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CLINICAL LECTURES
ON
Cases Illustrating Renal Surgery.

Delivered at University College Hospital,

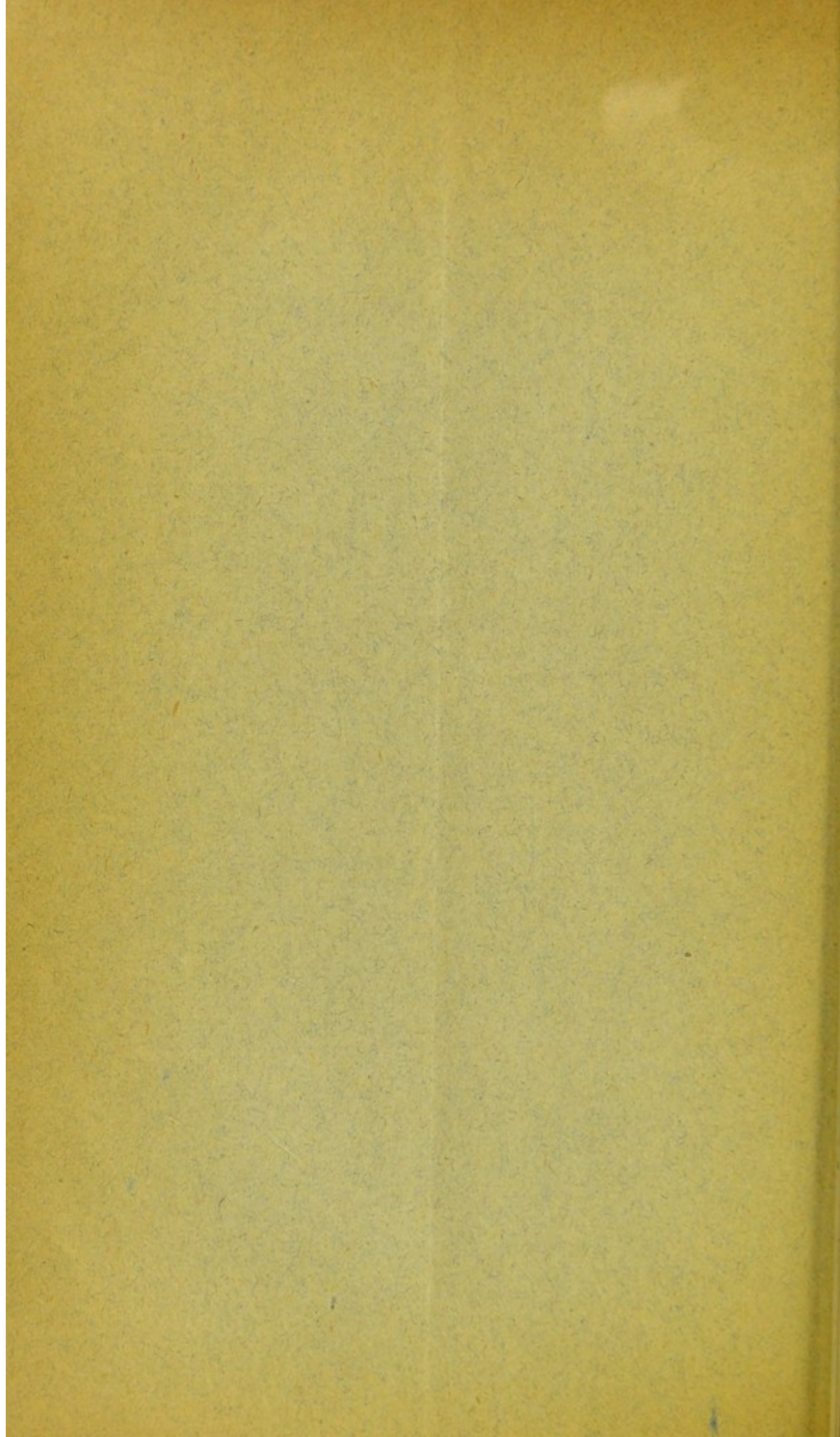
BY
ARTHUR E. BARKER, F.R.C.S.,

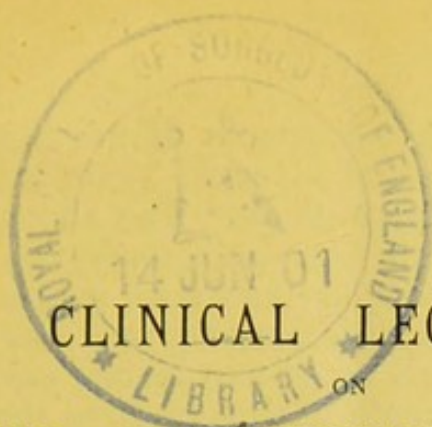
ASSISTANT PROFESSOR OF CLINICAL SURGERY AND TEACHER OF PRACTICAL
SURGERY AT UNIVERSITY COLLEGE, AND ASSISTANT SURGEON TO
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9.

CLINICAL LECTURES ON CASES OF RENAL SURGERY.

LECTURE I.

CASE I.—*Excision of the Kidney for Ruptured Ureter and Urinary Abscess, in a Child aged three years and eight months: Recovery.*

GENTLEMEN,—Several cases illustrating points of interest in renal surgery have lately come under my care, which I have thought might be profitably brought to your notice in the form of a clinical lecture. I have been reminded of these quite recently by a case in which, as you will remember, I removed the right kidney from a child three weeks ago—a case almost unique in itself, and not only very instructive from the facts observed in connexion with its clinical features, but also suggestive of many points to be observed in the future, both clinical and physiological. It is proposed now to bring this case under your notice somewhat in detail, and then, if time permit, to give a sketch of three other cases in which I also operated on the kidney, drawing whatever lessons may be learned from each. The notes of these latter have been written and lying by me for some months past, and I shall have little more to do than read them in abstract and make a few brief comments.

The first case is that of a child, A. W——, aged three years and eight months, who was run over by a hansom cab on August 13th, 1884, at 2.45 p.m., and was immediately brought to the hospital. When admitted the notes state that there was extreme bruising of the left side, and the mark of a wheel having passed across as far as the anterior iliac spine. The right side is no doubt meant, for when I saw the case next day the wheel-mark was plainly on

the right, as were all other evidences of mischief. There was also tenderness over the kidney. There was no loss of power or pain in the lower limbs. The abdomen, however, was very tender all over and somewhat swollen. Beyond these there were no points to note about the patient, who suffered but little from shock. The next day he was as before ; and it is noted that he had passed water naturally, but that it contained two or three small blood-clots ; he had also been very sick during the night. At this time I saw him, and, finding no distinct evidence of any internal injury, directed him to be kept perfectly quiet, with hot fomentations over the abdomen, and that there should be no manual examination of the latter lest some disturbance of possible healing processes might take place, and as nothing could be gained by further examination. On the 19th it is noted that the abdomen continued painful, that there was distinct resistance in the abdominal wall over the right flank and iliac fossa, with dulness over the same area, and pain on pressure. Two days later these symptoms were less marked, and it appeared as though they were due to some effusion of blood in the abdominal wall rather than anything deeper down. The bowels were moved naturally, and the temperature, which had risen at first on two or three occasions above 102° , was now about normal all day. For the next few days there was nothing to note about the child's general state, and he left the hospital to go home on August 28th. It may be mentioned here, however, that the boy appeared rather a delicate child. He had had bronchitis several times, and enlarged glands on the right side of the neck since a year old. He had a congenital scrotal hernia on the right side. His parents, however, are healthy, and there is no family history of phthisis.

