nuclein and nucleinic acid in the treatment of microbic diseases; but I am not aware that it has been tried except in the treatment of tuberculosis, although it has been advocated both in the form of the original preparations of de Backer and as nuclein solutions in the treatment of all microbic affections. It occurred to me that nuclein derived from the young yeast cells may have been the material responsible for the apparent usefulness of yeast in Sir W. Broadbent's and my cases, and that it was worthy of trial in cases at all events in which antistreptococcus serum would not be applicable.

The only case of infective endocarditis in which I have used nuclein is one seen by me in consultation with Dr. Christopherson of Hastings. The effect appears to be very striking, the temperature coming down to normal for twenty-two days, after which, however, another rise occurred.

CONCLUSION.

I regret that time has not allowed me to allude more fully to some forms of cardiac disease, more especially to the subject of senile and prematurely degenerative diseases of the heart. A reference to them must have been somewhat discursive, for whilst they admit of much management, they necessarily allow of little direct treatment. And, indeed, in trying to seek out points for treatment which are scattered here and there amidst groups of symptoms, I fear I have already been too discursive. My endeavour has been to illustrate the principles of treatment rather than to touch upon details, the recognition of a neuropathic state, the principle of rest, of exercise, of drug administration, of restrictions in diet, upon which we formulate our more precise management of individual cases. Finally, we must accept in cardiac therapeutics the principle of submission, so that we may better help patients to recognise the necessity of a restricted life caged within the narrowed limits of those conditions under which alone life can be maintained.

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THE HUNTERIAN LECTURES ON THE SURGERY OF THE KIDNEY.

Delivered at the Royal College of Surgeons of England,

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LECTURE II.

RENAL CALCULUS: THE DIFFICULTIES AND ERRORS IN DIAGNOSIS IN THEIR RELATION TO EXPLORA- TION OF THE KIDNEY: UNSUSPECTED, QUIES- CENT, AND MIGRATORY CALCULI.

MR. PRESIDENT AND GENTLEMEN,—To-day I wish to draw attention to some renal calculous disorders. If I put them in the very forefront of surgical affections of the kidney, I do so for the following reasons:

1. They are the most frequent and most painful of the surgical diseases of the kidney. Probably no disease, except acute tetanus, is capable of causing worse suffering.
2. Renal calculus, whilst slowly destroying the kidney, often physically disables its victim by its unrelenting irritation, and its unyielding resistance to every form of medical and dietetic treatment.
3. No disease gives rise to such a variety of morbid changes in the kidney as calculus; and none is more certainly fatal when allowed to progress without surgical interference.
4. Few operations in surgery are so successful as nephrolithotomy, by which a calculus is removed from a kidney not disorganised by the calculus or otherwise. No great operation is followed by a smaller mortality. Nephrolithotomy

gives absolute cure, saving the kidney from progressive destruction, and the patient from what at any moment may prove to be an imminent danger to life.

5. Renal surgery will grow in confidence and in favour with the profession and the public as nephrolithotomy anticipates and displaces nephrotomy and nephrectomy.

I attempted to show, in the latter part of the first lecture, that nephrectomy is being rapidly restricted in its application as advances are made in ureteral operations. It may also be safely asserted that nephrotomy—at present the most frequent operation resorted to for calculous affections—will be required but rarely if nephrolithotomy is earlier and oftener performed. Calculous pyonephrosis is the result of long-standing irritation and progressive destruction of the kidney, and there is no reason why it should ever occur if physicians would recommend and surgeons would practise early operations for stone in the kidney. That this is a consummation much to be desired is seen by comparing the mortality of nephrolithotomy with that of nephrotomy and nephrectomy for calculous conditions. The figures are as follow:

	Cases.	Recoveries.	Deaths.	Percentage.
Nephrolithotomy ...	34	33	1	= 2.9
Nephrotomy ...	43	23	10	= 23.25
Nephrectomies ...	17	12	5	= 29.4

[Case 21 amongst the nephrotomies and Case 16 amongst the nephrectomies are excluded for reasons which are obvious on a glance at the tables.]

6. Another reason why calculous disorders take so prominent a lead amongst the surgical affections of the kidney is because of the difficulties and errors attending their diagnosis.

