

ful look of returning health and rescued life and that inward satisfaction which far surpasses all the wealth of the Orient—"Inasmuch as ye have done it unto one of the least of these, my brethren, ye have done it unto Me."

A CONTRIBUTION TO THE SURGERY OF THE KIDNEY AND OF THE URETER.¹

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DURING the period beginning June 21, 1895, and ending February 1, 1897, thirteen patients suffering from various affections of the kidney and of the ureter came under the writer's care at Mount Sinai Hospital.

Ureters.

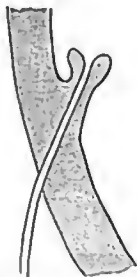
In four cases causative affections of the ureters were observed. In three of them the trouble was relieved permanently by operative procedures which were based upon the labors of Küster, Fenger, and Howard Kelly.

CASE I. Hydronephrosis of traumatic origin; nephrotomy, followed by successful plastic of the proximal orifice of the ureter; cure.—J. W., aged nine years, a well-developed, but somewhat emaciated boy, had sustained a severe contusion in January, 1895, while coasting on the snow. Hæmaturia followed and persisted for nearly four weeks. Much pain was complained of also, accompanied by considerable fever, which, however, abated by the end of the third week. About six months later a peculiar scoliotic posture was observed in the boy, which was found to be dependent upon the presence of a tumor located in the right hypochondrium. About two quarts of urinous fluid were withdrawn from this tumor, and the following December three pints were again removed. On January 31, 1896, the following conditions were found: in the right hypochondrium, extending well back into the loin, a large fluctuating tumor; the colon could be determined, both by percussion and palpation, situated below and in front of this tumor. The urinary examination yielded a normal result, specific gravity 1020. The liquid obtained by puncture was clear, straw-colored, and charged with urinary contents. On February 3d, chloroform being administered, the tumor was exposed by an oblique lumbar incision, whereupon, the reflection of the peritoneum being found, this was stripped up until the ureter was exposed. Now the sac was freely incised and evacuated. The attenuated substance of the kidney represented in the plane of section a crescent-like mass occupying the upper and posterior part of the periphery of this sac, having in its middle the thickness of about an inch. On the inner surface of this mass unchanged renal papillæ could be

¹ Read before the Society of the Physicians of the German Dispensary, New York, February, 24, 1897.

easily recognized. No sacculatation of the calices was present. The proximal orifice of the arter was very conspicuous, and was found on the anterior wall of the sac about three inches above that part which would be its bottom in the upright posture. It resembled a nipple-shaped elevation projecting about one-third of an inch into the lumen of the sac. (Fig. 1.) The everted mucous membrane of the ureter was

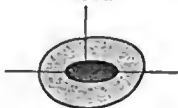
FIG. 1.



Longitudinal section of renal orifice of ureter.

thickened, hyperemic, and bled on touch. A silver probe was arrested at about the base of this projection, but the resistance yielded to moderate pressure, whereupon an elastic bougie (No. 5, French measure) was readily passed into the bladder. By the time these facts were ascertained the boy's pulse became thready, wherefore, after being plugged, the sac was attached by a few sutures to the integument, and the wound was dressed. The boy rallied promptly on stimulation, and only moderate fever followed. During the first twenty-four hours one and one-half pints of urine were passed by the urethra. Hence, it could be assumed that the left kidney acted in a satisfactory manner.

FIG. 2.

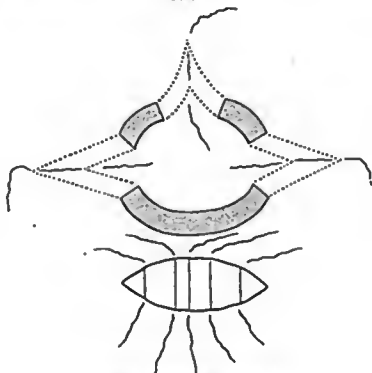


Incision of ureteral orifice.

On February 6th chloroform was administered again, and the orifice of the ureter being exposed, the following plastic operation was performed: the everted rim of the orifice of the ureter was incised on the right and on the left side, as well as in the middle of the upper circumference, the incision being carried far enough downward into the ureter to divide the stricture, also, at three points. (Fig. 2.) The upper

and lower angles of each of these rhomboidal wounds were sutured with catgut—i.e., the longitudinal incisions were sutured transversely (Fenger). It became evident now that the lower portion of the projecting rim also needed a plastic correction. Accordingly a flap of mucous membrane one-third of an inch wide and three-quarters of an inch long and distant from the ureter about one-half an inch, was excised from the lining of the sac, the defect being united by five buried catgut sutures. (Fig. 3.)

FIG. 3.



Plastic of renal orifice of ureter.

By this last step the nipple-shaped prominence was converted into a shallow, funnel-shaped depression. An elastic catheter having been placed into the ureter, the wound was lightly plugged and dressed. Slight reaction followed, and blood was observed shortly after the operation in the urine voided from the bladder.

On the morning of February 7th the catheter had to be removed from the ureter on account of severe pains radiating toward the bladder and penis. On February 9th the tamponade was renewed. On February 16th the discharge became slightly purulent, with moderate fever. On account of this complication plugging was discontinued, and two stout rubber drainage-tubes were inserted, by means of which the sac was irrigated three times a day with boro-salicylic solution. At the end of each of these irrigations a small quantity of methylene-blue was added to the solution to test the permeability of the ureter. By February 20th methylene-blue staining of the urine voided from the bladder was first observed. There was moderate fever every evening until the end of February. On March 1st the gaping wound was partially closed by means of a number of silkworm-gut stitches passed through the parenchyma of the kidney, leaving an aperture just sufficiently large for the drainage-tubes.

From this time on the boy picked up gradually, leaving the bed on

March 7th, and on March 15th he was sent home to Vermont, with instructions to have the sac irrigated daily. As there was considerable wetting from the renal fistula, a generous moss cushion was applied over the ordinary dressing, by which most of the urine was absorbed.

On April 15th the following report reached me by letter: "There was considerable fever, rising up to 103° F., after the boy's arrival from New York, which, however, abated as soon as the sac was properly irrigated. Thereupon the appetite returned, and the boy commenced to gain flesh and strength. At present there is very little discharge from the drainage-tube. The boy voided about a quart of urine by the bladder, which is acid and contains small quantities of pus."

On May 3d the patient was presented and looked excellently well. I found in the renal fistula a small drainage-tube, the moss cushion nearly dry. The capacity of the sac was ascertained to be one and one-half ounces by measure. Methylene-blue found its way immediately to the bladder. The urine was found to be normal, with the exception of microscopic quantities of pus. I decided to remove the drainage-tube tentatively. By July the fistula was reported closed, and the boy perfectly well.¹

CASE II. Hydronephrotic floating kidney; nephrectomy; cure.—Mrs. T. R., aged twenty-five years, nullipara, stated that on December 1, 1896, she began to suffer from paroxysmal pains of the left loin, without a known cause, requiring the administration of morphine. The paroxysms became milder and rarer, but the patient lost flesh, and was distressed by a ceaseless, dull ache, seated in the left loin, and radiating toward the corresponding groin and femur. A few weeks before this a large lumbar swelling was found by Dr. Paul F. Mundé, who sent the patient to me. The tumor was about the size of a child's head, was very movable, smooth, not painful on pressure, and very tense, so that fluctuation became apparent only after puncture, which yielded a clear, colorless serum, with only traces of urinary contents. The patient having been admitted to Mount Sinai Hospital, the daily amount of urine voided by the urethra was ascertained to be about three pints, of normal quality. Hence it was apparent that the other kidney acted properly. The alternative was either to remove the sac or to attempt the restoration of the function of the ureter, which had been lost through a cause as yet to be ascertained. The matter being laid before the patient, she was told that the former procedure would, in all probability, yield a rapid and complete cure, whereas the latter plan was not so certain in its results, and would require prolonged treatment, and possibly repeated operations. The patient declined any experimental measures, insisting upon the summary proceeding. On December 2, 1896, calomel was administered, followed by salts, causing a number of copious evacuations. The next morning the tumor had disappeared, and only when the patient had been anesthetized with chloroform, on December 4th, could a flabby, ill-defined mass be felt at the site of the tumor. This was displaced well backward toward the loin by pressure exerted by an assistant's hand, and was exposed by the