So far you will observe, gentlemen, that the question of any serious abdominal lesion appears to have been negatived. Had the liver, intestines, bladder, or spleen been injured, there would probably have been severe shock ; rupture to the liver would also probably have led to effusion of blood into the peritoneum, and the same may be said of the spleen, but there was no effusion during the fifteen days the patient was in hospital on the first occasion. Again, the bowels acted normally all this time, showing that the intestines were intact. The urine, too, was passed naturally, indicating that the bladder had escaped injury. The only symptom pointing

to any lesion of note was the passage of two or three small worm-like blood-clots in the urine first voided. No other urinary symptom was present ; but this, nevertheless, was a most valuable piece of evidence, as was proved subsequently. You will please note also that after the first few days the temperature fell to normal, and there was no evidence of any inflammatory trouble anywhere. But on returning home on August 28th, the patient's condition appeared to grow worse. He seemed restless and in pain, and he was brought back to us two days later. On his readmission, on September 1st, I examined him carefully, and found a fluctuating swelling filling the right side of the abdomen. This tumour had all the characteristics of a hydronephrosis or of an accumulation of urine in the flank, to which I will beg you now to give attention. The tumour reached from the right twelfth rib to the iliac fossa, where it was rounded off with a well-defined margin, and filled up the whole flank as far as the middle line to the level of the umbilicus. There was distinct fluctuation over all this region, and dulness on percussion from the loin forwards until the anterior and inner aspect of the swelling was revealed, where it was bounded by the colon. The patient could lie in any position and could extend both thighs equally ; there was no heat, redness, or swelling of the skin, and the temperature was normal. From all these facts, coupled with the history of the injury, and the passage of two small worm-like clots in the first urine voided after the accident, I came to the conclusion that the case before us was one of injury to the right ureter from crush by the cab-wheel, and all the urine was accumulating in the right side instead of passing into the bladder. A localised peritonitis with encysted effusion appeared to be negatived by the absence of fever, tenderness, or pain on movement of the abdominal muscles or thighs. I pointed out that one of three things must have happened : (1) Either the ureter was simply bruised, and consequently so swollen or blocked by clot as to be imperious ; or (2) it was completely torn across, and the urine was being poured out into the peritoneum, being limited by a layer of plastic matter ; or (3) it was completely torn across without injury to the peritoneum, and the urine had formed a sac for itself in the post-peritoneal tissues. I had no doubt that one or other of these conditions was present, and, on the chance of the ureter being simply bruised and capable of recovering itself and allowing the hydronephrosis

to discharge down the ureter in the usual way, I waited until September 3rd, simply keeping the child quiet and applying hot fomentations to the side. By this time, however, it seemed plain that no such issue was likely to take place, and that something must be done as the swelling was becoming much larger and more tense each day, while the child lost his spirits and seemed to suffer considerably from the distension, sleeping badly and being very fretful. The urine all the time was normal, and on September 3rd it is noted as acid in reaction, normal in appearance, of a specific gravity of 1021, and free from pus, blood, or albumen. Temperature 99°.

I now thought it necessary to aspirate the tumour and draw off the fluid. This I did with a fine needle, introduced midway between the last rib and the iliac crest and eight centimetres from the mid-line of the back. At this spot it is perfectly safe to puncture any form of renal tumour, and in a considerable number of cases in which I have operated in this way and seen others operate I have never observed any ill effect. The needle enters well behind the peritoneal reflection, and there are no other structures of any importance to be wounded if the point is not thrust too far. In this case, at the depth of about half-an-inch, the needle entered the collection of fluid, and of this I drew off forty-five ounces and a half. To the naked eye this fluid had all the characters of healthy urine. It was amber coloured, slightly cloudy; its specific gravity was 1010; it showed no deposit microscopically; it contained a quarter of albumen and a half per cent. of urea, also chlorides. Our diagnosis, therefore, was confirmed almost to certainty. But I was anxious to gain further evidence, especially as to the percentage of urea in the fluid, before pronouncing positively and determining on the more radical treatment of the case, as radical treatment could only be extirpation of the kidney ultimately. You will notice, gentlemen, that the secretion aspirated contained only a half per cent of urea, while the urine passed per urethram at this time contained $2\frac{1}{2}$ per cent.; it also contained 25 per cent. of albumen. But you must also know that this is only what we might expect even with a perfectly sound kidney on the right side. For it has been shown by experiment on dogs that if there be an obstruction to the flow of urine through the ureter, the kidney is unable to excrete its full amount of urea, while it still preserves its power of secreting urine of low specific gravity, and hydronephrotic fluid contains albumen

in many cases, if not all. Now, in this case, with a bruised or torn ureter, the right kidney would have to overcome considerable resistance as it forced its secretion into a slowly yielding sac, and therefore we should expect a low percentage of urea, just as in those cases where in the dog the ureter has been ligatured, and the urine collecting above the ligature has been tested. Of course the possibility of this being a localised peritonitic effusion had occurred to me, and the small trace of urea did not quite negative this. I therefore resolved to aspirate the collection a considerable number of times, at such intervals as should best relieve the child from the distension, watch the effect, and carefully test the fluid drawn off each time for urea and albumen, &c., and then drain the collection and see if the right kidney did not regain its power of eliminating urea, all obstacles being removed. I wished further to see if we could not gain some additional evidence as to the secretion being renal or not by observing what effect varieties of diet would have on the percentage of urea found in it. Besides these points of special clinical importance, there were several other matters of more purely physiological interest which it was desirable to note carefully. And here I may say, gentlemen, that, thanks to the care, patience, and thoughtfulness of Mr. Brown, house-surgeon, and Mr. Young, the clerk to the case, who, together with the nurses carried out my wishes in the most satisfactory manner, we have before us a most important series of observations, whether we regard them as a purely clinical record or as a physiological study. All praise is due to those gentlemen for the way in which they have done their duty, and it is particularly gratifying to think that the series of observations conducted for me by Mr. Young go far to fill up several gaps in our knowledge of renal affections which it was impossible before this to fill up for want of suitable cases for study in the human subject.

