. B., aged 38. Sent by Dr. Booth, Grimsby. The patient's first attack of gall stone colic was five years ago; it was followed by jaundice, which lasted only a few days. Two years ago there was a similar attack, and since this the patient has had some difficulty and pain after an ordinary meal. Three weeks before I saw him a third attack of colic occurred, followed by jaundice lasting one week. During this attack and subsequently he noticed that the motions were pale and the urine high coloured. A tumour formed beneath the right rib margin, and assumed the size and shape of a cocoanut. During the first week it steadily increased, then remained stationary for about a week, and has since very gradually diminished.

I operated April, 1902, and found the gall bladder much enlarged, and the omentum and stomach a little adherent; on aspiration about 7 oz. of thick, dirty-looking bile were removed. A stone equal to a Barcelona nut was found in the cystic duct and six other stones in the gall bladder. The hepatic and common ducts were free. The stones were removed and the gall bladder drained for eight days. The wound then healed and the patient has since been in excellent health.

CASE IV.—Mrs. T., aged 41. Seen March, 1901, with Dr. Wiseman, Leeds. For the last three months has suffered from pain and tenderness on the right side of the abdomen. Sickness has been a troublesome symptom, and wasting a marked feature. The attacks of pain are referred to the right side of the abdomen at about the level of the umbilicus. Four days ago an acute attack closely simulating intestinal obstruction came on. There were vomiting, hiccough, constipation, and marked prostration. A tumour was then found on the right side of the abdomen, almost entirely below the umbilicus and vertical in its longest diameter. The liver edge could be indistinctly felt just above the swelling. The abdomen was opened and the tumour found to be a largely distended gall bladder containing pus and forty-six stones. A single stone was tightly wedged in the cystic duct. The gall bladder was deeply congested and a few omental and colic adhesions were found. The stones were removed and the gall bladder drained for eleven days. An uninterrupted recovery followed. If the stone impacted in the duct be allowed to remain an empyema may form and adhesion be caused to a neighbouring viscus. Sloughing of the gall bladder and visceral walls may follow and a fistula result as in Case 5.

CASE V. *Cysto-Duodenal Fistula: Cystectomy.*—K. H., female, aged 55, admitted February 9th, 1901, complaining of pain in the right epigastric and hypochondriac regions. The pain is intermittent in character, comes on daily and unexpectedly, lasts a few hours, and then disappears. It is three months since the first attack; since then the spasms have increased

in severity and frequency. When an attack comes on she feels cold and faint and almost collapses. She has never been jaundiced. A fortnight ago a tumour appeared on the right side of the abdomen, described by the doctor as "a hard, smooth, globular tumour, larger than a golf ball." No tumour can be felt now.

Operation on February 15th.—The abdomen was opened through the outer part of the right rectus muscle. On exposing the gall bladder and adjacent parts the following condition was found. The gall bladder was distended with a grumous material; to its outer surface the omentum and the duodenum were adherent, the omental adhesions separated fairly easily, the duodenal with difficulty. On detaching the duodenum an opening was found between it and the gall bladder, there was in fact a fistula equal in diameter to a lead pencil between the two viscera. In the cystic duct a stone about the size and shape of a nutmeg was found tightly impacted. The gall bladder, cystic duct, and stone were removed, the cut end of the duct being ligatured close to the common bile duct, and the stump covered with peritoneum. The opening in the duodenum was closed with sutures, and a split drainage tube with gauze wick passed down to the common duct. Recovery was uninterrupted, and the patient left the hospital on March 12th.

Mr. Cammidge examined the gall bladder, and reported: "Great increase of fibrous tissue and patches of small-celled infiltration, and patches of calcified material. No evidence of malignant disease in the material examined."

Fistulae between the gall bladder and the duodenum are more frequent than any other form of abnormal communication between the bile passages and the intestine. Roughly speaking they form a proportion of one-third of all recorded cases, and they are followed in point of frequency by fistulae between the gall bladder and the colon.

If the gall bladder is found fairly healthy it can be separated off from the duodenum and drained, instead of being excised. I preferred cystectomy in this case as I was not sure that the thick pulpy wall of the bladder might not be the seat of the new growth.

If the inflammation set up by the gall stone irritation be ultra-acute and the infection of unusual virulence, a condition of acute cholecystitis or in rare cases of acute phlegmonous cholecystitis may be caused. Case VI is a very characteristic example of this latter catastrophe, which is always of most serious moment.