¹ On March 11, 1897, the patient presented himself with renal fistula reopened. The pelvis held one and one-half ounces of fluid. The colored fluid, however, did not descend promptly to the bladder; hence we concluded that a recontraction of the renal aperture of the ureter had taken place, which will need further correction.

usual oblique incision. It was seen to consist of a much-distended kidney and its pelvis. It was very readily stripped out of its fatty capsule and withdrawn from the cavity, which was a very easy matter on account of the long pedicle. The pedicle being now compressed, the pelvis of the kidney was laid open by an incision carried freely through the attenuated cortex. Within the distended pelvis the entrance to the ureter was easily found, and appeared to be normal. The ureter was patulous throughout. Hence the hydroaephrosis was due to obstruction by flexion. The kidney itself presented a characteristic example of what Feager describes as sacculated cystonephrosis. Each calix was much distended, communicating by a narrow orifice with the pelvis of the kidney, so that the mass really consisted of a number of smaller sacs communicating with the larger cavity of the pelvis. Feager had succeeded in curing a similar case by operation. He split the kidney in two longitudinally. The profuse hemorrhage proceeding from the large branches of the renal artery running through the septa was controlled by continuous suture. The septa separating the calices from the pelvis were severally divided. In this, our case, the correction of the sacculataion would have added the complement of a repair of the defective ureter—i.e., a portion of its proximal end would have been excised so as to shorten and stretch it, to prevent folding upon itself. Finally, the shortened ureter would have been implanted into the deepest part of the renal pelvis, as was done successfully by Küster. In view of the unwillingness of the patient, we had to abandon this enticing plan, and the kidney was accordingly removed. The ureter and vessels were severally tied with catgut. A drainage-tube was placed into the bottom of the wound, most of which was closed by suture. There was an uneventful recovery, the patient being discharged cured December 30th.

It must be considered a decided advance in the right direction that the cure of hydroaephrosis caused by obstructions in the ureter, or the pelvis of the kidney, or the elimination of renal fistulae, is now attempted in a conservative manner rather than by the sacrifice of the kidney, which procedure begins to appear rather barbaric. However, it must be added that external considerations, as, for instance, the choice of the patient, or a dangerous collapse caused by hemorrhage or heart-failure, may still and will compel the surgeon occasionally to have recourse to the summary process of nephrectomy, which, after all, yields a rapid and certain result. Under circumstances similar to those here related was I compelled to remove an otherwise healthy kidney in February, 1895, at the German Hospital. The case is reported in the *Annals of Surgery* for January, 1896.

CASE III. *Empyema of the ureter after nephrectomy; extirpation of the ureter; cure.*—J. K., aged twenty-six years, photographer, sustained during his twelfth year a severe compound injury of the left upper extremity, followed by suppuration and great deformity. In the summer of 1893 nephrotomy was performed on him for pyonephrosis by Dr. Park, in Buffalo, and the kidney being found to be totally disintegrated it was immediately removed. A rebellious fistula persisted, which closed from time to time. Whenever this occurred

symptoms of fever and retention supervened, which abated only after perforation and evacuation of the lumbar abscess. He was admitted to Mount Sinai Hospital in July, 1896. Considerable pyuria and an abscess of the prostate were found. This being incised, the pyuria still continued. Cystoscopy was impossible on account of a tight stricture of the prostatic urethra. In the left loin a very deep sinus was seen passing from the centre of the old scar downward and forward, and discharging from time to time large quantities of pus. No tumor could be felt in the hypochondrium. It was suspected that the discharge might be due to a retained ligature, wherefore the cicatrix was extensively laid open, but no ligature could be found. The large wound was packed, and as the wound was beginning to contract a remarkable variation in the amount of the discharge was observed. Whenever the sinus was discharging copiously the urine became nearly normal, but when the lumbar sinus had contracted large quantities of pus appeared in the urine. This alternation made it evident that the suppuration must be due to a diseased condition of the ureter. The wound in the perineum healed very slowly, closing by the middle of October. On November 13th we proceeded to extirpate the ureter. The most difficult portion of the task was the finding of the renal end of the ureter, which was searched for in a large cicatricial mass closely connected with the peritoneum. I decided not to work at random, but to proceed systematically, my plan being to find the reflection of the peritoneum and to follow this toward the spinal column, gradually raising the peritoneum from the cicatrix until the ureter was found. This plan proved to be successful. An oblique incision following the old scar, and continuing beyond it far enough forward, was passed through the abdominal muscles until the peritoneum was exposed in the anterior angle of the wound. This being stripped up, the posterior aspect of the descending colon became visible. Where the cicatricial mass commenced the peritoneum was dissected up with the knife carefully and slowly, the dissection progressing toward the median line. While thus proceeding, on account of the unyielding cicatricial deposit, the space became somewhat cramped, wherefore a second vertical incision, running parallel and close to the margin of the quadratus muscle, was added. This liberated the tissues to such an extent that the ureter was soon exposed. Its renal orifice was recognized by the everted hyperæmic mucous membrane. From this point on the operation became very easy. The peritoneum was stripped up along the downward course of the ureter. We found Cabot's statement beautifully verified, that on raising the peritoneum the adherent ureter would follow it. The oblique incision was further extended downward, and afterward to Poupart's ligament, care being taken to leave a sufficient muscular mass attached to the rim of the os ilium to enable us to apply an abdominal suture. Successively the psoas major and minor muscles, then the iliac vessels, were exposed, and the ureter was separated from its peritoneal adhesions. The vas deferens could not be seen. The lower portion of the ureter was found to be distended, its diameter being nearly three-fourths of an inch, its lining very tumid and strongly injected. It contained a large quantity of pus, which welled up unexpectedly, flooding the field of operation. Close to the bladder the ureter was found to be very brittle, and a continuous dissection became impossible. On attempting to pass a sound into the

bladder it was found that in close proximity to the lower orifice of the ureter a stricture existed, which, however, permitted the passage of an ordinary silver probe. The ureter was removed close to this stricture, its estimated distance from the bladder being not more than an inch. The wound was now thoroughly cleansed by irrigation, and its middle portion being closed by a dozen stout silk-worm-gut button sutures, the upper and lower angles were drained and left open. The procedure had consumed about two hours, and the patient had become very weak. The small and rapid pulse did not respond promptly to energetic stimulation, and the patient's condition remained critical for forty-eight hours. Profuse sweats, continuous vomiting, cold extremities all bode evil, and could not be ascribed to loss of blood, which had been moderate, but had to be rather charged to the extensive stripping up of the peritoneum. Finally the pulse improved, the patient's temperature rising from subnormal to 101° F. Lively suppuration followed from the bottom of the enormous wound, but the drainage was adequate and the abdominal suture healed throughout by first intention. The upper angle healed first. It took about four weeks to bring about closure of the entire wound. To enable us to deal with the patient's cystitis the urethral stricture was gradually dilated, and the bladder frequently irrigated. On January 22, 1897, a cystoscopic examination was made. It was found that the orifice of the right ureter was normal, that of the left ureter being difficult to locate in the mass of hyperemic ridges of mucous membrane. Gradually the cystitis also yielded, and the patient, formerly suffering from very frequent urination, can at present hold his water for two hours. His general condition has improved wonderfully, and he is still gaining weight. The patient was thereupon presented for inspection.