For you must know, gentlemen, that this case, though not quite the first of its kind recorded, is unique as regards the opportunities it offered for observation on the points to which I allude, also in having been made use of to elucidate many matters quite impossible of demonstration in the human subject, except in a case of the kind. And I may further tell you here that, so far as I can make out from a careful search through our home and foreign literature, only one case* at all like this has been put on record as a

* Vide Stanley, Med. Chir. Trans., vol. xxvii., 1843-4.

definitely diagnosed condition, while only two† more were shown to have been probably of the same nature after death, some months subsequent to the injury. These cases were published over forty years ago, and we need hardly be surprised if the records on many important points are scanty and defective, especially if we remember the advances made in the study of the chemistry of the urine since then.

Now, it so happened that in this case an early diagnosis was made, and that this received confirmation from the first tapping of the fluid accumulation. The evidence, however, was not absolutely beyond question. First, there was very little urea in the liquid aspirated; next, it contained a large quantity of albumen; again, it was desirable to see how soon it would refill to its former dimensions, and how far the opposite kidney was adequate. Now, it turned out that the tumour did refill, and just took about a week to reach its former size, so that I aspirated it once about every seven days for six weeks. Let us turn now to this table, in which I give you an abstract of the clinical charts prepared daily at the time, and see what we learn from what was observed. The charts themselves are very complete and elaborate, but it would occupy too much time to give them *in extenso*. They will always remain in the hospital register as one of the most complete records of the kind ever made, thanks to the clinical clerk to the case.

In the first place you will note that the amount of urine secreted by each kidney from the time of the accident up to the date on which I put in a drain-tube into the urinary collection on the right side differed very much. Out of forty-eight days, from September 3rd to October 22nd, the urine passed from the uninjured side during each twenty-four hours was carefully collected and measured on forty days. The average amount from this record was found to be exactly 10.5 ounces per diem (twenty-four hours). The eight days omitted were either Sundays or those on which the child had passed water into the bed, which could not be estimated. On the injured side, on the other hand, the amount secreted into the sac for the corresponding forty-nine days was almost exactly half—viz., 5.3 ounces per diem, taking the average of the amounts drawn off by aspiration once a week for the same period. Each aspira-

† Ibid., vol xviii., 1832-3, p. 175, and vol xxvii p. 8.

tion emptied the sac completely. This contrast seems to show us that the right kidney having to overcome the resistance of an elastic sac, as it poured out its secretion, was unable to eliminate as much fluid as usual, and that the opposite kidney did extra work in compensation so as to yield 10.5 ounces daily, against its fellow's 5.3 ounces. But after free drainage of the urinary abscess was established on October 23rd, and all obstacles to the secretion of the right kidney were removed, a perfect balance was established both as to quantity and quality, and for the twenty-two days, between October 23rd and November 19th, on which a careful record was made, the average on the left (uninjured) side was 7.8 ounces, as against 7.4 ounces on the right (injured) side. This, you will observe, corresponds almost exactly with the daily amount yielded by the two organs together before the drainage.

Next you will note that after the removal of the right kidney on November 19th the remaining organ was at once able to take over the functions of the two kidneys, and not only this, but actually excreted daily more urine than both had secreted together before the operation, the days succeeding operation, 21st, 22nd, 23rd and 24th, showing respectively 7, 26.5, 26, and 36 ounces. This was no doubt greatly due to the fact that the child lived on fluid food exclusively for some days after operation.

Then as to specific gravity, you will note that on the sound side all this time it remained fairly constant, its average being generally between 1021 and 1025, except during the week in which the patient was given an almost purely non-nitrogenous diet, when it fell to 1007. (After October 22nd the readings for the individual days are given in the Table.) During the corresponding seven weeks the disabled kidney registered 1010, 1008, 1006, 1010, 1007, 1004, and 1010 respectively, the lowest figure tallying with the non-nitrogenous diet.

Next, the average amount of urea excreted was pretty constant on the sound side for each week, except when it reached 2.85 during the highly nitrogenous diet, and fell to 0.71 for the last days of the purely non-nitrogenous diet, and it rose at once again the next week on ordinary diet to 2.75. In strong contrast to this we have a very small average percentage of urea eliminated by the opposite kidney while working against obstacles of pressure. The largest record is seen in the fluid first drawn off, and yet

RECORD DURING PERIOD OF ASPIRATION AND BEFORE FREE DRAINAGE.

UNINJURED SIDE.					INJURED SIDE.						
Date.	Average ounces of urine in 24 hours.	Average specific gravity and temperature.	Average percentage of urea.	Reaction. Albumen.	Diet.	Quantity of Urine.	Specific gravity.	Per cent. of urea.	Re-action.	Albumen.	
Sept. 3rd	12	1025	2.5	Acid	Ordinary.	Aspirated	1010	0.5			
" 5th	12	99.6°	2.6		"	45 oz.					
" 6th	12		2.2		"						
" 8th	12		2.7		"						
" 9th	12		2.8		"						
" 10th	14			Nil	"	42 oz.		0.15			
" to	8 $\frac{1}{2}$ = 9.6	1022	2.15	"	"	"					
" 19th	4 $\frac{1}{2}$ = 9.9	99.5°		"	"	47 oz.	1008	0.1	Neut.	50%	
" 24th		98.9°	2.12	"	Ordinary mixed, consisting of bread and milk, potato, cabbage, butter, cheese	38 oz.	1006	0.1	F.alk.	25%	
" 25th				"							
" 26th				"							
" 27th	11 = 11.8	1020	2.25	"							
" 28th		101.3°		"	Highly nitrogenous, consisting of meat, bread, cheese, milk, cabbage						
" 29th		96.9°		"		34 oz.	1010	0.1	Acid	33%	
" 30th				"							
Oct. 1st		1021		"							
" to	11 = 10.5	98.1°	2.85	"							
" 7th			1.9	"		37 oz.	1007	0.1			

RECORD AFTER NEPHRECTOMY.

UNINJURED SIDE.					
Date.	Average ounces of urine in 24 hours.	Average specific gravity and temperature.	Average percentage of urea.	Reaction. Albumen.	Diet.
November 20th	—	—	—	Nil	Ordinary mixed, consisting of bread and milk, potato, cabbage, butter, cheese.
" 21st	7.0	1018 100.7°	2.25	"	
" 22nd	26.5	1014 99.2°	1.8	"	
" 23rd	26.0	1011 100.4°	1.0	"	
" 24th	36.0	1013 100.5°	0.95	"	
" 25th	22.0	1017 100.3°	1.15	"	
" 26th	28.5	1016 101.7°	1.3	"	
" 27th	12.5	1020 100.8°	1.9	"	
" 28th	10.2	1018 100.4°	2.05	"	

this was only one half per cent. For the next five weekly aspirations it was constant at 0.1 per cent., in spite of change of diet, with the exception of one occasion, when it was 0.15. During the week of non-nitrogenous diet it fell to 0.05, and the next week rose to its former figure of 0.15 on resumption of ordinary dietary. But after October 22nd, when the drain-tube was inserted into the urinary collection, the percentage of urea on the injured side steadily rose from 0.15 to 2.6, all resistance to excretion being removed from the right kidney (*vide* Table). Both kidneys secreted acid urine throughout. On one or two occasions it is put down as alkaline, but I have reason to believe that it was not taken quite fresh at these times.