These difficulties arise from four chief causes:

1. Several other renal and ureteral affections give rise to the same symptoms as stone.
2. Several diseased conditions of other organs cause symptoms which simulate those of renal calculus.
3. Symptoms caused by renal calculus may be transferred to other organs; or may be of a psychological order, with or without high temperature, and not referred at all to the kidney itself.
4. Calculi may be for an indefinite time masked, giving rise to no symptoms whatever, yet causing the while progressive destruction of the kidney.

When calculi have been previously passed, when well-marked attacks of renal colic occur, when crystals of uric acid or calcium oxalate are frequently found in the urine, and when the urine is intermittently mixed with a good deal of blood, or persistently contains a microscopic quantity, there are the strongest *a priori* grounds for thinking that a stone is present. This evidence is strengthened if attacks of colic and hæmaturia are readily induced by exercise or jolting, and readily subside with rest; and if a sharp pain or distinct tenderness is always caused by bimanual examination of the renal region. In many cases, however, mistakes in diagnosis are bound to arise. Morbid conditions other than stone will be found, from time to time, in cases in which the character of the pain and the state of the urine point to calculus as the probable cause. These mistakes are apt to excite a prejudice against renal exploration; but the results obtained by those who have had large practice in renal surgery ought to correct this. The experience gained by operations has taught us much as to what the conditions are which cause symptoms typical of stone when no stone exists.

In 1892 I published some lectures¹ on the conditions simulating renal calculus as verified by surgical exploration in 28 cases. To these I now add 16 cases, making 44 in all. In a few instances a calculus was possibly in the ureter at the time of the exploration, because one was passed some little time subsequently. But in the greater number of the 44 cases some other morbid state of the kidney was found and remedied. It is certain that the diagnosis of calculus, though incorrect, was advantageous to these patients, for the very reason that it led to the exploration, and in this way to the discovery of the true cause of the disease. The expression "negative exploration" is often applied to every operation in search of renal calculus, but which does not result in the discovery of a stone. This expression is very misleading. It is not a "negative" result to find and excise commencing

foci of tuberculous disease; to fix a misplaced or freely-shifting kidney; to open and scrape away half a dozen small abscesses or suppurating cysts; to excise a solid or renal perirenal tumour, or a tense cyst; to discover and give exit to blood extravasated beneath the fibrous capsule, or pent up within the cavity of the kidney; to liberate a kidney hampered by tough adhesions (which in one of my cases were as dense and hard as cartilage); or to detect and divide a ureteral stricture or obstructing valve. Yet these are some of the conditions which have been met with in the search for stone in the kidney, and which, in many instances, have been most successfully cured.

I have explored several cases in which the diagnosis was very doubtful, but the severity of the sufferings were so intense that the patients have willingly submitted to an operation. The exploration has proved the absence of a calculus, but has revealed a degree of mobility behind the peritoneum, in what I have designated a cinder-sifting manner, altogether out of proportion to any mobility detectable by clinical examination; in some of them no mobility whatever could be made out by bimanual abdominal palpation. In these cases complete relief has been obtained by nephropexy. In other cases I have found, instead of calculus, the kidney more or less displaced, and though little, if it all, movable, yet greatly engorged with venous blood, owing to distortion of the veins at the hilum. In other cases, again, the kidney has been swollen and congested with venous blood, obstructed by the pressure of tough and condensed perinephric cellular tissue. The relief which is given by the so-called "negative exploration," in cases such as I have referred to, is to my mind a striking illustration of the indirect benefits which nephrolithotomy has conferred on suffering humanity.

Another important class of cases in which the symptoms simulate renal calculus is ureteritis, a disease to which more attention seems to have been given in France and Germany than elsewhere. As long as nephrotomy was limited to cases in which the kidney is converted into a great abscess swelling, the ureter was never seen in the living human body; but since nephrolithotomy took its place as a recognised operation, and an exploratory incision, with a view to nephrolithotomy, has been considered justifiable, because proved to be safe, the morbid states of the ureter have, by degrees, come to be better known, and operative measures have been adopted for their improvement or cure. An illustrative case of this sort was published by Israel in 1893.²

