effect of a simple and safe operation on a lady who had been a martyr to indigestion for over twenty years. She was a patient of Dr. C. C. Shepherd, of Cardiff, who suggested that surgical interference might be desirable, and sent her to me.

History.

Since 1883 Mrs. X. had suffered from indigestion and had consulted doctors in many provincial centres and London. Her history pointed to probable perforation of the stomach in 1883. When I saw her she was pale and very emaciated, and it was feared she had become a morphinomaniac. Her dyspeptic symptoms were purely subjective, and no tumour nor displacement of the stomach could be made out, and it could be distended with air without suffering; she had tenderness over the right hypochondriac region. Pain after taking any food, either solid or liquid, was so bad that she had been taking sedatives for over four years at least twice a day.

Operation.

On May 2nd, 1903, Mrs. X. was anaesthetized by Dr. C. C. Shepherd, and Dr. W. S. Haughton, of Dublin, was present at the operation. I opened the abdomen, and found the stomach and the first part of duodenum to be healthy, but on drawing up the liver I discovered that the under surface of the gall bladder and beginning of the cystic duct were adherent, and caused kinking at the angle of junction of the first and second part of the duodenum. By drawing the liver and gall bladder upwards and the duodenum downwards the adhesions were easily divided; they were about $1\frac{1}{2}$ to 2 in. long; the raw surface on the gall bladder and the duodenum were covered with peritoneum.

After-History.

The patient on the third night after the operation stated that her old pain had disappeared, and that she did not need any morphine. From that day she has been quite free from indigestion, and has not taken any more drugs for it.

In 1903 I used to perform gastro-jejunostomy *en Y*, and if one had overlooked or failed to discover the real cause of her trouble, one would have been tempted to do the operation I had a bias for at the time on account of the wasting and severity of the subjective symptoms; but the fact that the patient took morphine would have made me hesitate to do such a severe operation considering that there was no evidence of old disease of the stomach or pylorus. I would, therefore, wish to emphasize the scientific importance of having an open mind as to what operation, if any, should be performed upon chronic dyspeptics until the abdomen is opened; if the surgeon finds no evidence of old disease of the stomach and duodenum, nor contraction of the pylorus, it is wise to close the abdomen without risking life by doing a gastro-jejunostomy, for old dyspeptic symptoms usually recur as soon as the irritative effects of the operation have passed away. It is better to encourage such patients to face their "normal conditions of sailing" than to submit them to an operation which will bring undeserved reproach upon it and discredit to the operator.

SOME OBSERVATIONS ON NEPHRECTOMY,

WITH STATISTICS OF A SERIES OF CASES OPERATED ON DURING THE LAST TEN YEARS.*

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MR. PRESIDENT.—The subject I wish to bring before the Society to-night was suggested to my mind by an exceedingly interesting case under my care in hospital. Apart from the interest of the case itself, the methods of investigation employed to determine whether nephrectomy was permissible are so generally applicable, that I think I cannot do better than place on record full details concerning this patient as an introduction to some further observations.

Mrs. —, aged 41, was admitted under my care on January 14th, 1907, complaining of severe pain in the region of the left kidney. Five months previously a stone had been removed from this kidney in another hospital; the operation gave relief until the patient resumed active life, when pain returned with greater intensity than before. The pain supervened at night as well as by day and at varying intervals of time; it did not partake of the nature of ordinary renal colic, but was described as a tense, full feeling in the left side of the abdomen, as though something would burst, and was not accompanied by vomiting. The left kidney could be palpated bimanually, and was found to be enlarged somewhat, but it

was not tender unless an attack of pain was being experienced; the right kidney, which was freely mobile, could also be palpated, but it was not tender, nor did it appear to be enlarged. The past history was of great interest. Ten years ago, after a bad confinement, a vesico-vaginal fistula formed, which was treated by the late Lawson Tait by suprapubic section of the bladder. The fistula was completely closed, but almost from that time discomfort was experienced in the left kidney; this steadily increased, and was associated with hæmaturia occasionally.

Examination of the urine during several days after admission to hospital showed an unsatisfactory excretion; the amount varied from 30 oz. to nearly 40 oz., the specific gravity from 1007 to 1012; a small quantity of pus was always present and an occasional cast; the amount of urea varied from 120 to 180 grains, the patient taking an ordinary mixed diet and lying in bed.