The urine from the sound side was always free from albumen, that from the urinary abscess contained from 20 to 50 per cent. of albumen always. This was no doubt derived from the serum and lymph secreted from the walls of the sac, which usually rendered the fluid drawn off cloudy to a small extent.

The urea excreted by the remaining kidney after the other had been removed gradually rose from 1.8 to 2.05; or if we take the amount in grains per diem, we find on the 21st, 75.6 grains; 22nd, 127.2 grains; 23rd, 124.8 grains; 24th, 164.1 grains; 25th, 121.4 grains; 26th, 177.8 grains. A glance at the average temperature of these days, taken generally about every hour, will show that the amount of urea was probably influenced by the combustion of tissue going on, the highest percentage being observed on the day when the average temperature was highest—viz., 101.7°.

Now, gentlemen, I had accumulated almost all these facts, except the last data, before deciding the question of removal of the right kidney, although it appeared urgently necessary. They proved beyond a doubt that the fluid in the right flank was urine, and that the kidney secreting it was quite healthy, doing its work as to quantity and quality normally the moment the obstacles to its excreting forces were removed. They proved, further, that the left kidney was perfectly healthy, and able to take on double work if required. On several days it secreted quite as much as the average quantity of the two organs for the week, and during the highly nitrogenous dietary its elimination of urea arose as high as over 3 and even 4 per cent. while that of the other kidney remained unaffected. From this aspect of the case, therefore, there could be no objection to the removal of the offending kidney.

But other points demanded consideration. First, Is the operation of nephrectomy a dangerous one? To this I may reply at once that if we have a healthy kidney and a sound individual to deal with it is not so. Without going into details, I may tell you that I have collected a considerable amount of evidence to show that the organ may be dealt with very freely without danger when it alone is in question. Cases are on record where it has been slit open and prolapsed through a lumbar wound, and has been removed without the slightest constitutional disturbance. It has even been prolapsed through a wound and replaced, and recovered completely. We are not speaking now of its removal for diseased conditions, which is quite a different matter.

The next question to be decided was, What necessity was there for any operation at all? The answer to this is to be found in the child's condition after the injury and the history of the only analogous cases recorded.* You will remember that this child had an accumulation of urine in the retro-peritoneal tissues, which was increasing at the rate of about two pints a week. From our maturer observations it seemed clear that the fluid was not contained in the distended pelvis of the kidney, and was also not encysted in the abdominal cavity. Now, in addition to the discomfort and distress due to this collection, which were both very marked, there was the danger of rupture of the sac into the peritoneum at any time, and death as a probable consequence. In addition to this there was the danger of free suppuration in the sac; this seemed by no means remote, for with each aspiration of the fluid there was noticed more turbidity from lymph, although the strictest antiseptic precautions were observed. There seemed to be no hope in this case of an atrophy of the organ, which was healthy and vigorous; in the meantime, even if this were remotely possible, some immediate relief was necessary for the child, and simple aspiration was resorted to. And while this showed us the hopelessness almost of looking for gradual atrophy of the organ, it was plain it could not be resorted to for a continuance, and of course it increased the risks of suppuration of the sac. Then I tried a more perfect drainage of the sac as a palliative. But it was plain after a few weeks

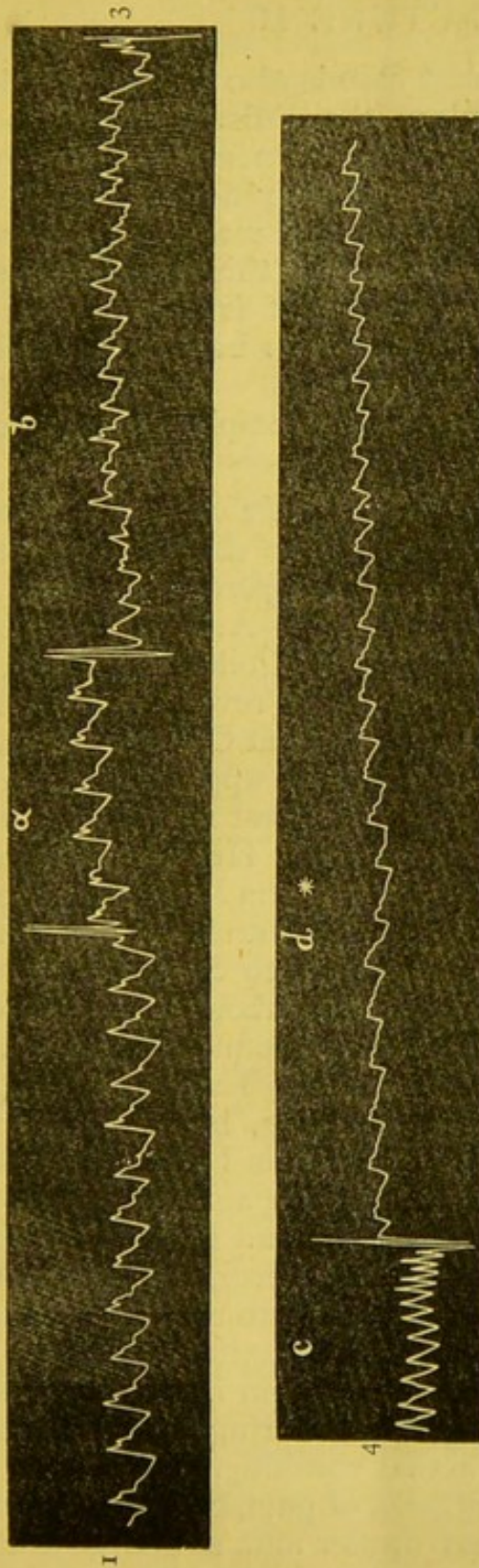
* Loc. cit. Two of these died within ten weeks after the accident the other was lost sight of after the tapping.

observation of this measure that the child's condition was not improved, and that he ran increased risks. The slightest block of the drain-tube was followed by the severest constitutional disturbance, and on several occasions this was alarming in the highest degree, the temperature on one occasion reaching 105.6° , and several times exceeding 104° . Such blockages appeared to be unavoidable on account of the deposit of phosphates in large amounts in the cavity around the tube. On several occasions these deposits had to be removed in masses as large as beans, and could only be expected to reform in consequence of the free flow of urine from the healthy kidney. Should the child leave the hospital and be transferred to the care of his parents, the dangers from this side would be much increased of course. Finally, if he should be freed in any way from the danger of blocking of the drainage opening, his condition would be very miserable with a constant flow of half the daily amount of urine from his side for the rest of his life which no urinal could save him from. There appeared upon all these grounds no choice left to me but to remove the organ which was furnishing this abundant secretion. This I accordingly did as described on Nov. 20th, and the result so far has been satisfactory. The operation itself, which was strictly antiseptic, and which you have seen, requires but brief notice. It consisted in an incision, about three inches long, immediately below and in the direction of the last rib and commencing just behind the external border of the erector spinæ muscle; then division of the layers of muscle and aponeurosis; then clearing the whole surface of the kidney from its surrounding fat with the finger; next transfixion of the pedicle with an aneurysm needle armed with carbolised twisted silk, and tying the pedicle in two portions; then in drawing the kidney out of the wound, and a further ligation of the vessels *en masse* on the proximal side of the first; after this the pedicle was divided with a snip or two of the scissors and slipped back into its place; then suture with silver stitches and dressing with salicylic wool, a drain-tube being left in the original drainage opening. The whole operation lasted twenty-three minutes, and presented no difficulty except in the ligation of the pedicle, where I lost some time in tying *in situ* instead of drawing the organ out of the wound and then placing a ligature round it. I was anxious, however, to avoid dragging on the pedicle and its nerves, as this appears, in some cases at all events, to add much to shock.