A young man, aged 28, had for eight years suffered from a urinary affection, which commenced with frequency of micturition. Soon to this symptom were added acute attacks of pain in the bladder, and left renal colic of extraordinary violence. He became in consequence almost a morphomaniac. After long futile treatment elsewhere he came under Israel—thin, miserable, tormented by atrocious pains, which recurred many times a day. The clinical examination, in corroboration of the patient's account, left no doubt as to the presence of renal calculus; there were frequently blood and mucus, but no tubercle bacilli, present in the urine; there was, too, tenderness in the left flank, and pain was caused by pressure upon the ureter throughout its abdominal course. Thus Israel felt called upon to explore for calculus, and did not doubt that he would find one in the kidney. To his astonishment there was none. He found the kidney small and soft; he incised its convex border, and explored the renal cavity, which was dilated. The kidney was then sutured, the wound closed and rapidly healed, but without any amelioration of the symptoms. It therefore seemed clear that the ureter was in some way at fault, and Israel determined to explore it. Cystoscopic examination showed the orifice of the left ureter to be patent and the bladder free of growth, but afforded no other information. Two months and a week after the first operation he again explored the kidney, with negative result, and then through a curvilinear incision, prolonged towards the middle of Poupart's ligament, he discovered that the ureter throughout its entire length was extraordinarily hard, of nearly three times its normal diameter, and presented at intervals enlargements of quite cartilaginous consistence, adherent to the surrounding tissues, especially in the region of the small pelvis. It was permeable from kidney to bladder, but there were at three places slight obstructions, due to thickened folds of mucous

membrane, the result of ureteritis. The kidney, small and hydronephrotic, was removed. After the nephrectomy the colic disappeared immediately, and, although a certain amount of pain persisted for eight days along the course of the ureter, and pus was detected in urine for many months, the patient quite recovered.

Israel makes the following comment upon the case: "I hope if in such cases this plan of procedure is followed the number of instances will more and more diminish, to explain which—in the event of no satisfactory cause for the painful symptoms being ascertained—the unmeaning diagnosis 'nephralgia' is made."

I join with Israel in hoping that fewer cases will in the future be set down to nephralgia. I feel sure that cases of so-called nephralgia will become rarer and rarer—(1) if due care is used in the clinical observation of patients supposed to be suffering from renal calculus; (2) if proper care is taken in the selection of cases for operation; and (3) if a more thorough and methodical exploration is made of the kidney and ureter than is, I believe, customary at present.

I am not, however, prepared to go so far as some who assert that all the "algias" are a cloak for ignorance: that nephralgia, or renal neuralgia is a term without significance, "an expression to hide our inability to explain the cause of paroxysmal attacks of pain in the renal region." I would certainly, with others, urge the necessity, in every case in which one is tempted to adopt this diagnosis, of being very watchful not to overlook anything which might lead to a more satisfactory explanation.

There are many conditions outside the kidney, as well as those connected with that organ, which give rise to symptoms suggestive of renal calculus; and, if overlooked, are likely to be set down to nephralgia. I have known instances of each of the following diseases being the subject of mistake: (a) Gastric ulcer; (b) malignant and tuberculous growths in the intestines; (c) intestinal adhesions, whether involving the renal pedicle or not; (d) aortic or coeliac aneurysm stretching the ureter or renal vessels; (e) spinal disease; (f) vesical calculus; (g) abscess, and calculus in the prostate; (h) growths in the bladder; (i) ovaritis; (j) tuberculous disease of the Fallopian tube; (k) a gall stone in the cystic duct. Still, there certainly are cases in which, neither within nor without the urinary organs, has anything been discovered to explain continuous discomfort, or attacks of paroxysmal pain in the renal region; and yet complete relief has followed an exploratory operation. These are the cases which we are apt to call nephralgia: and these the only operations which we can properly speak of as "negative explorations." Nor do I think we must quite rely upon a statement, which has been put forward with some authority, to the effect that paroxysmal renal pain, or so-called nephralgia, is never associated with neuralgia in other situations, and has never been relieved or cured by antineuralgic remedies. We do not get well-marked cases of the kind in this country, nor do I suggest that all the cases of renal pain which are cured by renal exploration are of malarial origin; but nephralgia of malarial origin would seem to be known in other countries, and there is reason, therefore, for thinking it may from time to time be met with in our own, in persons who have lived much abroad.