Pertaining to this subject is the observation that certain forms of pyelitis are maintained by temporary causes, which are very often relieved as soon as the pelvis of the kidney is drained through a direct incision made from the loin. A clot of blood or fibrin, or a calculus, may be the cause of such transient disturbance. In the fall of 1894 I had occasion to test this method of treatment in a case of acute pyelitis with evident retention. After maintaining drainage for about four weeks the febrile symptoms disappeared, and the drainage-tube being withdrawn the wound healed, the patient making a perfect recovery. In the following case, however, the relief was temporary only, lasting so long as the renal fistula was open:

CASE IV. Double pyelitis, with intense cystitis; nephrotomy of the left side; temporary improvement.—Mrs. G. Z., aged thirty-eight years, multipara, had been suffering for three years with very painful urination. The urine, voided in small quantities, was turbid and very often, toward the end of micturition, tinged with blood. For two months she complained of frequent attacks of lumbar pain. The robust woman was admitted to the hospital March 3, 1896, and her physical condition was found to be otherwise sound. On cystoscopy, according to Kelly's method, the bladder was found to be extremely irritable, its mucous membrane everywhere velvety, bleeding on touch. The trigo-

num, especially, was found to be much injected and intumescent, so that the left ureter could not be found. Catheterism of the right ureter, however, was accomplished, and twenty-eight grammes of a moderately turbid, acid urine were secured, which contained few pus- and blood-corpuscles, specific gravity being 1024. The kidneys could not be felt by palpation, but intense pain was complained of on pressure exerted over the left lumbar region. The patient voided forty-one ounces of urine from the 3d to the 4th of March. Diagnosis was made of double pyelitis, with chronic cystitis. The bladder would not hold more than two and one-half ounces of fluid during deep anaesthesia. On March 26th the left kidney was exposed. The aspirating-needle withdrew from the pelvis about two ounces of slightly turbid urine. Hence it was fair to conclude that it was somewhat distended. Along the aspirating-needle the pelvis of the kidney was freely incised, the incision being carried through the convexity. The surface of the kidney, as well as the parenchyma, appeared normal. Little reaction followed, the frequent urgency to urination becoming decidedly diminished, presumably in proportion to the reduced quantity of urine passing out through the bladder. April 1st cystoscopy was repeated, and the condition of the interior of the bladder was found unchanged. April 21st the patient was discharged at her own request, with the advice to wear a drainage-tube for several months. The disagreeable wetting of her clothing caused by the renal drainage, however, discouraged her so soon that she had the tube withdrawn by the end of May, whereupon the fistula closed within a very short while. There was a strong suspicion of tuberculosis, which, however, could not be confirmed, though frequent search for Koch's bacilli was instituted. Inoculation of a rabbit with the urinary sediment yielded also a negative result.

Echinococcus of the Kidney.

It is well known that the kidney becomes very rarely the seat of hydatids. Statistics show that the left kidney is about twice as often attacked as the right. The literature of the subject, comprising over three hundred recorded cases, contains only one instance of calcification of the sac. In Simon's case (No. 6) partial calcification is mentioned, whereas in this, our case, the entire sac was calcified throughout.

Echinococcus of the right kidney; hydatids voided by the urethra; exposure of the large tumor; incision and evacuation of the contents of the calcareous sac; secondary extirpation of the concremental shell; cure.—Mrs. E. D., aged twenty-six years, was presented by Dr. Steudel, of Seymour, Conn., June 19, 1895. The delicately built, small woman was pregnant in the sixth month, and stated that up to within three months she had felt entirely well, with the exception of a dull and heavy feeling she had observed to exist in the right hypochondrium for about seven years, which, however, had caused her no serious inconvenience. She said that eight years ago, while serving in a place in Germany, she had to feed regularly a number of dogs. A fortnight ago she was attacked by severe renal colic while voiding urine, and she observed that toward the end of micturition a number of grape-like bodies passed away from her. A collection of these bodies was shown to me,

which I immediately recognized as secondary hydatids. Dr. Steudel also found a considerable tumor in the right loin, which on examination was found to be smooth, unusually resistant, non-fluctuating and immovable. It extended downward in the right hypochondrium to the level of the navel, but was not influenced by the respiratory movements. Corresponding to the lowermost portion of the mass a smaller, knob-like, softish projection could be felt, which was very tender on pressure. By percussion it could be ascertained that the tumor extended upward to the level of the seventh rib posteriorly. Moderate nightly elevations of the temperature were observed, on account of which circumstance I advised an operation. Being admitted to the hospital, her daily quantity of urine was found to be 1430 grammes. It contained neither albumin, pus, nor sugar. All other organs were found normal. On June 21st, the patient being chloroformed, the tumor was exposed by an oblique lumbar incision. Now it became evident that the knob-like projection found on the lower circumference of the mass consisted of about two-thirds of the normal kidney, upon the upper pole of which, and connected with it, rested the large ovoid tumor, having the shape and size of a small cocoanut. The attempt to puncture the tumor failed because a stout needle could not be forced into it, breaking off. Finally, with considerable trouble, a square aperture was cut into the bony investment of the tumor by means of a stout resection-knife. Besides a small quantity of turbid serum, the cavity contained nothing but a closely packed, nested mass of hydatid membranes, enclosed in a large outer membrane. All this material being scraped out with a sharp spoon, it was seen that the rough, bone-like shell was bleeding wherever scraped, hence it became clear that it was organized. The oozing was so considerable that it became necessary to plug the cavity and to dress the wound. It may be added that the sharp spoon encountered everywhere the same resistance that an osseous cavity would offer to it. The place of communication between the hydatid cyst and the pelvis of the kidney could not be found.

The operation was borne very well; but in the course of the next week it became more and more evident that the cavity had not the slightest tendency to collapse and to diminish. It was clear that as long as the hard shell remained closure of the wound could not be expected. In Simon's case a number of small, bony plates were expelled, having apparently sloughed away. In this our case, however, we had to deal not with a rudimentary formation of small detached osseous plates, but with a complete bone-like capsule of extremely hard material, which, as we saw later on, varied in thickness from between one-fourth to one-half of an inch, and was well vascularized everywhere. Hence it was not probable that spontaneous expulsion would occur. As it is well known that the outer sac of echinococcus-cysts enters into intimate connections with all the organs of the vicinity, extirpation of the sac is rightly considered one of the most difficult undertakings, and was condemned as improper and inadmissible by Simon. In spite of these considerations the contingencies of the case seemed to

point urgently to the necessity of extirpation, which, with the consent of the patient, I determined to carry out.

On July 15th she was accordingly chloroformed. The operation was an exceedingly difficult, troublesome, and laborious one, both on account of the deep and inaccessible situation of a large part of the osteoid sac, and on account of the serious complications which had to be encountered in the shape of the invasion of both the pleural cavity and the peritoneum. Two of the lower ribs had to be excised, and even then the removal of the closely adherent calcareous masses was very difficult, and blunt dissection inapplicable. The edge of the knife had to be used throughout. When the pleural cavity was widely opened alarming cyanosis and heart-failure set in. The pleural defect was quickly plugged, and artificial respiration was instituted. After about five minutes the patient's condition had improved so far that the operation could be continued. It was found that, just as on the pleural side, so toward the peritoneum the sac had incorporated the serous membrane, and that a large portion of the peritoneum had to be taken away. As soon as the mass was detached from the peritoneum the defect was closed with a catgut suture. The irregular-shaped, calcareous shells composing the entire capsule were of different sizes, the largest one measuring over 7 cm. in both directions; but most of them were much smaller and were connected along irregular lines by short and dense connective tissue, resembling the lines of cranial sutures in an infant's skull. Finally, after about two hours' hard work, all the calcareous masses were removed. The wound was packed and the patient brought to bed. Considerable collapse followed and had to be combated by frequent stimulation, recurring from time to time unexpectedly, so that considerable vigilance had to be exercised. Finally, on the third day, the pulse was steadier and the patient's face lost the pinched look. On July 19th the packings were removed from the main cavity, and it became evident that this had contracted very considerably. The pleural packings were removed on July 21st, and from this date on progress was steady and rapid until the middle of August, when the patient aborted, but this did not retard her recovery long. Her general condition improved steadily, and the large cavity contracted rapidly, so that the patient could be discharged cured, August 22d. Professor Simon mentions explicitly that in his case (No. 6) the extruded plate-like mass contained osseous tissue. In our case Dr. Schwyzer, pathologist of the German Hospital, found only calcareous matter. The remarkable collection of potsherd-like concretions presented vividly recalls the shape of infantile cranial bones. The patient, also presented, is now perfectly well. On palpation the kidney can be felt connected with a resistant mass resting above it, which undoubtedly consists of shrunken cicatricial tissue.