In this case there was no marked shock at any time as indicated by the pulse, which was carefully observed all through. Another interesting observation which I have often wished to make I was able to record in this case. This consisted in taking a sphygmographic tracing of the radial pulse immediately before, during, and after the act of ligaturing the pedicle. This was kindly undertaken for me by Mr. Horsley while I was proceeding with the operation, and you have seen the tracing (*vide* Chart). As he told you, it does not indicate any particular shock, but shows what is usually noticed when a large artery is ligatured. A very short time after the operation the child came to himself and seemed remarkably well, and soon began to talk with the other children in the ward. His temperature has risen on several occasions, but without any other alarming symptom, and probably as the result of blocking of the drain opening with some of the phosphatic deposits which have not yet been thrown off from the walls of the sac, but are daily coming away. He is now, three weeks after operation, enjoying his ordinary diet, and cheerful and well.* The glands in his neck noted as much enlarged for the last two years and a half, and fluctuating long before the operation, have increased in size and have been since opened, giving exit to a considerable amount of pus. The rise of temperature may be accounted for, to some extent, by the maturing of these abscesses, for he has been much relieved by their evacuation. At all events his present state is satisfactory, and I hope soon to be able to bring him down here and show him perfectly convalescent.

The kidney removed proved to be perfectly healthy macroscopically and microscopically, and the pelvis was not dilated. The ureter appeared to be divided just below the seat of rupture. The lower end of the kidney formed part of the wall of the urinary abscess, and was covered with lymph and phosphates, showing the correctness of our diagnosis that we had to deal here with a retro-peritoneal collection of urine, not a true hydronephrosis. Perhaps the best name for this condition is that used above—viz., "urinary abscess"; or if this is objected to on account of the small amount of inflammation, we might call the condition pseudo-hydronephrosis.

* The child left the hospital and went home on Jan. 8th, seven weeks after the removal of the kidney. He had still a very small sinus in the side, yielding about a drachm of pus daily, but was otherwise well.



The accompanying tracing was taken on one continuous slip, which was run through the sphygmograph as the operation proceeded, and was stopped from time to time when a fair sample of pulse was procured, but the instrument and limb were not otherwise touched. The slip is only cut in two for convenience of printing, the division being made at one of the stops (3), which corresponds directly with (4). Pulse 118. A long tracing (normal) was first taken as the child lay on the table under chloroform, and this terminates at 1, where the operation commenced at 3 p.m. After a time there appeared a slight rise with normal wave still (α); then, corresponding to the manipulation of the kidney, some irregularity is shown (β); then a fall with a different kind of irregularity (γ); then a gradual rise, slightly increased, perhaps, by the ligation of the renal artery at d^* with a lower stroke. Pulse 140.

LECTURE II.

GENTLEMEN,—The next case is also that of a child, and illustrates in the first place the difficulty of diagnosis of certain renal affections, and in the next the freedom with which the kidney may be dealt with in exploratory operations without risk to the patient. I may remark here that this point was far less known when this case was operated upon, nearly three years ago, than it is now, for since then many similar exploratory operations have been performed and data have accumulated.

The points I wish particularly to emphasize may be summarised in the title which follows:—

CASE 2. *Complete History of Renal Calculus; Exploratory Lumbar Incision, with Palpation and Multiple Acupuncture of the Kidney; no Stone detected; Operation Wound healed in a few days, with no ill effects.*—A. G—, aged nine years, was admitted into University College Hospital, under my care on January 23rd, 1882. Previous to this he had been treated for renal calculus both at Ormonde Street and at St. Peter's Hospitals. His illness appears to have dated back three years, when his parents first noticed that he had pain and difficulty in micturition. He was then circumcised at the Children's Hospital; but a little later the additional symptoms of pain in the right side and hæmaturia were noticed. He was then taken to St. Peter's Hospital for Stone, where he remained for about a month, during which period he was several times sounded for calculus in the bladder, with a negative result. The rest in bed, however, seemed to check the bleeding, but the pain in the loin was as bad as ever. After this I admitted him into hospital to observe his case, and here again the rest seemed to relieve him almost completely, and he left the hospital accordingly soon after. Again, however, he was readmitted on January 23rd, 1882, all the symptoms having returned. They are noted as follows in the hospital register:—"Paroxysms of pain gradually increasing in intensity, and felt in the loin and tip of the penis. During the pain there is severe retching, but no actual vomiting. The urine is not always bloody after the attacks of pain, but is usually lighter at first, and then becomes darker and darker and thicker, resembling pure blood at times; micturition five to six times daily; no history of increased frequency at any time.

The bowels are stated to be much relaxed after taking hot food. The boy has always been delicate, and suffered much from bronchitis as an infant; his father is also asthmatic and catarrhal, as also the other children of the family, but the mother is healthy."

On January 31st I examined the flank with the hand carefully, as also the bladder and ureter through the rectum, the boy being under the influence of chloroform, but could find nothing abnormal anywhere. The urine passed immediately after this was very clear, but that voided the night succeeding was dark reddish-brown, containing red and white corpuscles and oxalate of lime crystals. The next day the boy seemed very well. On February 3rd, too, it is noted that the urine just passed was more bloody than any seen yet. It was acid, of a specific gravity of 1025, and contained crystals as before. In other respects the general health was good, and there were none of the paroxysms of renal colic formerly complained of. Here, then, there appeared to be the completest evidence of renal calculus, hardly a symptom, as usually described, being absent. In the first place, there was pain in the right renal region of a very severe character, paroxysmal and running down to the tip of the penis, and followed by severe hæmaturia. The urine at the same time was acid, and contained crystals of oxalate of lime and red and white corpuscles. The fact of the kidney not being enlarged excluded new growth, as the symptoms dated back three years, and also appeared to negative tubercular disease of the same standing. Either of these diseases existing for three years would almost certainly have been accompanied by enlargement of the kidney. Then, after manual examination of the loin, there was an increase of hæmaturia the next day. There was not, however, any increased frequency of micturition at any time, so far as we could make out, and this was the only symptom of calculus absent.