I recall a short but suggestive contribution to the *Medical Times* on Nephralgia due to Malarial Poisoning, by an old pupil, Mr. F. W. Kirkham, formerly surgeon to the Royal West India Mail, and whose name is associated with a most successful case of ureterotomy for impacted calculus.³ Mr. Kirkham therein reports the case of an engineer whom he was called to see when at Colon, in the Isthmus of Panama, who had twice suffered from intermittent fever. This young man (aged 25) was seized suddenly with severe dull aching pain in the right loin, varied at intervals by paroxysms of severe shooting pains extending down the corresponding thigh. After lasting about four hours they passed off, attended by profuse perspiration. Similar attacks occurred on the two following days, and again on the fourth day, when he was first seen professionally. Mr. Kirkham found the temperature 102.4°, pulse 108, skin dry, and tongue clean. There was no enlargement of liver, spleen, or kidney, but there was tenderness in the right loin. The urine, though alkaline, was free from any abnormal sediment.

Morphine relieved pain and promoted sleep, and 20 gr. of

quinine prevented the recurrence of the attack on the following day, and 15 gr. of the drug had the same effect on the day after. As soon as the quinine was discontinued the attacks recurred, but a return to the quinine, and subsequently a change of climate, enabled him to enjoy perfect health. Mr. Kirkham adds: "During the past two years I have had four patients under my care who, after recovering, or during their recovery, from malarial fevers have been seized with daily recurring attacks of pain in the region of the kidney, presenting symptoms very like those due to the passage of a renal calculus."

Tiffany,* of Maryland, speaks of having seen a number of cases of malarial hæmaturia, in which it would seem a history of intermittent or remittent fever was often wanting, but the patients had a sallow complexion, which might, however, have been wrongly attributed to the affection for which surgical relief was sought. His remarks lead one to suppose, though he does not actually say so, that he has proved the malarial origin of the hæmaturia and pigmented urine in some of these cases by finding the plasmodium malarie in the blood. If renal pain be associated with the hæmaturia, and the microbe of malaria be not looked for, or not found, the diagnosis of renal calculus would be almost sure to be made.

An ingenious suggestion to explain certain cases which simulate renal calculus has been advanced by Mr. Howard Marsh,⁵ who in 1892 reported the case of a woman of 25, who from the age of 13 suffered pain in the left loin, and, when under observation, had paroxysmal attacks of pain, pyuria, and hæmaturia. Nephrectomy was followed by relief of these symptoms; the kidney excised was small, movable, and contained three stones about three times the size of a grain of wheat. Within two months after the operation she began to suffer severe pain in the right kidney, with hæmaturia and scanty secretion of urine, and frequent and painful micturition—all symptoms which are suggestive of renal calculus. The case further simulated stone, because she passed a small calculus on one occasion, and two small pieces of calculous material on another. This affection of the right kidney continued for over four years, during which time the kidney and ureter were twice explored for stone, but with negative result. She died after the second exploratory operation, and at the *post-mortem* examination no calculous or other renal condition was found to explain the symptoms.

Mr. Marsh suggests that the case is one of the nature of Raynaud's disease—and that the symptoms were due to a profound disturbance of the vasomotor system of the kidney, just as symmetrical gangrene is to exaggerated vasomotor disturbance in the fingers and toes, and other peripheral parts. If this view of the occasional causation of symptoms, usually regarded as pathognomonic of stone in the kidney be correct, it may enable us to explain certain cases of mistaken diagnosis which otherwise are inexplicable.

Hopes were entertained that the Roentgen rays would be of service in determining the presence or absence of renal calculi, but hitherto they have afforded but little help in this direction. In time, possibly, they will be able to render more assistance than they have yet done; but if they demonstrate with certainty the presence of a calculus without being also able to reveal the other morbid conditions remediable by operation which mimic calculus, they will, I fear, be the means of putting back renal surgery by deterring many patients from submitting to surgical operations, who can be cured by no other treatment than an operation.

"UNSUSPECTED RENAL CALCULUS."

I have pointed out that there are numerous morbid conditions other than renal calculus which cause typical renal colic. Conversely, there are many cases in which the symptoms due to renal or ureteral calculus are not referred to the kidney or ureter at all, but to some other organ. It is also well known that a calculus for a long time may cause no symptoms whatever. If such silent, lurking calculi could be discovered and removed, many deaths from calculous anuria, much illness and suffering from perinephric abscesses and renal fistulae, and many kidneys gradually undergoing atrophy or disorganisation might be saved by well-timed operation. Unsuspected calculi group themselves into two classes—those which do not excite symptoms; and those which

cause symptoms which are not referred to the kidney or ureter.