A Plea for an Earlier Performance of Nephrotomy in Acute Inflammatory Conditions of the Kidney.

In the year 1890 a young woman was admitted to Mount Sinai Hospital with rebellious and rather profuse hæmaturia, which was evidently of renal origin. No traumatism, no acute malady had preceded, and the hemorrhage had persisted three weeks before the admission of the

patient, who presented the signs of considerable exsanguination. Her spleen was not enlarged, the quantity of urine normal, its composition altered only inasmuch as it contained a great deal of blood and a few pus-corpuscles, which probably came from the vagina. Every evening slight elevations of the temperature were observed, and the left kidney was rather sensitive both on pressure and spontaneously, and sufficiently enlarged to be felt on palpation. I thought of the possibility of tuberculosis, calculus, or of a neoplasm of the kidney. A number of attempts were made to influence the hemorrhage by internal medication, but were ineffectual. Finally the condition of the woman became so alarming that I decided to explore the kidney. Accordingly nephrotomy was done. It was found that the organ was considerably enlarged and turgid, and that the capsule was extremely tense. The kidney-fat was oedematous. Punctures yielded a negative result. The capsule was incised along the entire convexity, whereupon the parenchyma of the kidney bulged out somewhat. The capsule was strongly adherent, and the surface of the kidney marked by a number of punctate and stellate hemorrhages. By an incision carried through the convexity, the pelvis of the kidney was opened, and, the left index-finger being introduced into it, the entire circumference of the organ was examined manually. No stone and no appreciable tumor were found, and the pelvis gave the sensation of a normal mucous membrane. A drainage-tube was introduced, through which large quantities of bloody, urinous serum were discharged. It was noted that the urine voided by the urethra contained much less blood the day after the operation, and in the course of the next ten days the blood-staining of the urine disappeared entirely. The local and general disturbances also disappeared, and a fortnight later the drainage-tube was withdrawn, whereupon the wound healed rapidly. I had occasion to see this patient in the year 1893, when she told me that she had been perfectly well ever since her last illness. According to these facts, tuberculosis, neoplasm, and calculus could be positively excluded, it being evident that we had to deal with a form of acute nephritis accompanied by great tension. The hyperæmia gave rise to capillary hemorrhage, which was relieved by the drainage and relaxation of tension afforded by nephrotomy.

Within the last few years similar experiences have been noted by other surgeons, and finally there appeared in *The Lancet*, in its issue of January 4, 1896, a communication by Reginald Harrison, in which the indication for the performance of nephrotomy is extended to some forms of acute albuminuria which are accompanied by swelling and tension of the kidney. The following lines of thought will appear very natural to the surgeon who is accustomed to see the deleterious influence of great tension and infectious retention on various glandular organs. Every form of glandular inflammation, whether produced by purely chemical or microbial, and through them indirectly also chemical, influences, is accompanied by pronounced disturbances of the circulation, which manifest themselves through the presence of hyperæmia, stasis, exudation, and tension. It is well known how favorably the initial stages of these conditions are influenced by a free incision, which

relieves tension. Especially noticeable is this where glandular tissues are enclosed in a stout capsular envelope, as, for instance, the testicle, the submaxillary and parotid glands. In the case of the testicle and submaxillary salivary gland infection and excessive tension may lead to total necrosis, as can be seen in angina Ludovici and in cases of so-called spontaneous gangrene of the testis. As far as the final result is concerned, it is not different whether the infection entered through the secretory ducts or through the circulation by embolism.

Very similar must be the conditions in the kidney. Total, embolic necrosis of the kidney, however, is an extremely rare occurrence, there being only one case (Friedlander's) on record. The circumstance is explained by the large size of the renal artery. But the destruction of multiple circumscribed areas of the organ is a common observation. And where the integrity of the kidney is attacked through chemical influences circulating in the blood we see that the secretory apparatus of the organ is primarily attacked. If the invasion is a general one, we see that the disturbance is followed in its highest degrees by marked diminution in the urine, which becomes bloody and charged with albumin, or finally by total and fatal suppression. Very often, in the primarily non-fatal cases, lasting damage is done. The destroyed secretory elements are not only not restored, but their continued disappearance will finally culminate in uræmia. Furthermore, the modifying influence of purely mechanical interference with the normal circulation of the kidney by valvular lesions of the heart, or of a vicarious congestion due to sudden disability of the other kidney, through traumatism, operation, or morbid processes, will also have to be considered. Finally, as before stated, we have to mark the difference between forms of nephritis characterized by rapid and extensive destruction noticeable to the naked eye, and processes of degeneration which affect only the finer structure of the kidney. The questions which present themselves upon the basis of these reflections are: *First*, Will the relief from tension afforded by early nephrotomy and drainage exert a favorable influence upon the initial stages of acute infectious processes of the kidney, which otherwise would lead to suppuration? *Secondly*, Will nephrotomy exert a curative influence if it is performed during the initial hyperæmic stage of certain forms of infectious, non-suppurative nephritis, which have a tendency to lead to ultimate loss of the specific function of the organ, and are not relieved by internal medication?

Before answer is attempted to these questions we have to examine what danger is involved in the performance of the operation of nephrotomy. We know that the relative danger of nephrotomy is directly proportionate with the extent of the renal damage. Tuffier (Duplay et Reclus, *Traité de Chirurgie*, tome vii.) gives a rate of mortality for nephrotomy performed in non-infectious cases of renal calculus of 6

percentum; while in cases of pyonephrosis the rate for the same operation is 23.3 per cent. Other authors have arrived at similar figures. My own statistics, embracing twenty-one nephrotomies, contain only one case of death following this operation, and in this case, as we shall see, the cause of death was really not dependent upon the operation. From this we see, then, that nephrotomy can be considered a comparatively safe operation. As a purely technical problem, nephrotomy is known to every surgeon to be, under ordinary circumstances, a simple and easy procedure. The hemorrhage unavoidably encountered is trifling and easily controlled, and the hemorrhage caused by the incision of the renal tissue itself, though profuse at first, is also easily checked by packing. Should one or more of the larger branches of the renal artery, traversing the septa, be injured, the slight pressure exerted by a good pack will always control the bleeding.