CASE VI. *Phlegmonous Cholecystitis: Rupture of Gall Bladder.*—M. A., aged 46; male. Patient seen with Dr. Erskine Stuart, Batley. Had been perfectly well up to December 31st, 1900. On that day he had a sharp attack of pain in the right hypochondriac region about an hour after his evening meal. He felt sick and cold, vomited several times, and could only obtain ease by doubling himself over the back of a chair. He was given a large dose of opium and put to bed. The next day he was slightly jaundiced; the day following more so, and the jaundice has persisted. Pain in the right hypochondrium has been constant—relief had only been obtained by opium administrations.

On examination, January 11th, 1901, the patient was found moderately jaundiced and looking ill. The abdomen was full and prominent; the whole right hypochondriac region was hard, strongly-resisting, tender on pressure. The muscular protection was so effective that no deep examination was possible. A diagnosis of cholangitis and cholecystitis, depending possibly upon calculus, was made. The rigidity and tenderness were supposed to be due to a localized peritonitis, possibly dependent upon distension of the gall bladder as a result of obstruction of the cystic duct.

The abdomen was opened on January 12th by an incision through the right rectus muscle. On opening the peritoneum bile-stained liquid with flocculent masses of lymph flowed from the wound. At the least 3 pints of fluid were removed. A collection was found between the liver and the diaphragm, the fluid there being thick and semi-purulent. An examination of the gall bladder disclosed the cause of the condition. The gall bladder was thickly coated with lymph, was deep purple in colour, and showed a sloughing opening on its surface from which bile-tinged fluid was oozing. The opening was about 1¼ in. in diameter, its edges were ragged and a little thickened. In the gall bladder seven stones were found; an eighth, the largest, was discovered later in the upper part of the renal pouch, partly buried in lymph. The cavity was cleaned up as well as possible, the gall bladder opening trimmed, and a drainage tube secured in it; the subphrenic abscess was separately drained, and a tube was also passed in through a stab wound in the loin.

The patient, whose condition was bad before the operation, died, gradually declining in forty-eight hours.

Perforation of the gall bladder from disease is but rarely encountered. Bricka[1] has collected the records of all the examples of spontaneous rupture of the gall bladder which have been treated surgically. They number 35—23 were due to gall stones; 11 to typhoid fever; there were 4 recoveries.

Fistula between the stomach and the gall bladder is decidedly rare. Courvoisier found only 12 cases recorded.

The chief point of interest in the following case lay in the question of diagnosis. Vomiting of bile, almost or quite unaltered, in quantities of 10 to 30 oz. daily, can only be due to one of two conditions—fistula between the gall bladder and the stomach, and infra-ampullary carcinoma of the duodenum. The history of gall-stone attacks extending over a period of five years made the diagnosis a matter of no difficulty, and I predicted with confidence the condition we should find.

CASE VII. *Fistula between Stomach and Gall Bladder.*—Mrs. T., aged 50. Seen with Dr. Galloway, Otley, April, 1902. Nine years ago had an attack of typhoid fever. Five years ago began to suffer from "spasms" at intervals of a week to a month. Jaundice followed on every occasion. Four months ago had a very severe attack which was not followed by jaundice; the pain was acute and intolerable, in the right hypochondriac region and in the epigas-

trium; vomiting was severe; after two days bile was noticed in the vomit. From that date she has vomited almost every day and on all occasions bile has been present in the vomit. For the last month she has vomited daily between 10 and 30 ozs. of bile, little if at all altered. She has steadily lost flesh, in all about 3 st. in weight have been lost in four and a half months. The vomiting is not attended by pain, but comes on suddenly, and about 10 ozs. are ejected at one effort. The right hypochondriac region and the epigastrium were tender. No blood was seen in the vomit and the stomach was not dilated. The diagnosis rested between fistula communicating with the gall bladder on the one hand and the stomach on the other, and infra-ampullary growth in the duodenum. The history pointed strongly to the former and it was that which I accepted.

As I was at the time suffering from a poisoned wound of the hand, I was unable to operate myself. My colleague, Mr. W. H. Brown, in whose beds she was, kindly undertook the operation for me. He found a fistula between the fundus of the gall bladder and the anterior wall of the stomach near the pylorus. The gall bladder and stomach were detached; the opening in the stomach closed, and the gall bladder drained. The stitches used to close the stomach opening were applied with difficulty, as they cut through the friable stomach wall very readily.

The patient died forty-eight hours after operation, and it was found that two of the stomach sutures had given way.