In considering what means should be adopted to give relief to the pain, which was extremely disabling to the patient, the possibility of nephrectomy had to be kept in mind. The elimination of waste products, as shown by the quantity of the urine, its specific gravity, and the amount of urea excreted, all indicated that there was but a small margin of safety, which might easily be jeopardized if the left kidney were functioning and were removed, thus further reducing an already insufficient excretion.

The past history of a plastic operation for the cure of a vesico-vaginal fistula and the persistent trouble in the left kidney, beginning almost immediately afterwards, suggested that the left ureter was stenosed and the kidney pelvis dilated; the enlargement of the left kidney and the character of the pain confirmed this view.

To obtain more complete information two further methods of investigation were employed—cystoscopy and separation of the urine from the two kidneys. Cystoscopic examination failed to recognize the orifice of the left ureter; its position and the median portion of the trigone were obscured by scar tissue. The right ureteral orifice was easily found, but the ureteral bar was distorted, and the orifice looked upwards and outwards to the right lateral wall of the bladder. Separation of the urine was effected by Luys's separator, the instrument being retained in position for forty minutes, during which time about 3vj were collected from the right ureter, and practically none from the left. Everything therefore pointed to the left kidney being entirely disabled, and so far enhanced the value of the right, from which the whole of the urea excreted was derived. A quantity of urea, often below and never above 180 grains, and the low specific gravity of the urine, together with distortion, and probably therefore some embarrassment of the right ureteral orifice, hinted strongly that the efficiency of the right kidney was damaged. Methylene blue did not colour the urine until thirty-six hours had elapsed after its administration.

Under these circumstances it was determined to expose the left kidney by lumbar incision, and to do nephrectomy only if no alternative course seemed feasible. As in nearly all secondary nephrectomies freeing of the kidney was difficult, but was thoroughly effected, and the organ brought out of the wound for investigation. Stone was recognized in the pelvis and in the dilated calyces; the pelvis and ureter were both considerably dilated. The ureter was opened and a bougie passed down it, which stopped abruptly close to the bladder; smaller bougies were tried, but nothing passed through the obstruction. Mere removal of the calculi was, in the face of the facts recited, little likely to give relief to the symptoms complained of; nephrectomy was therefore performed. As a final precaution, the peritoneum was opened in the anterior part of the wound and the right kidney examined with the hand; its mobility was confirmed, but no gross change, such as dilatation of its pelvis or calculus, could be detected in it, which, so far as it went, was reassuring. The artery, vein, and ureter of the left kidney were ligatured separately and the organ removed.

An uninterrupted recovery followed without incident of any kind. The excretion of urea on the day of operation was 180 grains, and for the three following days respectively it was 330 grains, 520 grains, and 315 grains. Gradually this enhanced excretion fell to about 250 grains on the tenth day, and to 160 grains on the eighteenth day, the quantity of urine being 50 oz., of specific gravity 1010. The diet taken was an ordinary light diet, much as before the operation. Clearly the right kidney is damaged but is at present sufficient. It responded, as I have often noticed that these kidneys do, after removal of the other extensively diseased organ, to the stimulation of an increased blood supply, or to some other perhaps unrecognized factor, and the urea output ran up enormously; but the increase was only a temporary one, and this I find to be usual after nephrectomy.

What is the normal amount of urea excreted by a healthy person? The physiological textbooks estimate it as about 500 grains, but this presumably means by a person actively employed, and on a full nitrogenous diet. Certainly nothing like this prevails in patients lying in bed, and taking a light diet of fish, chicken, vegetables, milk, bread, and tea. In my hospital patients, before they are submitted to any considerable operation, the

* A paper read at a meeting of the Midland Medical Society, March 27th, 1907.

urea is in many cases estimated, and I find that the amount is generally about 300 grains, occasionally as low as 200 grains, but the amount varies of course with body weight, and perhaps with age and sex. If the excretion of urea falls below 200 grains, whatever the nature of the operation, I look askance at the patient, but do not necessarily refuse operative measures even when nephrectomy is contemplated, as the case I have already quoted shows.

An interesting question worth asking is, What effect upon urea excretion has an operation of similar severity to nephrectomy but not involving the kidney? I have had several observations made on this point, and some are now being carried out by my dresser, Miss Eglington. Their general effect appears to be that the amount of urea rises considerably after most operations, but not to the same extent as after nephrectomy, and that it falls to the normal more rapidly. The increased excretion is perhaps due in part to the anaesthetic, and, it may be, to absorption of certain materials from the wound (not septic). This would occur in nephrectomy as in other operations, but in the former there appears to be some other potent factor at work such as I suggested in some of my earlier remarks.