Let us return now to the questions which we have raised. To answer it in a categorical fashion, it is necessary to ascertain the degree of the injury sustained by the renal structures in each given case. The physical and chemical aids at our disposal are extremely valuable and important, but cannot yield the result that is gained from a systematic search made through the parenchyma of the kidney itself by the microscope. I consider Fenger's advice, to avail ourselves of each opportunity afforded by a nephrotomy to remove a segment of the kidney for microscopical examination, extremely useful. No harm is done to the patient, and more definite and precise information is gained regarding the actual condition of the kidney than from the examination of the urine alone, which occasionally leaves us in the lurch altogether. Mucous changes, as, for instance, capillary embolism with consecutive infarction, the presence of pathogenic microbes in the primary urinary channels, desquamative processes, and shrinkage of the glomeruli and canaliculi, can be positively recognized. In case of recovery their former existence cannot be gainsaid. As to the questions themselves, these answers can be given:

First, in all forms of suppurative inflammation of the kidney the surgical principle of early and extensive incision, to relieve tension and to afford drainage, is to be maintained with the same strictness and emphasis as it is accepted for all cases in which the suppurative focus is enclosed in rigid envelopes, capsules, fasciæ, or the periosteum. If a timely incision is not made, increasing tension will inevitably end in the death of the tissues. What we are accustomed to do without hesitation in phlegmonous affections of the subaponeurotic tissues of the palm, in suppurations of the harsæ, of the submaxillary and parotid glands, of the joints, and in acute infectious osteomyelitis—i.e., a free incision, should be done just as unhesitatingly in suppurations of the kidney. The objection that the diagnosis is difficult on account of the deep situation of the organ

is not new. It had to be met, and was swept aside when the pathological conditions just mentioned were clearly recognized. With our ability to diagnosticate deep-seated suppurations at an early stage the hesitation formerly felt has disappeared. It is undoubtedly true that in some of the most destructive invasions of the kidney, as, for instance, in ascending septico-pyelonephritis, or in multiple embolic nephritis, one or another or several of the important physical diagnostic signs may fail. But by skilfully excluding all other organic disturbances, and in the presence of grave and threatening danger from suppression, the surgeon's action will be determined by weighing all the apparent circumstances. One of the most important and reliable signs of a serious involvement of the kidney is local pain on pressure. But even this symptom may be occasionally absent, as will be seen from the case published by Dr. Howard Lilienthal, in *Annals of Surgery*, March, 1896, Case No. 3. The patient in question was operated on in the surgical division of Mount Sinai Hospital. The history is as follows:

Four weeks after an acute osteomyelitis of the upper jaw, treated by extensive incision and the extraction of a sequestrum, the course of healing having been complicated by an attack of erysipelas, suddenly high fever developed with a rigor, accompanied by exquisite lumbar pain of the right side. The urine was normal, except that it contained a trace of albumin, and micturition was painless. Guided by the lumbar pain, Dr. Lilienthal incised, on May 5th, a cortical abscess of the right kidney. The sepsis continuing, another abscess was found on May 20th by an exploring-needle, and was also incised. At this time the urine was still free from pus, containing only a trace of albumin and a few blood-corpuscles, together with a few granular casts. The sepsis still continued, the patient losing ground visibly. He was delirious and somnolent. On July 10th I examined the patient with Dr. Lilienthal. He was extremely emaciated, and presented the features of the gravest septico-pyæmia. A thorough examination of all the internal organs evinced nothing positive. No pain on pressure could be found anywhere. In spite of this, and on account of the absence of other organic changes, I advised a renewed exploration of the right as well as an incision of the left kidney. Accordingly, on July 23d, Dr. Lilienthal incised in both kidneys a number of cortical abscesses. The patient recovered and was discharged cured September 29th.

We had in this instance a very encouraging example of the utility of surgical procedure in a case of multiple embolic suppuration of both kidneys, an affection which heretofore was considered absolutely hopeless. On the other hand, it is very questionable whether the most energetic measures will be of any use where the multiplicity of suppurative foci virtually amounts to a complete destruction of the organ. This condition is comparable to the infiltrating, diffuse phlegmon of a limb, in which the most thoroughgoing and extensive incision cannot lay open every focus of infection, and where the danger to life can be eliminated

only by an ablation of the entire organ. This remark refers to a late stage of the infection. Different, however, is our standpoint when we assume that by an early and extensive incision this very destruction may be prevented. At any rate, it is proper that this interesting and important question be submitted to a thorough test. Assuming that the rapid extension of the destructive process can be modified and checked by an early incision, this procedure assumes a truly conservative value. The rapidity with which the kidney may become compromised can be estimated from the following history:

Chronic cystitis; acute parenchymatous nephritis with miliary abscesses; nephrotomy; nephrectomy; cure.—Mrs. S. S., aged thirty-four years, was admitted December 13, 1896. Had had two children, and stated on admission that she had been suffering from painful micturition for two years. Her strangury was so intense that occasional catheterism was necessary. On December 7th, shortly after a catheterism performed by her family physician, she suddenly felt an intense, cutting pain in her left loin, which was followed by a violent chill and high fever. Each paroxysm was accompanied by retching and vomiting. The lumbar pain was growing steadily worse, radiating toward the bladder and left thigh. On admission a temperature of 104° F. was found. A continuous desire to urinate tormented the patient, even when the bladder was empty. Her pulse was small, very frequent; her integument bathed in perspiration, and in the left loin an exquisitely painful tumor could be felt, which was overlapped by the colon, and was evidently the left kidney. During nine hours which preceded the operation she voided thirteen and one-half ounces of urine, which was alkaline, had a specific gravity of 1022, contained a trace of albumin, a few pus-corpuscles, but no blood. She was chloroformed as soon as I had seen her, and the enlarged kidney was exposed. It was observed that a considerable quantity of watery serum escaped from the fatty envelope of the kidney, which was edematous. The surface of the kidney appeared to be deeply congested. As soon as the capsule was incised the parenchyma bulged out. When the cortex was incised no blood was seen to flow, but turbid, bloody serum was escaping. Several punctures of the kidney were made, until finally a cavity, evidently the pelvis, was found, from which also a dark-brown bloody serum was withdrawn. Using the needle as a guide, the pelvis of the kidney was freely incised, the incision penetrating from the convexity. While a finger was dilating the deeper part of the incision a resistant band of tissue gave way. This was followed by extremely profuse arterial hemorrhage, which, however, was easily checked by firm plugging with iodoform-gauze. To encourage secretion the kidney was separated everywhere from its fatty envelope, and was surrounded with gauze compresses. Then the wound was dressed.

The only change observed was the disappearance of the acute pain, but retching and the high fever remained, though not so intense as before the operation. When the dressing was changed on December 14th the absence of that copious sero-sanguinolent discharge was noted which is seen regularly to follow nephrotomy. The same observation was made during the following three weeks. Nineteen and one-half ounces of

urine were voided on December 15th. It was alkaline, containing few pus- and blood-corpuscles, n trace of albumin, and had n specific gravity of 1024; strangury unchanged. These observations made it extremely probable, not only that the secretion of the diseased kidney was remarkably scanty, but also that its ureter was occluded. Otherwise much blood would have descended to the bladder. On December 20th the deep packings were removed from the kidney. Renewed arterial hemorrhage compelled us to replace them immediately. Some pus also escaped, but its source could not be ascertained. The quantity of urine passed by the urethra had increased, December 16th, to forty, December 20th, to sixty ounces, and its reaction had become acid. No blood was found in it at any time before January 7th. With continuing fever and vesical pain the condition of the patient became gradually and steadily worse. Several larger and smaller abscesses had broken through into the drainage-channel, and it became evident that the patient would succumb unless the kidney were removed. Accordingly on January 7th this was done. The day preceding the operation sixty-two ounces of urine were voided, hence we concluded that the other kidney was acting in n satisfactory manner.

During the nephrectomy the following facts were observed: the volume of the kidney had shrunk to about the normal standard. Its parenchyma had a waxy pallor. In the lower portion of the kidney an abscess containing about two ounces of pus was found. Separation of the vessels and ureter was very difficult on account of their extreme shortness. One of the ligatures slipped after the kidney was cut away, and the tremendous hemorrhage was controlled by a large clamp. The wound was packed and treated by the open method. The patient bore the operation very well. By January 11th there was a marked diminution of the fever noticeable, and the daily quantity of urine, which had fallen from sixty-two ounces to twenty-six ounces after the operation, arose from twenty-eight ounces on January 11th to seventy-one and one-half ounces on January 12th, which remarkable rise was undoubtedly induced by copious draughts of water. The urine contained much blood the day after the operation. From this day on recovery went on uninterruptedly. The last ligature came away on January 29th, and February 4th the larger part of the wound was closed by secondary suture. At present the patient is expecting her early discharge. It may be added that the strangury ceased immediately after the nephrectomy. The urine is at present acid, abundant, and contains nothing abnormal except a slight trace of albumin. The pathological report on the specimen is as follows:

Diagnosis. Acute parenchymatous nephritis, with embolic abscesses; incipient purulent nephritis.