It appeared therefore that, everything having been done by ourselves and at two other hospitals to mitigate the sufferings of the child without avail, the proper course to pursue was to cut down upon the kidney, explore it carefully, and if possible, remove the stone, if present, from it. With this object in view, I cut down upon the kidney on February 8th, by an oblique incision running from above and behind the tip of the twelfth rib downwards and forwards. To gain room the tip of this rib was removed with

bone forceps. I now passed my finger over both surfaces of the kidney, but found nothing abnormal. I then punctured the organ in all directions about twenty times with a long needle passed deeply, but with a like negative result. As I could not decide to remove a kidney in which nothing was to be discovered abnormal, I closed the wound. This was one of the first cases in which this mode of exploration was adopted in this hospital, and the effect of it was watched with much interest. There was very little difficulty in it. Only one muscular vessel required ligature and the punctures of the kidney hardly produced any bleeding. The palpation of the organ, which was small and highly placed behind the ribs, was the only matter of any trouble. In the exploration I used every antiseptic precaution except the spray, and after suturing the wound covered it with lint and carbolic oil and a pad of dry salicylic wool, a small drain-tube having been inserted in the lower angle.

The next day there was little to note except slight tenderness in the side and uneasiness. Temperature 99.8° ; pulse 144 to 155. The following night the patient slept better, and was brighter the succeeding morning. Temperature 100.6° ; later 101.3° ; and at 6 P.M. 99.6° . He had passed sixteen ounces of urine in twenty-four hours, with some pain at the tip of the penis, but far less than before. The urine passed at 6.30 last evening was light-coffee coloured, with thin ropy deposit and very acid; sp. gr. 1032. That passed at 1.30 A.M. was lighter still, and strongly acid; and that voided at 8 A.M. was still lighter, and had only a slight tinge of blood; sp. gr. 1034.

The wound was dressed for the first time on February 10th, and was found quiet, with only a trace of odourless serum around the tube, which was removed; it was dressed as before. On the 13th day there was a slight pain in the flank after a meal consisting of mutton chop and bread. At 2 P.M. he passed some very thick alkaline urine of deep reddish-brown colour, with deposit; sp. gr. 1032. By the 14th he had got over all the effects of the operation, and had been sitting up in bed for some days. There was very little pain in the side, but some after micturition. The urine about this time was only a little smoky, with red and white corpuscles in fair amount and oxalate of lime crystals. On the 17th he seemed quite well, but the urine remained as before, and there was still pain in the side. On the 21st I removed the wire sutures, as the wound had healed by

first intention. On and after the 27th he was out of bed and running about, all pain, both in the side and penis, having disappeared, and except for paleness he looked very well. He went to Eastbourne on March 1st, having no pain anywhere. The urine at this time was 1025 and acid, with a slight trace of albumen, due no doubt to the presence of blood.

It is worthy of remark that from this time onward for a considerable period the patient was free from all lumbar or other pain, and only noticed a little blood in the urine. This has been noticed since in other cases. When he returned from the seaside he looked well and hearty, and remained so for some time. A few months later, however, he seemed to fall off in health, and with this there was a return of the old symptoms. He was then readmitted into the medical wards for observation, but nothing new was discovered. Rest, good diet, and tonics appeared, however, to benefit him, and the symptoms became less severe. Since his discharge I have not seen him.

In considering this case in the light of further experience I am inclined to think it possible that, although the symptoms appeared so typical, we may have had to deal here, not with a renal calculus, but with a small tubercular deposit, or ulcer, in the pelvis or ureter. I cannot help thinking that the two conditions in their early stages may give rise to identical symptoms. In a later stage we know that they closely resemble each other in their manifestations. Of this I have had an excellent illustration quite recently in a case admitted into hospital in an almost dying state. The symptoms might either have been held to indicate renal calculus or tubercular pyelitis. On the death of the patient (a man aged about fifty), soon after I found well-marked tubercular disease of the right kidney, right ureter, right vesicula seminales, and of the epididymis of both sides. The deposits were caseating, but not very much broken down. The left kidney was sound. Be this as it may, we learn from the foregoing history that even with the most complete history of renal calculus, and with all the assistance of our recently devised lumbar incisions and explorations, we may yet be baffled in detecting a stone in the kidney when we actually have the organ between our fingers. Either this or there is some other condition beside the presence of a stone which can give rise to identical symptoms. On the other hand, a

sufficient number of cases are now on record, where with such a history and exploration a stone has been found and removed, to justify a resort to such a proceeding even in doubtful cases. And this appears distinctly to be our duty when we consider how devoid of risk the measure is when employed with care and all antiseptic precautions. You will observe that this little boy, far from being in any way injured by the exploratory operation, was actually known to have been relieved of some of his most distressing symptoms for some months afterwards; and though we cannot definitely put this down to the credit of the operation, it is, at all events, satisfactory to observe the fact, especially as it has been noticed in several cases of the same exploration since undertaken.

CASE 3. *Pyonephrosis: Aspiration of thirty-six ounces of Pus: Relief; subsequent Re-accumulation, then Rupture of the Collection into the Sheath of the Psoas Muscle, with pointing in Scarpa's Triangle; Nephrotomy; Drainage of large quantity of Pus from the Kidney; Relief.*—This case is of a somewhat different kind, and illustrates points which are sufficiently indicated in the title affixed to it, to which I invite your attention. It is chiefly remarkable for the fact that a large pyonephrosis eventually made its way along the sheath of the psoas muscle, and so into Scarpa's triangle, taking, in fact, the same direction precisely as an ordinary psoas abscess from spine disease, a most unusual course for a renal abscess which usually forms in the loin and points somewhere above the crest of the ilium. It is also noteworthy that whereas before the incision was made into the kidney only a slight trace of pus was found in the urine, some time after the operation the ureter became more pervious, and pus was passed freely by the urethra. During July, 1884, it escaped from the lumbar sinus and bladder alternately about every other day, ceasing almost completely to come one way when abundant the other. Another point is perhaps suggested here—namely whether it is an advantage to the patient that the perviousness of the ureter should be re-established where there is a suppurating kidney. In this case the appearance of pus in the bladder in considerable amount some months after the nephrotomy, during which the patient's health was materially improved, was soon followed by the occurrence of pain in the kidney opposite to that first affected. This pain seemed for a time troublesome, and was accompanied by

tenderness on palpation and other symptoms mentioned below, the patient's health at the same time appearing to fall off. All this suggested to me the possibility of the other kidney becoming secondarily affected from irritation in the bladder due to the pus passing that way, it being impossible to keep this pus perfectly sweet for months with an open sinus in the loin in a patient up and going about out of doors. The case also suggests a limit of operative interference for pyonephrosis, based upon evidence pointing it is believed, to unsoundness of the opposite kidney, or at all events, arousing grave suspicion as to its healthiness. The case is briefly as follows:—