A. Calculi which do not Cause Symptoms.—I might quote several cases in which a calculus, after existing for years, has set up perinephric abscess without having previously caused any definite renal symptoms. A calculus may grow silently to such a size as to be felt on palpating the abdomen without causing any subjective symptoms. I have met with three or four cases. I will epitomise one of them.

In May, 1894, I saw a lady, aged 27 (with Dr. Ford Anderson), who for two or three years had suffered from pain and sense of weakness in her back, more especially in the left side. About four weeks before I saw her she began to pass mucopus in alkaline urine; and five days before she was seized with violent pain in the left renal region, which lasted many hours, in spite of morphine injections. Following upon this attack were several rigors, a temperature of 105°, more or less continuous pain in the left side, and some fulness in the left flank. When I saw her she was extremely ill with a hectic flush on her cheeks, widely dilated pupils, a small, rapid, weak pulse, a furred tongue, and very marked nervous depression and anxiety. She complained of pain over the left kidney, but had never felt pain, and was quite unaware of anything wrong in the right kidney. There was no pain elsewhere, though she replied in answer to questions on this point that "she felt as though she might have pain anywhere." There was no tenderness about the right kidney, and little if any about the left; but the left could easily be made out by bimanual examination, and was felt to be rather larger than normal. On the right side there was a hard, irregular swelling plainly to be felt in the loin and through the anterior abdominal parietes.

The temperature on the morning of my first visit (May 16th) was 101° F.; overnight it had been 105° F. Through an incision in the right semilunar line the left kidney was made out to be larger and more globular in form than normal. It was quite impossible to be sure that the enlargement was due to anything other than simple hypertrophy. Had it had the feeling of a hydronephrotic kidney or of a calculus I should at once have opened it through the left loin. At the inner and lower border of the right kidney was felt a lump, which was obviously a large calculus, filling the infundibulum and projecting into the upper part of the ureter. Through an oblique incision in the right loin a calculus weighing 330 grains was removed.

It was, I believe, little more than a coincidence that after this operation on her right kidney the patient lost all her pain on her left side; and on the second day felt so much better that she described herself as being "quite a different person." I think the relief she felt was owing to the stone, which was irritating the left ureter, slipping back into the renal pelvis during the movements requisite for the operation, or under the relaxing influence of the anæsthetic.

It was plain, for the following reasons, that the pus in the urine, both before and after the nephrolithotomy, must have come from the left kidney: (1) the urine remained unchanged by the operation; (2) the right ureter was completely blocked before the operation by the large stone removed, and to which the whole infundibulum was tenaciously adherent, (3) after the operation all the urine secreted by the right kidney escaped through the lumbar wound; (4) there was no pus found about the stone in the right kidney. It is also equally certain that the calculi which were later on passed naturally and removed by operation from the left kidney had been the cause of the feverish and nervous, as well as of the urinary, symptoms; and that I had, so to speak, operated upon the wrong organ. This arose through my following the teaching, to which a good deal of importance was attached by the distinguished operator who originated it—namely, that a stone in one kidney may cause pain to be referred to the opposite kidney, without itself being the seat of pain; and that if the abdominal route is taken, we shall be able to avoid operating upon the wrong kidney, by finding out by direct palpation in which organ the stone is really situated.

In this particular case, cœliotomy was not needed to discover the stone in the right kidney; this was done at the bedside. On the other hand, it did not enable me to ascertain that the left kidney contained one large branched calculus,

and two others of smaller size which I removed at a subsequent operation, nine months after the first, as well as a calculus which was passed naturally from the left kidney, during convalescence from the nephrolithotomy on the right kidney. The left kidney, with the hand in the abdominal cavity, was felt to be enlarged, more or less globular, and of uniform firmness. It was very carefully palpated for stone, but nothing was felt beyond what was consistent with simple hypertrophy.