The case I have described illustrates very well the methods generally available to determine the renal adequacy and the value of each kidney separately. Some of these investigations are in many cases unnecessary, but when all have been employed in a given case there is seldom much doubt in the mind of the surgeon as to the risk his patient runs of uraemia after nephrectomy.

During the time I have worked at our present hospital—that is, nearly ten years—I have had occasion to perform nephrectomy thirty times for various conditions, and in the same period I have in private work removed the kidney nine times, making a total of thirty-nine nephrectomies, with one death, a hospital case. Death occurred from shock and commencing peritonitis thirty-six hours after operation for a huge pyonephrosis.

The patient was a male, aged 29, admitted with an extensive perinephritic suppuration, as well as pyonephrosis. The pus around the kidney was evacuated and the abscess drained for some days before nephrectomy was attempted. At the latter operation the difficulties experienced were very great—the kidney was densely adherent, the peritoneum was widely torn, the pus soiled the peritoneal cavity, and the pedicle, though secured without mishap, gave exceptional trouble. In other cases anxiety arose from time to time, though all eventually came through, but in no instance did uraemic symptoms occur or ever threaten.

The route adopted for attacking the kidney was, except in one case, by the loin, through an oblique incision parallel with, and close to, the last rib. This incision can be prolonged downwards and forwards, if necessary, up to the line of the deep epigastric artery, and allows of removal of kidney and the whole of the ureter post-peritoneally down to the bladder. If there is one point I would lay stress on in nephrectomy more than another, it is that for safe removal of the kidney the operator should not cramp himself by too limited an external incision.

I have removed in this way very large kidneys, from 9 to 12 in. long by 5 and 6 in. across, and in no instance has it been necessary to resect the rib nor has the thorax been at all invaded. It appears to me to be inviting misfortune to remove a suppurating kidney transperitoneally when it can be taken out through the loin. Such organs are apt to be torn in enucleating, making it impossible to avoid soiling the peritoneum if the transperitoneal method is adopted. By the lumbar route the peritoneum is frequently torn, but by quickly detecting this and suturing the rent, or by packing it off when suturing is not feasible, the peritoneal cavity is much more easily protected than when the other method of operation is employed.

In my one transperitoneal operation this route was adopted because the tumour, a hypernephroma, appeared to be attached to stomach or duodenum. This proved to be the case, and the growth had to be carefully peeled off the duodenum and the walls of the latter sutured. After a lumbar nephrectomy careful suturing of the divided muscles and fascia should be effected, otherwise a weak scar will result which may become the seat of a hernia with much inconvenience and disability. The frequency of this form of hernia has much increased of late years, and operative measures to give relief are generally unsatis-

factory owing to the wide retraction of the muscular edge.

In securing the pedicle I prefer to tie its constituents separately and with as little tissue in the grasp of the ligature as may be. Occasionally ligation cannot be safely effected either because of the density of the pedicle or owing to the critical state of the patient from haemorrhage, when the saving of every minute of time is essential. As an instance of an untieable pedicle I may mention a case of pyelonephritis following a hysterectomy performed by another surgeon in which one of the ureters was injured with a resulting ureteral fistula in the anterior abdominal wall. At the time of the nephrectomy, some months after the hysterectomy, the patient was in a septic feeble state, the kidney was most firmly adherent and the pedicle in my opinion too dense for safe ligation. I accordingly applied two powerful curved clamps and cut the kidney away, removing the clamps without difficulty or danger on the fourth and fifth days respectively; a safe recovery followed. In one patient operated on for secondary haemorrhage after incision of the kidney to discover stone, the loss of blood had produced such collapse that clamping of the pedicle was adopted as quicker than tying. A faecal fistula resulted, but did not appear until some days after removal of the clamps; it was caused no doubt by my dragging a little of the wall of the colon into the grasp of the clamp forceps, a mishap due to haste and to bad light, for the operation had to be performed by artificial light. I heard subsequently that the fistula had been closed by a plastic operation performed by another surgeon. This is the only instance in which I have known harm to result from the use of clamps.

Some of the nephrectomies followed previous operations on the kidney, as, for instance, nephrolithotomy, or fixation of the kidney, when hydronephrosis was complicated by extreme mobility and it was hoped that fixation might give relief to the symptoms and save the remnant of kidney tissue. These secondary nephrectomies are as a rule much more difficult than primary operations. In the desire to conserve some part of the kidney in such conditions as I have above instanced, a desire altogether praiseworthy, risk of secondary nephrectomy must be borne in mind with its added difficulty and therefore added danger. Unless there is real prospect of the organ settling down after the lesser operation and of giving a certain amount of help to the economy by its excretory power, the bolder measure of removal is fully justified in view of the changes around the organ which result from previous interference.