Impaction of stones in the hepatic duct is an infrequent occurrence. The following is a typical example:

CASE VIII.—Mrs. T. B., aged 39. Seen with Dr. Sproulle, Mirfield. Three years ago she had an attack of epigastric pain and vomiting, followed by slight jaundice—a typical attack of biliary colic. Since then she has had nine similar but progressively more severe attacks. Nine weeks ago an extremely severe attack. Pain has continued all the time, and jaundice, though varying slightly, has always been pronounced. The motions during this period have been light-coloured, the urine thick and scanty. Pain is constant, but at times an acute paroxysm occurs. Has lost flesh rapidly during the last two months, and has been eating little, owing to pain and heaviness after even light diet, and vomiting.

Operation, December 7th, 1900.—Eighty-seven gall stones were removed, mostly from the hepatic and common ducts. A few lay in the gall bladder, but both hepatic ducts and the whole length of the common duct were filled with tightly-packed stones. These were removed through an incision in the common duct, which was afterwards sewn up. A stone was found tightly impacted in the ampulla of Vater, and the duodenum had to be opened in order to remove it.

The patient had severe haematemesis after the operation, and died on the third day.

Stones may be impacted in the common duct at any part of its course, from the angle of junction of the cystic duct to the ampulla of Vater. The method of rotation of the liver suggested by Mayo Robson and Berndt renders access to the duct quite easy, except in those cases in which innumerable dense binding masses of adhesions are present, fixing the liver immovably. The following are the cases I have met with:

CASE IX. *Stone in Common Duct: Duodeno-choledochotomy.*—M. A. R., female, aged 41, admitted March 23rd, 1901, with jaundice. For eight or nine years has been subject to attacks of pain in the right hypochondriac region, and pain after food in the epigastrium and "right round the body." Sixteen months ago for the first time an attack was followed by jaundice. The pain came suddenly and overwhelmed her. She was in bed with pain and soreness for three days. On the third day jaundice was observed. Four months ago a similar attack, and since then five attacks similar in character, but varying in intensity. She was deeply jaundiced four months ago and has been jaundiced since, though the depth of colour has varied very much. When the last attacks have commenced she has felt cold and shivery, and in a few minutes she has broken out into profuse sweats. Nothing to be felt in the abdomen. On opening the abdomen the gall bladder was found shrunken and thickened; it was freed from adhesions, opened, and seven stones removed. A large stone was felt in the ampulla of Vater; an attempt to push it back into the common duct failing, the duodenum was opened and the ampulla incised and the stone removed. The duodenum was closed, and the gall bladder drained. The patient was discharged well on April 23rd, 1901.

CASE X. *Stone in Common Duct: Choledochotomy.*—M. A. C., female, aged 33, admitted with deep jaundice January 11th, 1899. In May, 1899, she had an attack of pain in the region of the xiphisternum, passing round the right side to the scapula. The pain was very severe, produced faintness and collapse, and was accompanied and followed by vomiting. Jaundice followed two or three days later. Several similar though slighter attacks since. For eight weeks has not been free from jaundice, though there has been considerable variation in its tinge. Each attack has caused profuse sweating.

On November 7th the abdomen was opened. The pyloric end of the stomach was found to be embedded in adhesions with the under surface of the liver and gall bladder. After freeing the bladder and ducts two stones were felt in the common duct, one was crushed passed onwards into the abdomen, the other was fixed and was removed through an incision in the duct; it was of the size of a small Barcelona nut. The duct was stitched and a Bantock's tube introduced. The patient was discharged well on December 3rd.

CASE XI. *Stones in Common Duct: Choledochotomy.*—C. W., female, aged 42, admitted March 7th, 1900. Patient admitted with jaundice. For several years has had occasional attacks of "spasms," followed by slight jaundice. No attack has lasted more than a few hours, and has never incapacitated her for more than a day, or perhaps two, from her work until five months ago, when she had a severe attack, followed by jaundice. Pain and jaundice have been present ever since, varying in intensity, but never very severe. During the last few weeks has felt cold, and shivered when an attack was impending; soon afterwards has sweated profusely. The motions have been very pale for five months, and the urine high-coloured.

At the operation a small, thick, adherent gall bladder was opened and relieved of forty-six stones, which lay within it and the cystic duct. The common duct had seven small stones in it; these were removed by a separate incision, which was stitched up directly. The gall bladder was drained. The patient was discharged, quite well, on March 31st.