A. F——, aged forty-eight, originally a shoemaker, now a porter, was admitted into University College Hospital, under the care of Dr. Roberts, on Jan. 21st, 1884. At this time he had a large lumbar swelling, with all the characteristics of an accumulation of fluid in the kidney, and which was diagnosed to be renal, on the same grounds generally as those given in Case 1. There was a history of an attack of inflammation of the kidneys two years before, which compelled the patient to keep his bed for eight weeks, during which time the urine was very thick; otherwise his general health, past and present, was noted as good. His viscera and all secretions except the urine were normal, the latter containing a slight cloud, which showed corpuscles, but only a trace of albumen and no sugar; its specific gravity was 1014, and the average percentage of urea for ten days only 1.6; the temperature was 99.4°. Soon after his admission Dr. Roberts kindly asked me to see the patient, and I had only to endorse the view that this was a renal swelling, and to suggest that it was a pyonephrosis; I therefore aspirated the collection from behind at the point mentioned in Case 1, and drew off thirty-six ounces of laudable inodorous pus on Feb. 6th. No calculus was felt by the needle. After this the man lay in bed for seventeen days, and during this time the sac did not refill. He seemed so much better that on February 23rd he was allowed to go home, with directions to return from time to time for observation. A few weeks later it was clear that the sac was filling again, as was expected. By the middle of March I was surprised, however, to find that not only had the pyonephrosis returned, but that it had given way, and now stretched from the flank to Scarpa's triangle under Poupart's ligament, fluctuating the whole way. This offered a remarkable contrast to the previous

condition, where the sac was sharply defined below, and indicated that the collection had most probably burst into the sheath of the psoas muscle.

As the patient was now beginning to suffer again I re-admitted him on March 31st with the object of drawing off the pus by incision in the loin. Accordingly, the patient being under the influence of ether, on April 2nd I made an oblique incision three inches long midway between the last rib and the iliac crest downwards and forwards, through skin, muscles, and fascia. Reaching the sac I opened it with a firm thrust of my finger nail, and gave exit to twenty ounces of pus. This opening led directly into the pelvis of the kidney, and with the finger I and my colleague, Mr. Godlee, could feel the calyces of the organ. A probe passed inwards and downwards reached nearly to the groin, but nowhere was a stone to be found. As the drainage from the loin seemed sufficient, I did not think it necessary to make a counter-opening in Scarpa's triangle, but placed a large tube in the lumbar opening before partially stitching it together. Very little blood was lost during the operation, which was conducted under strict Listerian precautions. There was a moderate amount of shock on the same evening, the temperature falling to 96° , but on the following morning the patient is noted as being very comfortable. Pulse 80; temperature 96.6° . The wound was dressed on the 4th and looked well, the general condition being also good. On the 5th the patient was sick several times, complained of pain in the hypogastrium and around the umbilicus and did not look at all well, the temperature being 101° ; his urine was almost black from carbolic acid and contained a little above the normal percentage of urea—namely, 2.8 on the whole amount. This, however, only equalled twenty-three ounces in twenty-four hours, making only about 310 grains of urea excreted in the same time. The patient, however, was below the average weight and size and, it must be remembered, was in bed on restricted diet. (His weight was 120 lbs., and he ought to have been eliminating about 400 grains of urea.)

On the 7th all the above symptoms had disappeared, and the patient looked very well. The dressing was changed under the spray. On the 8th there was again carboloria, with a slight rise of temperature, but the other symptoms of carbolic intoxication were absent, and he passed forty-seven ounces of urine, with a specific gravity of 1020, and a per-

centage of 1·85 of urea, or about 407 grains in twenty-four hours. The condition of the wound from this date on requires no comment. It healed up to the drainage opening quickly, and the patient was soon able to get up and go about, wearing a Listerian dressing of gauze, &c. At the beginning of May he was sent to the convalescent home, still wearing an antiseptic dressing as before. After the operation the temperature was satisfactory throughout, except on April 4th and 5th, during the period of carbolic intoxication, when it rose to 101° , falling again with the disappearance of the symptoms. Again, on the 7th, after the second dressing, it rose to 100° corresponding to the re-appearance of the carboloria; after this it was only $99\cdot4^{\circ}$ once, but usually normal, until he left the hospital.

When the patient returned from Eastbourne a month later, at the beginning of July, he looked very well indeed, and continued so for a time, the fistula in the loin being still open. Then, being out of work and not having an abundant diet, he seemed to lose strength again. At the beginning of August I readmitted him for observation and to see whether anything could be done to get rid of the sinus in the loin. I found, however, that there were but two courses open to us only one of which could be regarded with favour—viz., either to encourage closure by rest and the free drainage of the part or to remove the kidney. The latter idea I abandoned at once, for the following reasons:—First, the patient seemed to have lost strength lately; again, his temperature had, after August 4th, regularly risen each evening two, or even three, degrees, to fall again, though not quite to normal, in the morning; there was nothing about the wound or abscess to account for this. He now also began to complain of a good deal of pain in the left flank, with some tenderness on palpation in the left renal region. This pain radiated down the left thigh and testicle, and was at times described as severe. There was now no pain or tenderness on the side operated on. At this time, too, he began to complain of scalding on micturition and to pass more pus than before, with acid urine, which contained besides a good deal of phosphates. The pus when coming from the sinus was diminished in the urine, and *vice versa*. All this—together with the fact that the percentage of urea had originally been below normal before the operation, and was now, after all immediate effects of the latter had passed off, still below, being only 1·3 on an average of ten days—led me to suspect

that the opposite kidney was also not sound. This surmise, of course, if accurate, contra-indicated nephrectomy. The patient left the hospital on Saturday, September 27th, and with none of the symptoms mentioned above very prominent; but for the weakness due to confinement to bed there would have been no reason for his not following his calling. For the last ten days of his stay in the hospital (September 14th to 24th) the amount of urine passed in twenty-four hours was very constant, the average being only 32.2 ounces; the specific gravity was steady each day at 1025; the percentage of urea was also perfectly constant, at 1.9 for every twenty-four hours—this gives an average of only 293.6 grains of urea for each of the ten days. The temperature was above normal, showing usually a slight rise each night. The morning average was 100.0°, the evening 100.4°, for the last ten days; but the difference between morning and evening was usually more than this average showed. (This diminished elimination of urea in spite of the presence of pyrexia is worth noting as part of the evidence, in all probability, of derangement of the excretory power of the left kidney.) The urine was still slightly turbid from the presence of pus, but when this subsided it showed no evidence of the presence of albumen. It was still foul to some extent, though acid again, having been until lately either neutral or alkaline. The fact that the patient suffered considerably from carbolic intoxication on very slight provocation is also worth noting, and, taken with other facts, lends support to the view that the left kidney was probably inadequate to any great extra strain thrown upon its eliminatory functions.*

We now turn to another case offering a different class of phenomena for consideration.