I have never attempted partial nephrectomy, and only once have I been tempted to do so. This was in a patient with a well-encapsuled hypernephroma at the lower end of the kidney, so circumscribed as to prompt removal of the lower third of the organ and the growth. Reflecting on the uncertain degree of malignancy of the tumour, I removed the whole organ, and feel justified by the fact that, although a complete extirpation was done, the patient was eventually the victim of a local recurrence for which I should have blamed myself if I had performed only a partial removal of the kidney.

During the period to which I have referred—the past ten years—I have on no occasion performed nephrectomy for injury of the kidney. More than once I have been tempted to, either almost immediately after the injury or at varying intervals of time, but waiting has eventually justified non-intervention; all the cases have recovered unless the injury to the kidney were associated with other injuries which brought about a fatality. The experience is worthy of note in a hospital of 300 beds which receives a large proportion of accident cases.

Analysis of the conditions for which nephrectomy was performed shows that:

Pyonephrosis or pyelitis from calculus, tubercle, etc., was responsible for 21 cases.

Hydronephrosis with pretty complete destruction of the kidney for 9, and with lesser dilatation for 3.

Malignant growth (hypernephroma) for 2.

Secondary haemorrhage after incision for stone for 2.

Stone and papilloma of kidney pelvis for 1.

Cystic kidney for 1.

A total of 39 operations with one death, a case of pyonephrosis and perinephritic suppuration.

In 3 cases of hydronephrosis of moderate degree combined with mobility, fixation was first effected, but pain

and disability continuing, nephrectomy was eventually resorted to.

The subsequent fate of patients submitted to nephrectomy must always be worthy of attention, but the comparatively short period which has elapsed since many of my operations were performed, and the difficulty of tracing hospital cases, renders the record I am now about to mention of less value than it would otherwise have been.

Eight of the 9 patients operated on outside the General Hospital remain well; 1 is suffering from recurrence of growth; the longest interval of time since the first of these operations is nine years.

Of the hospital patients I am unable to learn anything concerning 10; of the remaining 20, 19 are alive, and as far as can be gathered in reasonable health, several of them expressing themselves as "in very good health." One patient is dead, a woman operated on five and a half years ago, when 38 years of age, for a huge polycystic kidney. The other kidney, at that time just palpable, rapidly increased in size, but remained for a long time fairly efficient in its excretory functions, and the patient was enabled to lead an active and useful life, which without nephrectomy would not, I think, have been possible. In September, 1906, the excretion by the remaining kidney was becoming very insufficient, and the patient died in January last, after a brief illness the details of which I have not been able yet to obtain.¹

REFERENCE.

¹ *Lancet*, May 20th, 1906, p. 1326.

A CASE OF PYONEPHROSIS CONTAINING TYPHOID BACILLI IN PURE CULTURE.

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IN the report of the proceedings of the Clinical Society of London held on May 10th, 1907, Drs. H. French and M. Louisson contributed a paper on the extent to which Widal's reaction persists after recovery from typhoid. The following case is worth recording from this point of view:

History.

A. B., aged 35, who was sent to me at the Derbyshire Royal Infirmary by Dr. Chawner of Clay Cross, suffered from typhoid fever rather more than six years ago. The disease was acquired from contaminated well water. After eleven weeks' illness he apparently became convalescent and was allowed to get up, but a week later he had a severe relapse and was in bed again for about seven weeks. He recovered and returned to work as a collier.

He said that during his illness he had occasional difficulty in passing water. He passed "lumps of flesh like liver as big as peas" for about a fortnight; he then passed thick water with pieces of "phlegm" in it, especially towards the end of micturition. This has occurred occasionally ever since.

Seventeen weeks before admission he complained of pain in the left loin and was attended by Dr. Chawner of Clay Cross for nephritis. After eleven weeks of pain he returned to his employment and managed to work for three weeks, when the pain became worse, and he went to bed again. Two weeks before admission a swelling was noticed in the left loin. The pain had been constant in the left side, but had extended occasionally to the left groin and testicle. There had been occasional attacks of vomiting. He had lost flesh considerably; the bowels had been fairly regular, but lately somewhat constipated.