Glomeruli partly normal, partly atrophic; in the latter case the capsule is filled with granular material; the epithelium congested; the canaliculi show granular degeneration; nuclei do not accept staining. The epithelium is swollen and necrotic; everywhere between the canaliculi round-celled infiltration, without increase of the connective tissue. Vessels appear to be normal, with the exception of the smaller capillaries, which are clogged with n large number of small cocci, probably staphylococcus. The cocci become beautifully visible by staining with Löffler's solution. Inside of the canaliculi there are also groups of short rods, which take the Löffler stain. Everywhere in the cortex are small,

but well-defined agglomerations of degenerated white blood-corpuscles, which can be accepted as miliary abscesses.

Nephrotomy was performed in this case six days after invasion, but the destructive process was not checked by it, nor could the infectious material accumulated in the kidney be drained away in an effectual manner. Had nephrotomy been done twenty-four or forty-eight hours after invasion, would it have been otherwise?

Fulminant and fatal case of double ascending gonorrhæic nephritis deserves to be described here on account of its rarity:

J. J., aged ten years, acquired gonorrhœa while crossing from Europe in the steerage of a transatlantic steamer. The disease became manifest on April 30th, when he arrived. On May 15th difficulty of micturition and fever set in. May 22d—i. e., eight days before his admission to the hospital—violent lumbar pain of both sides was complained of. Three days previous large quantities of pus were voided by the urethra, followed by some blood. After that continuous high fever prevailed; the secretion of urine becoming gradually diminished, and finally scanty. On admission, on the evening of May 30th, the following facts were observed: the patient somewhat cyanosed, somnolent, covered with perspiration; his extremities cold; temperature 101.4° F., pulse 130; copious purulent discharge from the urethra, from which there escaped at short intervals, involuntarily, bloody, turbid urine in small quantities; the urine charged with pus, albumin, and blood; alkaline; its specific gravity 1030. The following morning I found, in addition to the facts just related, both kidneys perceptibly enlarged and palpable, especially so the right one, which was exquisitely painful to touch. The amount of urine voided during the entire night was *eight ounces*. In spite of this desperate condition I determined to incise both kidneys. After the administration of a small quantity of chloroform to produce primary stupor, the right kidney was rapidly exposed. Its fatty capsule was found very œdematous, the kidney itself enormously enlarged and tense. When the cortex was deeply incised there was no hæmorrhage. The parenchyma appeared dusky, almost brown, and mottled with a large number of gray spots. It was extremely brittle, discharging turbid, reddish-brown serum. The same kind of serum escaped from the pelvis. A large drainage-tube was slipped into the opened kidney, and the wound was packed. On account of failing pulse incision of the other kidney was desisted from. The patient rallied from the collapse, but his previous condition remained unchanged. The amount of the urine continued to diminish, until the suppression became absolute. The boy died twenty hours after the operation, with a temperature of 105° F. The minutes of the post-mortem examination, made by Dr. Mandelbaum, the pathologist, on June 1st, read as follows:

Both kidneys very much enlarged, especially so the right one, which seemed to be increased to double the normal volume; the left kidney was much congested, containing in its lower portion an abscess which held 4 c.cm. of the pus; the right kidney converted into a mass of innumerable abscesses varying from the miliary to the size of a cherry; capsule strongly adherent; the cortex much thickened. In stripping off the capsule a large number of subcapsular abscesses were exposed; the lower

half of the kidney occupied by a large disintegrating clot; the ureters normal, with the exception of the lower thirds, which are much congested; vesical walls considerably thickened; vesical mucous membrane everywhere hemorrhagic; the prostate much enlarged, strongly congested, and containing a nearly empty abscess-cavity, which still held 2 c.cm. of pus. Slide-preparations of pus gained from the kidneys contained multitudes of staphylococci and gonococci. The blood-serum and serum-agar cultures of the same pus yielded colonies of gonococcus and staphylococcus albus. The pus from the prostate, however, yielded only staphylococcus albus. Cultures made from the urethral discharge remained sterile, probably because they were taken shortly after the escape of some urine. Microscopic sections of both kidneys gave evidence of unmistakable pyelonephritis, and showed luxuriant colonies of gonococcus and staphylococcus by means of Löffler's solution. Gonococci were in every instance decolorized when treated by Gram's stain.

In the presence of such an extraordinary invasion of both kidneys little can be expected from any therapy instituted at a late period of the disease. I wish to emphasize the opinion that when both kidneys are attacked simultaneously in a very virulent manner the indication for energetic action seems to be most urgent, and that much more ought to be done than heretofore in this field, scarcely cultivated by any surgeon. The same indication presented itself in another case during the period of time comprised in this paper, but my urgent wish to interfere was frustrated by the resistance of the patient:

Repeated nephrotomy for pyonephrosis; relapse; nephrectomy; sup-pression; death.—J. W., aged thirty-five years, had been operated on by me for calculous pyonephrosis in May, 1893, at the German Hospital. Two stones were removed, and the patient was discharged cured. On February 23, 1895, the same operation was performed a second time at Mount Sinai Hospital by Dr. Lilienthal, who also evacuated much pus and removed one stone from the kidney. The patient again recovered, and the wound healed. The patient was readmitted February 24, 1896. He stated that his old pains had recurred in the lumbar region, with high fever, chills, and vomiting. Strangury and augmenting pain drove him to the hospital, where a considerable tumor was found occupying the left loin, with a temperature of 100.6° F., and alkaline urine, which contained much albumin, pus, phosphates, and hyaline casts. The daily quantity of urine was fifty-one ounces. The right kidney could not be felt, nor was deep pressure exerted upon the right loin painful. February 27th the bladder was emptied and irrigated, preparatory to a cystoscopic examination, which, however, could not be carried out on account of the occurrence of a severe chill. March 2d, under chloroform, the old scar being incised, the much-enlarged left kidney was exposed and opened. It consisted of a thin-walled bag, composed of a number of communicating cavities distended by pus, many of these cavities still containing stones. As the organ had become manifestly useless it was immediately removed. Hemorrhage was very moderate, and the patient rallied well from the operation. During the following night very little urine was voided (eleven ounces in sixteen hours), becoming more and more scanty. The patient was apparently failing.

His pulse was very rapid; the temperature 104.6° F.; the skin covered with a clammy perspiration. My proposition to relieve the right kidney by a free incision was firmly declined, and the patient died March 4th in a comatose condition. No post-mortem could be had, but the right kidney was withdrawn through the existing wound, and was found in a state of purulent pyelonephritis, which seems to have existed for some time.

It is proper for me to make this remark that, had I been content with simply incising for a third time the left kidney, the patient's life would have been probably prolonged.

How little can be expected from simple nephrotomy in the presence of a multiple suppuration of the kidney can be seen from the following case:

Tumor of the kidney with pyuria; nephrotomy and evacuation of five renal abscesses, each containing a stone; closure of the wound; recurrence; nephrectomy of the calculous kidney; cure.—Mrs. J. V., aged forty years, multipara, admitted June 8, 1896, stating that she had suffered from persistent hæmaturia five years ago, which, however, ceased spontaneously. A year ago she had sharp renal colic, accompanied by fever and vomiting. Shortly after this pus was detected in the urine. Micturition was never painful. Since four months continuous pyuria and noticeable emaciation existed. Dr. Alfred Meyer found a lumbar tumor, and sent the patient to me. On admission a large, dense, non-fluctuating tumor was found in the right loin, which protruded into the hypochondrium, displacing the colon downward and forward. The urine was abundant, acid, had a specific gravity of 1016, and contained large quantities of pus and some albumin. June 10th, through the cystoscope a normal, pale vesical mucous membrane was seen. Furthermore, it was observed that on gentle massage of the right groin a cylindrical plug of pus escaped from the right ureter, the orifice of which appeared much congested. The left ureter appeared normal. Into this a catheter was introduced by means of Kelly's procedure. Sixteen grammes of urine were collected, that contained a few pus-corpuscles and traces of albumin. Hence it was concluded that the left kidney, though not perfectly sound, was not seriously involved.