Fifteen years ago, in a paper published in the *Medico-Chirurgical Transactions*, vol. lxviii, p. 75, *et seq.*, I called attention to the uncertainty of ascertaining the presence of a calculus by direct palpation of the kidney, either with the hand in the abdominal cavity, or after the kidney had been removed from the body. In the *Clinical Society's Transactions* of 1887, vol. x, p. 109, I again referred to the same probability of error. Further experience has convinced me of the fallacy of this mode of examination, and I would lay it down as an axiom, that the kidney which ought to be first explored is the one on the painful side.

I shall refer in my next lecture to a case of calculous anuria, in which calculi could be felt through the abdominal wall in the right kidney, but the attacks of pain associated with the anuria were referred to the left kidney. I operated upon the painful side, found a small stone in a large, hypertrophied kidney, and the paroxysms of pain and anuria ceased entirely.

I have been once or twice tempted to follow the teaching of the gentleman I refer to, but, excepting on this one occasion, I have resisted. In Case 9, Table I, the inducement was very strong. The nature of this case was, in many respects, similar to the one I have just related. I was able to feel a stone in the right kidney through the abdominal walls. I removed it through the right loin: it weighed 1,303 grs. The young woman recovered, with a urinary fistula. Nearly twelve months afterwards she returned, complaining of terrible pain in the left kidney, but none in the right. At a consultation with several of my colleagues, the opinion held was that the left-sided pain was reflected from the right kidney, and that right nephrectomy should be done, more especially as this operation would get rid of the fistula in the right loin. Not believing in so-called reflected pain, I ventured to act contrarily to this opinion. I explored the painful kidney, and extracted therefrom a stone weighing 513 gr. The girl rapidly recovered from the operation. Fifteen months later I removed the right kidney because it became distended and suppurated. The patient recovered well, and was cured of the sinus in the right loin. Sixteen months after this last operation (the nephrectomy) she was known to be in good health, her left kidney, from which the stone of 513 gr. had been extracted, discharging its functions well. One is tempted to ask, "What would have happened had I nephrectomised the right kidney before freeing her left kidney of the calculus? My own experience of nephrectomy in other cases where there was a stone in the opposite kidney, compels me to answer, 'Probably death.'"

There is not, so far as I know, any case on record in which there is completely satisfactory evidence of symptoms on one side only being caused by a stone in the kidney of the opposite side. The presence of a stone on one side is not proof that the opposite and painful side is not also affected. That the attacks referred to one side have ceased after operating upon the opposite and painless side is not conclusive. This may be a coincidence, and due to the accidental shifting of a calculus in the painful kidney, or to some other cause.

Of course it may happen that, with a great deal of disease on the painful side, there may be silent or quiescent disease on the opposite side, as in the cases I have just quoted, and this quiet disease may be so advanced as to cause a fatal issue after operating on the painful side; but this is an entirely different question. In several of the fatal cases in my lists of nephrotomy and nephrectomy for stone, the opposite kidney has been proved, by *post-mortem* examination, to be disorganised by unsuspected calculus. This was so in cases Nos. 11 and 22, Table II; in No. 4, Table III; and was, I have no doubt, so, though not verified by *post-mortem* examination, in No. 15, Table III.

It may be asked, "Is it consistent to reject the theory of transferred or reflected pain, as applied to the opposite

kidney, and yet to accept it when applied to the bladder or to the ovary?" Well, I believe it is. I have verified the one and have not seen any proof of the other. I do not attempt a full explanation of this; but I would point out that there are instances of a more direct nerve connection between parts on the same side of the median line than between similar organs or parts on the opposite sides of the body.

Take, for example, hip disease—how often does it give rise to reflected or transferred pain in the opposite hip-joint? yet it is not rare for it to cause pain in the knee of the same side. How often does a decayed molar tooth cause pain in the sound molars of the opposite side? or an obstinate ulcer on one edge of the tongue cause pain in the healthy tissue of the opposite edge? Yet the decayed tooth will keep up eczema in the ear hole of the same side, and the lingual ulcer racking pain there, so long as the tooth is not extracted and the ulcer not healed. The eye is often quoted as a parallel with the kidney in this respect, but the relations of nerves and vessels respectively on the two sides in the case of the eyes are quite different to those in the case of the kidneys.