CASE XII. *Stone in Common Duct: Choledochotomy.*—Mrs. G., aged 58, admitted June, 1901. The first attack of biliary colic occurred at Christmas, 1896. This had been followed by others at almost regular intervals of three months until January, 1901, when the severest attack of all took place. She was confined to bed after it for three months, and it was after this that she suffered from continuing though varying jaundice. Shivering was noticed on several occasions, on each the pain was rather worse and the jaundice a little deeper.

Operation, June, 1901.—There were a host of adhesions around the common duct, gall bladder, and duodenum. A stone was felt tightly fixed in the common duct near the termination of the cystic duct. An incision was made on to it, and a stone equal in size to a Barcelona nut evacuated. A couple of drachms of pus followed the stone. The common and hepatic ducts were thoroughly explored and found to be clear. A large drainage tube was fixed by one stitch into the common duct and the abdominal wound closed round the tube.

After the operation there was retention of urine, and cystitis followed upon catheterism. Healing of the wound was delayed by cellulitis, due probably to infection from the pus escaping from the common duct. Bile was discharged freely from the wound for several weeks. A year later the patient was quite well, and her doctor informed me that "the relief from operation has been complete."

CASE XIII. *Stone in the Common Duct: Choledochotomy.*—Miss B., aged 55. May, 1902. Sent by Dr. Clarke, Doncaster. Two and a-half years ago had the first attack of jaundice, preceded by an extremely severe attack of pain lasting two days. The jaundice passed away in fourteen days, and afterwards she felt quite well. In December, 1901, a similar attack of pain over liver, passing through to the right scapula, was followed by jaundice slight in character and lasting only five days. After recovery from this attack she felt weak, easily prostrated, and had a "loathing for food.' Flatulence was distressing, and her weight gradually decreased. Six weeks before admission a similar attack of pain, followed by jaundice; since then jaundice has varied in depth of tinge but has never disappeared; pain has varied, but a dull aching sense of oppression and weight has always been present. She has had several shivering attacks during the last six weeks. She has lost 1½ st. in the last three months. The jaundice is said by her friends to be less in the morning, and to get gradually deeper in tinge during the day. On examination there were tenderness and rigidity in the gall-bladder area. Nothing definite felt.

Operation.—A long incision was made. The gall bladder was found buried in adhesions thick and contracted. There were many adhesions between the abdominal wall, the liver, duodenum, transverse colon, and bile ducts—so firm and so widespread that rotation of the liver was not possible. A stone was tightly wedged in the common duct about 1 in. from its junction with the cystic duct. As the common duct could not be brought to the surface, it was necessary to cut down upon the stone in the duct, and to remove it with a scoop. The stone was of the size of a nut-meg. The hepatic and the rest of the common duct were explored, but no other stone discovered. A large tube was fixed into the opening made into the duct, and the abdominal wound closed.

The tube came away on the eleventh day. The wound rapidly healed, and the patient is now quite well and free from pain, discomfort, or jaundice.

The only case of carcinoma of the bile passages that I have had under my care is the following:

CASE XIV. *Primary Carcinoma of Gall Bladder: Cystectomy.*—M. B., aged 60.

Operation, April 8th, 1902.—Patient sent by Dr. Sykes, Garforth. Two years ago the patient had an attack of hepatic colic, followed by jaundice. No stone was found. Six months ago a second attack; and a fortnight ago a third attack. In each attack the pain has been acute, sickening, and of several hours' duration ; and after each jaundice has appeared. After the last attack a tumour was noticed in the right hypochondrium. It seemed about the size of a billiard ball, was not in the least degree tender, and moved very freely in all directions, as though only held by a stalk to the liver. There was neither jaundice nor ascites. A diagnosis of stone impacted in the cystic duct with consecutive dilatation of the gall bladder was made, though the entire absence of tenderness was against this.

The abdomen was opened through the right rectus muscle, and the gall bladder exposed. It was found densely hard, adherent to the omentum by moderately firm adhesions, but not bound to the liver. An incision in it showed that the enlargement of it was due to a great thickening of its walls, the lumen being small, and having a capacity of barely more than a drachm. The omental adhesions were separated, and the gall bladder freed down to the cystic duct. The bladder and the cystic duct were removed by cutting through the latter close to its junction with the common duct after a ligature had been applied round it. The peritoneum over the cut end was stitched with a continuous catgut suture, and the abdomen closed without drainage. The cavity of the gall bladder was barely as large as a thimble; it contained a dirty greyish black fluid. No stones were present, either in the gall bladder or the cystic duct. A careful search of the hepatic and common ducts was made, but no stone was found. The wound healed by first intention, except at one stitch opening, from which about 10 to 20 drops of pus were expressed about three weeks after the operation. The patient went home well, in the fourth week, and her health has been well maintained since.