CASE 4. *Tubercular Kidney; Extreme Prostration: Exploratory Nephrotomy: Drainage: Considerable Improvement for some months: subsequently Amyloid Disease of Opposite Kidney and other Internal Organs, and Death from Asthenia five months later.*—Regarding the following case the con-

* NOTE, Jan. 20th, 1885.—I saw this patient last week, and examined him. He says he is better, and feels no pain in either flank. The urine looks normal, and has been so for some time; it has no deposit. There is no tenderness in the renal region on either side on manipulation. There is still a very small sinus in the right loin, which secretes a drachm or two of pus in the day. The patient is thinner than when last seen, but this may be accounted for, perhaps, by his diet.

clusion is, I think, justified that the limit of operative interference was reached in dealing with it. To have gone further at the time the patient first came under surgical treatment would almost certainly have led to a fatal termination, whereas what was done may fairly be held to have improved the health, relieved suffering, and prolonged life.

The patient, A. P——, aged twenty-seven was admitted into University College Hospital on May 12th, 1880, under the care of Dr. Bastian. Her history was that she had begun to lose health about six months before (Sept. 1879). She suffered then from weakness, great headache, occasional shivering, anorexia and diarrhœa, to such an extent as to be obliged to give up her employment as governess; she had been losing ground ever since. She described symptoms, noticed at the age of seventeen, extremely like those due to the passage of a renal calculus, and since then there has been frequently a "brick-red" sediment in the urine. The same symptoms were noticed last August, and at that time there had also been pain in the loins from the last rib to the nates, with thirst, diminished flow of urine, and abundance of "brick-red" sediment. Then at the end of September she noticed a lump in the right side of the abdomen rather larger than an egg, slightly tender on pressure. This remained about eight weeks, and then gradually went away. During its presence she had occasional sickness, increased frequency of micturition, with pyuria, and also diarrhœa. Since January no pus had been seen in the urine, and the tumour had quite disappeared. But in February her left thigh and leg became very much swollen, tender, and itching, and shortly after the right limb became similarly affected, with much loss of power besides. She was admitted into hospital on March 12th, 1880.

At this time she was very emaciated and anæmic, and her lower limbs were as described, the veins being marked out and hard besides. The nervous and respiratory systems showed nothing abnormal. The pulse was 128, regular in force and rhythm, and compressible. The abdominal organs appeared normal to palpation, except for a fulness in the right flank extending to the iliac fossa, where its margin was distinct. This tumour was not painful on pressure, and there was resonance over it in front. The urine was 1020, slightly alkaline at first, but acid later. It contained no albumen or sugar, but deposited a little mucus. There was still much headache. Her family history was good.

With rest in bed, care in diet, and other general treatment, some improvement took place in the patient's condition ; at first she became less anæmic, the swelling in the legs became much better, and she felt stronger, the headache, however, being still distressing at times. The temperature rose nightly, often to between 103° and 104° with striking regularity, and was normal in the morning. On April 6th the patient had a rigor. On April 21st I was kindly asked to see her, and endorsed the view that the tumour in the right flank was renal, and probably contained pus and a stone. I therefore explored it with an aspiration needle through the loin in the usual way, and at a moderate depth struck a collection of the most fetid pus, of which I drew off an ounce and a half. On thrusting the needle a little deeper, nothing but pure blood came away, and no calculus was felt. No ill effects followed this exploration, and no pus or blood was seen in the urine. The condition remaining as before, I cut down upon the kidney from the loin a week later, on April 27th. On reaching it, an aspiration needle was thrust into the organ, and some pus again evacuated. Along this needle I passed a knife, and through the opening thus made my finger, which I thrust into the pelvis of the organ. Pretty free bleeding resulted for a few moments, but then ceased. No calculus was felt, and the pelvis of the kidney was found to be smooth wherever it was reached. The strictest Listerian precautions were observed. This operation produced considerable shock in the weak condition of the patient, from which, however, she recovered fairly rapidly. On the same evening the temperature rose as usual, and reached 103° . The next morning it had fallen to 95.2° , and only rose to 97.2° at 10 a.m.; from this on for twenty-four hours the average taken in the axilla and rectum every two to three hours was 95.5° , and it then only very slowly rose until in twenty-four hours more it had touched the normal again. After this it remained nearly normal for five days, and then rose as before in the evening, but not within two degrees of the usual evening temperature before the nephrotomy. Indeed, to the termination of the case the temperature was shown to be permanently modified for the better by the drainage of the suppurating kidney. All the subnormal temperatures were verified by repeated observations with different thermometers. The patient's general condition during the period of very low temperature seemed but little affected, but a

few days later it appeared much improved. She was brighter and ate and drank with more relish and was soon able to sit up a little. On the whole the nephrotomy may be said to have produced marked benefit for a time. The urine throughout remained almost normal, only showing a trace of albumen; the legs became less œdematous and gained strength, and the patient could sit up. All this time the wound drained well but showed no tendency to close from below, and a probe could still be passed downwards and inwards towards the uterus for a distance of eight inches. On passing my finger into the wound its whole length nothing in the shape of a deposit or stone could be felt on any occasion.

In this case the question was several times debated whether the kidney ought to be removed; but to this measure I was strongly opposed on account of the weakness of the patient and the fact that the swelling in the lower limbs probably indicated some thrombosis of the larger systematic veins, due to causes not yet discovered, but still undoubtedly grave; besides this there was slight albuminuria; and I am confident now that to attempt to remove the kidney would have had a fatal result. The subsequent history of the case may be briefly summed up. In the early part of June the patient became listless and dull, taking but little interest in things around her and giving up reading; she also became irritable and careless about passing motions and urine in the bed; diarrhœa also became a prominent symptom. The superficial veins on the right side of the abdomen and groin became much dilated, those of the left slightly so. From June 30th albumen was found in the urine in steadily increasing quantity, only a trace having been present before. Later on (June 20th) casts, hyaline, granular, and epithelial, were found. On July 26th there was an attack of convulsions, ending in stupor. Two days later another fit, with increased stupor and weakness, was noticed, and again on the 29th. On the 30th there was some sharp bleeding from the sinus, and she died at 3 a.m.

The autopsy, made by Dr. Barlow during my absence from town, shows how well justified was the conclusion that removal of the kidney would have been an improper operation in this case as it presented itself to us. The brain was generally healthy, though the sulci were abnormally wide and the convolutions somewhat wasted. The heart showed

small vegetations on the aortic, and some larger ones on the mitral, valves, otherwise nothing abnormal. The lungs and pleuræ were fairly healthy, showing no tubercles. The liver was healthy. The spleen was enlarged and markedly amyloid. The left kidney was much enlarged and notably amyloid, the cortex being fatty and increased in depth. The right kidney, which had been operated on, was firmly adherent to its surroundings, including the cæcum and ascending colon. It was hollowed out into several rough tuberculated spaces, into one of which the lumbar wound entered, and all its secreting substance seemed destroyed. The uterus was also rough and lumpy. This kidney contained some greenish pus, but no calculus. The renal vein was filled with a soft cheesy thrombus, which extended into the vena cava upwards nearly to the heart, and downwards for about three inches.

A sufficient explanation of the gravity of this case from the first is furnished by these notes without further comment.