June 15th the right kidney was exposed and freely incised. From the pelvis and from four calices large quantities of pus and several irregular shaped uratic stones were removed. The kidney and wound were drained in the usual fashion and dressed. Little reaction followed. The secretion diminished rapidly, and patient was discharged July 18th with a nearly closed wound. Her general condition had improved noticeably. October 7th she presented herself again, reporting that the wound, which had been closed for several weeks, had reopened a week ago, discharging a large quantity of pus. I found the lumbar tumor smaller than it was before the first operation, painless to touch; the general condition of the patient was very good, her urine acid and abundant, but containing much pus. I advised the removal of the kidney, which was done October 22, 1896, without accident. The kidney was found to contain six more abscesses, each harboring a stone. The renal parenchyma looked waxy, and was very much shrunken. By October 27th the urine became nearly normal, though still containing microscopical

quantities of pus. November 20th the mass-ligature of the pedicle came away, and December 15th the patient was discharged, cured.

The presence of morbid changes in the other kidney should not prevent nephrectomy of a totally disorganized organ. On the contrary, the removal of such a pus-bag as was encountered in this case eliminates a continuous menace to the other moderately diseased kidney.

Resembling in many respects the preceding one, the following case was nevertheless much more serious, on account of the extreme marasm caused by a renal suppuration of ten years' standing:

Calculus pyelonephritis of the right side; cystoscopy; nephrectomy; cure.—E. W. A., aged thirty-eight years, merchant, was admitted October 13, 1896, having come from the South. He stated that twelve years ago internal urethrotomy had been performed for rebellious gleet and stricture. This was followed by an acute cystitis, which had persisted ever since that time. He suffered for ten years, more or less, from periodical attacks of severe renal colic of the right side, which were accompanied by chills and bloody urination. In spite of a ravenous appetite the patient had emaciated to a skeleton. Since ten weeks his urine had become putrid, and from that time on continuous fever, frequent chills, night-sweats, and incessant lumbar pain, radiating toward the bladder and the right testicle, were present. Urination was very frequent. The physical examination showed excessive emaciation and light anasarca of the feet; otherwise normal conditions; an accelerated pulse of good quality. In the right loin a large, sensitive, resistant tumor could be felt, which descended to the level of the navel, and extended to the median line. The urine was foul, but acid, containing much pus, some blood, and very large quantities of detritus; its daily quantity was about fifty ounces; the temperature 100.2° F. in the morning, with regular evening exacerbation. October 14th cystoscopy was done. The trigonum was found to be moderately congested, especially around the orifice of the right ureter, from which a solid plug of pus was seen escaping. From the left ureter clear urine was seen escaping at short intervals. Catheterization of this ureter was not attempted. The left kidney could not be palpated. The assumption was fairly justified that the left kidney was sound. October 15, 1896, the patient being chloroformed, the tumor was exposed and easily separated from its lateral adhesions. It represented a thin-walled sac from which the aspirator removed foul pus, and within which a number of stones could be distinctly felt. The cortex appeared waxy. A mass-ligature was placed around the pedicle and the organ was ablated. The wound was dressed in the usual manner. During the first twenty-four hours following the operation fifty ounces of urine were voided, which was nearly clear. It had a high specific gravity, containing a small quantity of pus and a little blood. From October 18th the temperature became normal. The urine continued to be abundant, and the patient's general condition, aided by his enormous appetite, was rapidly improved, so that on November 15th he could return to his home cured, having gained since the operation thirty-four pounds in weight.

CONCLUDING REMARKS. The surgical principle, to afford timely relief from tension, and early to evacuate after an early diagnosis, made

in the presence of acute suppurative processes threatening the integrity of an organ, must find unreserved application in suppurations of the kidney. The earlier such measures are taken the more they deserve to be called truly conservative—that is, directed toward the preservation of the functional ability of the viscus. Nephrotomy done in the early stages of renal suppuration is a safe procedure, and ought to be done much oftener than heretofore, the indication being based upon the presence of suppurative fever, a renal tumor, and especially upon the voiding of a decreasing daily quantity of uriae.

Secondly. As far as the indication is concerned for the performance of nephrotomy in the presence of acute non-suppurative forms of nephritis, Reginald Harrison strongly recommends early interference whenever, in the presence of an infection, albuminuria and appreciable painful renal intumescence can be demonstrated, from which the presence of increased renal tension can be deduced. He published in the issue of the *Lancet* of January 4, 1896, three successful cases of nephrotomy performed, respectively, in a case of scarlatinal nephritis, in one caused by influenza, and in another one following exposure to weather. These suggestive facts are mentioned here only to serve as a stimulus to further endeavor.

Neoplasms of the Kidney.

During the period comprised within the limits of this paper the kidney was twice successfully removed for neoplasms. Unfortunately in one of the cases relapse followed:

CASE I. *Alveolar sarcoma of the right kidney; extirpation; cure; relapse.*—D. G., aged five and a half years, was admitted June 13, 1896, to Mount Sinai Hospital. Her mother stated that the child had commenced to complain of right lumbar pain six weeks before, and that a peculiar hardness could be felt in the loin. No difficulty or pain in urination was observed, but the patient became pallid and lost flesh. On admission a large, smooth tumor could be felt occupying the right loin and hypochondrium, extending downward to the crest of the ilium, and projecting the width of four fingers beyond the median line. It was scarcely movable, and by inspection the colon was found to be displaced far downward and to the left side. The tumor could not be differentiated by percussion from the liver. The uriae was absolutely normal, likewise all the other organs. June 19th the patient was chloroformed and the posterior aspect of the tumor was exposed by an incision beginning near the margin of the quadratus lumborum, and extending in an oblique direction downward and forward four inches beyond the median line of the abdomen. The peritoneal cavity was immediately opened and the collapsed intestines were packed away under hot towels. After this my first endeavor was to expose the renal vessels, as from their early occlusion I expected a considerable diminution of the otherwise dangerous and profuse hemorrhage. Accordingly, the peritoneum was stripped up from the kidney until the ureter and renal vessels were exposed. They were cut through between a double

ligature. A large portion of the peritoneum was so closely adherent to the mass that it had to be sacrificed. The most difficult part of the operation consisted in the separation of the upper portions of the mass from the under surface of the liver. A number of large veins communicating with the liver were torn through, and bled profusely. Artery-forceps being inapplicable, the bleeding surface was covered with an iodoform-gauze packing, by which the hemorrhage was perfectly controlled. After the kidney had been removed an appalling cavity lay exposed, in the bottom of which the renal cavity could be seen hared to the length of six inches. An affluent vein of the size of a crow-quill had been torn out of the renal cavity. The resultant defect was closed by a continuous lateral catgut suture of the vein-wall. While I was rapidly closing the peritoneal defect by a continuous catgut suture, and while the abdominal portion of the external wound was being closed by a number of button sutures, Dr. Lilienthal infused 1000 grammes of normal saline solution, this having become necessary by a threatening collapse. The wound was plugged with absorbent gauze brought out near the posterior angle, and was dressed. The patient was brought to bed with a thready pulse. Repeated attacks of collapse required constant vigilance and renewed energetic stimulation. During this period of depression, lasting until June 21st, the quantity of urine voided was decidedly below the normal, containing albumin, but no blood.