Condition on Admission.

He was a distinctly emaciated and anxious-looking man, with a pale, earthy complexion, and a somewhat dry, slightly-furred tongue. The temperature was normal and the pulse 80. The urine, 1028, acid, contained neither albumen nor sugar.

A large, tender swelling was seen extending from the left costal margin to about 2 in. from the left iliac crest. It extended forwards to the middle line, and was more prominent above the level of the umbilicus. The swelling did not descend on respiration. It was tender on palpation, was smooth and rounded, and no irregularities, such as notches or nodules, could be felt anywhere. A distinct thrill could be felt by a hand placed on the tumour in front if light percussion was made in the loin; fluctuation could also be made out. The percussion note was dull and could not be separated from splenic dullness. The liver was not felt. Nothing abnormal was detected in the chest, and no signs of disease were found elsewhere.

On the day following admission the urine was examined with the result: Specific gravity, 1020; acid; trace of albumen; no

sugar; deposit of urates. Segregation of the two ureters was performed on two occasions by Luys's separator. No urine was obtained from the left half of the bladder.

Operation.

On April 12th, three days after admission, he was placed under an anaesthetic and cystoscopy performed.

The right ureteric opening was seen to be normal. The left ureteric opening was difficult to see, as it was surrounded by a stellate arrangement of engorged veins. No urine was observed to issue from it, and no pus. Nothing else abnormal was seen in the bladder. The patient was placed semi-prone on the right side, and the usual left lumbar incision was made. After the muscles were incised, a trocar and cannula was introduced into the tumour, and pus appeared. This was received into a sterilized test tube for further examination. The opening was enlarged, and an exploratory finger felt a large stone in the left ureter. This was extracted without much difficulty. The sac was enormous, but soon contracted on being emptied. Its content was pus with hardly any urinous odour. Two drainage tubes were inserted, and the wound closed in the usual way.

After-history.

The operation was followed by a quite uninterrupted recovery. The average urinary output before operation was 22 oz., after operation 67 oz. Three weeks after operation there was only a small sinus left; one week later the last tube was removed, and this rapidly closed. He was sent to the Convalescent Home five weeks after the operation.

Bacteriological Report.

The pus was sent to the Clinical Research Association, and the following reports were received:

I.

The only organism met with in the pus and in the culture prepared from it is a Gram-negative bacillus, belonging apparently to the *enteritidis* group. Its pure cultures will require further investigation, and the identification of the bacillus is difficult and may be impossible. A further report will follow in due course.

II.

The organism isolated from your case of pyonephrosis has all the cultural and microscopical characters of the *Bacillus typhi-abdominalis*. When freshly isolated the bacillus showed no tendency to become agglutinated on treatment with a serum from a case of enteric, and we were therefore inclined to believe it was not the typhoid bacillus. However, after sub-cultivation several times the organism now gives a fairly well-marked reaction.

The suggestion was made that Widal's reaction should be tried, and a specimen of the patient's blood was sent up and the following report was received:

This serum shows the reaction characteristic of typhoid fever with all the dilutions employed—namely, 1 in 10, 1 in 25, 1 in 50.

A fortnight later a second specimen is reported upon as follows:

The serum gives a well-marked Widal's reaction, producing rapid agglutination of typhoid bacilli in dilutions of 1 in 10, 1 in 25, 1 in 50, and well-defined clumping within thirty minutes with a dilution of 1 in 200. An attempt was made to isolate the bacilli from a portion of the dressings and drainage tube, but without success, owing to contamination by other organisms.

The calculus was nearly entirely phosphatic, with a centre which contained phosphates and a predominance of oxalates.

I have no knowledge of calculous disease as a sequela of typhoid fever, and on looking up the subject of typhoid pyelitis I can find no case recorded where a calculus was formed subsequently. It is possible that the calculus was pre-existing, but I do not think it probable, as there were no symptoms of urinary trouble before the attack of enteric, and they were so extremely prominent during the attack. I think the case is sufficiently interesting to report, both on account of its rarity and on account of the persistence of the typhoid bacilli in the kidney for so many years.

TWO CASES OF SUPRAPUBIC LITHOLAPAXY.

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THE two cases of vesical calculus reported below are interesting in so far as they were dealt with, with excellent results, in a manner somewhat different to that usually adopted. The patients were both young children of poor physique, on whom it was impossible to perform the usual "crushing operation," even with modern perfected instruments.

The stones could only be removed by the suprapubic