REPORT OF SPECIMEN BY DR. MAULE SMITH.

Gall Bladder : Malignant Disease.—The growth consists of tubules of epithelial cells embedded in a dense stroma of fibrous and non-striped muscular tissue. The epithelial tubules are more numerous and more densely packed together towards the internal surface of the organ. They decrease in number towards the external surface. The matrix, on the other hand, is less in amount towards the internal surface and greatly increased in amount as the external surface is reached, so that in the former situation there is a maximum of epithelial growth and a minimum of stroma; in the latter the condition is reversed and the epithelial ele-

ments are scanty. The mucous membrane is totally destroyed. The epithelial tubules are composed principally of columnar cells in one layer, but usually in some part of the tubule the columnar shape stops abruptly, and is replaced by a clump of irregularly-shaped cells of a variable number, layers deep. These project into the lumen of the tubule, or outwards into the struma. The tubules branch irregularly in all directions. The growth is traced right into the commencement of the cystic duct. The tumour is a carcinoma apparently arising from the glands lining the gall bladder. It has much the same kind of structure as the growths in the uterus described under " atypical glandular carcinoma."

Primary carcinoma of the gall bladder is a rare surgical affection. The only museum specimen showing the disease limited to the gall bladder that I have found is at St. Bartholomew's Hospital. In the very great majority of the recorded cases the liver or the cystic duct, or both, are found involved in the growth. Primary carcinoma may be squamous-celled, columnar-celled, or spheroidal-celled. When squamous-celled it is, as suggested by Rolleston, not improbable that transitional epithelium may be so altered in appearance as to resemble squamous epithelium.

In one specimen examined by Mulot cell nests were found. Secondary carcinoma may be the result of metastasis or direct extension. An example of the former is related by Courvoisier; the patient had been operated upon three times for cancer of the lip, and at the necropsy a secondary malignant mass in the gall bladder was found. The most frequent direct extension is from the pylorus.

The association of primary carcinoma with gall stones has been frequently remarked. Zenker found gall stones in 85 per cent. of the cases of cancer of the gall bladder. Courvoisier gives a proportion of seven-eighths. Females are affected more frequently than males in the proportion of 5 to 1.

It is now generally recognized that in these cases, in which the gall bladder and the liver are both affected, the disease has had its starting-point probably in the former.

Very few operations upon primary carcinoma of the gall bladder have been recorded. Terrier and Auvray in their recent admirable work make mention of only 18 operations, with 4 fatalities: 1 death from syncope, 1 from septicaemia, 1 from peritonitis, and in 1 no details are given. In the case I have just recorded there was a history suggesting a recurrence of gall-stone attacks, but no stone was found in any part of the bile ducts.

The above record gives some idea of the frequency and of the character of the difficulties met with in operating for gall stones. It is almost impossible to say beforehand what conditions may be encountered when the abdomen is opened for the purpose of affording relief to recurring attacks of biliary colic. The surgeon must be prepared to meet and to deal with any complication. That some such complications as these are met with, in approximately 20 to 30 per cent. of all gall-stone operations, is surely the best indication we can have that earlier operations are desirable. And as early uncomplicated operations are devoid of risk, and as, owing to improvements in the technique of the operations, a complete clearance of all the stones can be assured, the surgeon is entitled to ask that the patients be handed over to his charge at a reasonably early period of their disease.

REFERENCE.
1 *Thèse de Lyon,* 1900.

REPORTS OF SOCIETIES.

PATHOLOGICAL SOCIETY OF LONDON.

Professor E. KLEIN, F.R.S., Vice-President, in the Chair.

Tuesday, November 4th, 1902.

SOME CASES OF STREPTOTHRIX INFECTION.

MR. ALEXANDER G. R. FOULERTON read a paper on some cases of streptothrix infection. During the last two years five cases of the kind had been investigated bacteriologically at the Middlesex Hospital. The first case was that of a young man, aged 21 years, who presented an inflamed and indurated condition of the subcutaneous tissue of the front of the neck, following on an attack of tonsillitis. An abscess formed, and the pus contained numerous yellowish-white granules ; a pure culture of the organism was obtained. The second case was that of a girl, aged 19 years, who came under treatment for an