Stools passed involuntarily, and the child's condition remained critical until July 15th. The apathy and depression gradually disappeared. In spite of the extensive abdominal invasion the child took and retained considerable quantities of strongly stimulating liquid food, and to this circumstance is to be ascribed her recovery. The sutured parts healed by the first intention. The large cavity contracted rapidly, and the patient's general condition improved visibly, so that she could be discharged cured September 6th. Unfortunately, a relapse became manifest toward the end of November, when the patient was presented to me with a rapidly growing tumor, occupying the lower surface of the liver. It was inoperable. She died in December. The pathologist reported that the tumor was an alveolar sarcoma.

The removal of this very large and, in its upper circumference, closely adherent tumor became only possible through the adoption of the plan of exposing and securing the renal vessels at the beginning of the operation. The principle of first securing the important vessels holding close relations to a large tumor, before attempting its extirpation, was first promulgated by Langenbeck.

CASE II. *Chronic pyelitis; endothelioma of the right, pyelitic kidney; frequent hæmaturia; cystoscopy; extirpation; cure.*—I. D., peddler, aged forty-four years, had been suffering for eight months from frequent exhausting hæmaturia, which had not depended upon any form of traumatism. An operation was proposed to him in October by Dr. Fluhrer, but was declined. On readmission, January 19, 1897, I found in the right loin of the anæmic and somewhat emaciated man a movable nodular tumor, which was not painful to touch, and did not fluctuate. All other organs appeared normal. The urine, voided in sufficient quantity, was acid, had a specific gravity of 1021, and contained much pus, a few

blood-corpuscles, and much detritus imbedded in glairy mucus. The left kidney could not be felt. January 22d cystoscopy was done. The vesical mucous membrane appeared normal. On massage conducted along the course of the right ureter the exit of a cylindrical plug of consistent pus could be observed from the orifice of the right ureter. The left ureter appeared normal, and the escape from it of clear liquid was repeatedly seen. The vermicular material gained from the right ureter came away through a catheter passed after the cystoscopy, and consisted of pus, mucus, and blood. January 26th, the patient being anesthetized, the diseased kidney was easily removed through the usual oblique incision. The vessels of the pedicle and ureter were separately tied, and most of the wound was closed by suture. The day after the operation the urine showed no traces of pus, but contained a few blood-corpuscles, and was abundant. Healing was uneventful, and the patient was discharged cured, February 28th. The pathologist's report on this specimen was: pronounced alveolar arrangement of the sarcomatous elements, which clearly derived their origin from the endothelium of the smaller bloodvessels of the kidney.

TECHNICAL REMARKS. Uniform preference was given to an oblique incision beginning from the twelfth rib near the margin of the quadratus and extending downward and forward well into the abdominal wall, the length of the incision depending upon the size of the tumor to be dealt with. Simon's vertical incision yields much less space, and, in the case of large tumors, must be supplemented by one or more transversely placed incisions. Extending the oblique incision well forward has the advantage that the reflection of the peritoneum is readily found, and its accidental injury can be easily avoided. Furthermore, by following the guidance of the peritoneum the ureter is found without difficulty, and a kidney occupying a high position, and hidden by the lower ribs, can be exposed and made accessible without additional resection of the ribs. The renal vessels can also be readily secured, which step commends itself as the initiatory one in the extirpation of large renal tumors. The abdominal muscles should be always reunited in the anterior two-thirds of the wound byutton sutures. Where contamination by the accidental escape of pus is not present, and the ureter and vessels were tied separately with catgut, the entire wound can be closed by sutures, with the exception of the posterior angle, which is to be left open for the admission of a large drainage-tube. Should the wound become contaminated by pus, it is safe to employ a thoroughgoing and careful picking of all recesses with absorbent gauze. This can be withdrawn on the fourth or fifth day. Should the wound then be found clean and sweet, the employment of a secondary suture will materially shorten the duration of the healing-process. Should it be necessary to apply a mass-ligature to the pedicle of the kidney, a solid, cylindrical rod of rubber, about one-sixth of an inch in diameter, will be found very convenient and safe. It will never

slip, and will cut through much sooner than a silk ligature. Patients should be encouraged to leave the bed as soon as possible.

Statistics.

Plastic of the ureter	1
Extirpation of the ureter	1
Nephrotomy	6
Nephrectomy	7
Of these were cured	10
Improved	1
Died	2

THE RELATIONSHIP OF OTOTOLOGY TO GENERAL MEDICINE.¹

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OTOLOGICAL SOCIETY.

SOMEWHAT more than twenty-five years ago one of the first distinctly special practitioners in this country made a statement in open meeting to the effect that general practitioners were to be considered as the rank and file, and specialists as the officers and staff of that army whose business it is to fight, to conquer, and to limit the ravages of disease. It is needless to say that this proposition met with but little favor from his hearers, and, notwithstanding the growth of specialism and the division of the work done by the medical profession into parts, having apparently often but very slight relationship to each other, it would meet with no more favor to-day. At the time when it was first made specialism in medicine was a new, to many a dreaded, and to some an abhorrent thing. The general practice of medicine left the more minute investigation of many organs and their diseases untouched; bacteriology was not, and aseptic surgery had not yet come to point the shorter path to many a long-sought goal and cut the knot of many a medical problem.

With the experience of a quarter of a century, the simile between the medical profession and an army can be only justly used by comparing that army to a brotherhood, the members of which have each and all equal, though different, functions, and if the general practitioner is to be classed with the rank and file, the specialist is to be regarded, not as in any way a superior officer, but as one of that rank and file sent out on special service; for, everywhere, the men who, with the foundation of the general study of medicine, and, still better, in addition, the practical study of general medicine as their base, go forward in any particular

¹ Read at the Congress of American Physicians and Surgeons, Washington, May, 1897.

line of investigation, may be regarded as skirmishers sent in advance, whose duty it is, first of all, to observe, and, secondly, to report back to the main body the result of their observations, and thus to indicate the lines on which the main body may advantageously proceed. It stands to reason, therefore, that the specialist, in whatever line his duty may take him, must be not only an observer, but in some way or other, and to a greater or less degree, a teacher; and the extent to which these functions have been fulfilled, and these relationships of the interdependent parts of the medical community have been developed in the last twenty-five years, it is interesting to observe.

The establishment of the nine special societies which, in addition to the five others of more general purpose, make this august Association, is a striking evidence of the fact that within the period mentioned the growth of scientific medicine and the enlargement of its field of observation have so increased as to make it impossible for any one student to cover completely and adequately the whole ground; and we realize that it is, as always, the study of the infinitely little which establishes the immeasurably great.

Thirty years ago, with few exceptions, there was not a sufficiently large number of medical men engaged in any special branch of research to form a society. The first of the several special societies forming the present Congress of American Physicians and Surgeons was founded in 1864, and the others followed in the order given in the circular of this Congress.

Buried deep beneath the surface, approachable only through a narrow and somewhat tortuous canal, containing within itself an example of almost every histological structure to be found within the human body, the human ear had long been a favorite study of those older anatomists whose minute and painstaking investigations and whose delicacy of research were in keeping with the work of their artist contemporaries. As always, the anatomist lays the foundation-stone; and to Meckel, Valsalva, Eustachius, and Corti we are indebted for that knowledge which has made the study of diseases of the ear, both in itself and in its relation to general medicine, one of the most fascinating of its kind. For not only does the inaccessibility of the organ require, on the one hand, trained manipulation in the surgical treatment of its diseases, but, on the other hand, the reflex relationship of the ear to other organs in the body, its visible and sometimes elucidative participation in other diseases, and its multiple office as an organ of hearing, as a peripheral organ of equilibration, and also as a supplemental organ of space-perception, afford wide opportunities for that theoretical conjecture which is the appetite of research and the stimulus to scientific nutrition.

The mental processes which lead to effective results are always slow and concentrative, and in the brotherhood of scientific research some