The anatomical communications between the kidney and the bladder, and between the kidney and uterus, as well as between the kidney and ovary and Fallopian tube of the same side, are much more important from the point of view of transferred impressions than those between the two kidneys. The half of the bladder may be regarded as an expansion of the lower end of the renal duct of the same side; and any irritation from a cause seated in the kidney may be conveyed to it by continuity of structures. The blood vessels to the ovary and tube, as well as the uterine vessels, are in close relation with the ureter of the same side. Moreover, the ureter has a considerable course within the folds of the broad ligament, and not far removed from the neck of the uterus, and any drag or tension on the cellular tissue within the ligamentous folds is calculated to irritate the ureter, or *vice versa*.

I have no doubt that *movable* kidney causes certain uterine and ovarian symptoms; and in some cases of very great mobility of kidney I have felt a considerably thickened tender ureter through the vaginal roof. In one case it was so thickened and indurated that it felt like an elongated stone. It is acknowledged that some movable kidneys, and I believe also some kidneys not movable, will swell and ache during the catamenial period; and in a case within my knowledge a movable kidney did so to the extent of being mistaken for a malignant renal tumour by a very noted obstetric physician. The kidney also occasionally undergoes grave and even alarming inflammatory changes during the early months of pregnancy, even where there is no periuterine inflammation; and did time permit I would quote cases of the kind.

In parametric and perimetric inflammations albuminuria and pyuria are far from rare, and may assume alarming proportions. They occur in non-puerperal as well as puerperal cases, though much more frequently in the puerperal. These urinary changes are not due to vesical but to renal conditions, occur during the parametric and perimetric affections, and subside with them. And as showing the influence of the periuterine cellular tissue upon the ureter and through the ureter to the kidney, I may point to the fact that in the late Matthews Duncan's experience⁶ albuminuria is much more frequently associated with parametritis, that is, inflammation in the pelvic cellular, than with perimetritis, that is, inflammation of the peritoneum of the broad ligaments and uterus. It is also well known that in parametritis the inflammatory process has a strong preference for spreading along the ureter to the kidney; and having done so, occasionally gives rise to perinephric abscess.

B. Unsuspected Calculi with Symptoms transferred to other Organs.—If the reasons above stated are correct, there is no cause for surprise that with renal calculus, as with vesical calculus, hip joint and spinal diseases, pain may be referred to a distant part instead of to the organ affected. In renal calculus the symptoms may be referred to the bladder, ovary, or uterus instead of to the kidney. I am constantly seeing cases of renal calculus and other renal diseases which have been under prolonged and repeated treatment for cystitis. Bladders are frequently sounded, irrigated, injected with solutions of silver nitrate, and otherwise actively treated,

without apparently the least suspicion that the trouble is due to stone in the kidney. I will mention one very striking instance, in which for nearly ten years all symptoms pointed to the bladder, none to the kidney; but at length a renal calculus was removed, and the patient regained perfect health.

A married woman (see Table I, No. 19), aged 35, leading an active life, and of a physically and mentally healthy constitution, had suffered from very painful micturition, cystitis, and frequent phosphatic concretions in the bladder for two years. All the tried remedies having failed to give relief, a vesico-vaginal fistula was established by operation, and the urine was allowed to flow away continually into a urinal. This state of things went on for some years, and then the vesico-vaginal fistula was closed. No sooner had this been successfully accomplished than all the old symptoms returned, so that in two or three months the fistula had to be re-established. In this condition the patient passed over nine of the best years of her womanhood. Then some pain and some extra resistance were experienced in the right renal region, and after four or five months' duration I was asked to see her by Dr. Fenton, who had diagnosed right renal calculus. I endorsed this opinion, and on May 14th, 1893, I removed a small lozenge-shaped uric acid calculus, weighing only 4 gr., through an incision in the convex border of the kidney. The patient made an uninterrupted recovery, and, when quite convalescent from the nephrolithotomy, Dr. Fenton closed the vesico-vaginal fistula. The patient remains well to this day, has perfect control over her urine, and, as she expresses it, "finds her life quite a different thing, and is now well worth living."

It is sometimes the same with the ovary as with the bladder; it receives all the attention and treatment, whilst the cause of the trouble is in the kidney. I altogether exclude in these remarks cases in which there is some morbid, organic, or functional state of the ovary as well as of the kidney. I refer exclusively to instances in which pain, either paroxysmal or constant, is referred to the healthy ovary, not to the kidney, and may be associated with tenderness in the hypogastrium or *per vaginam*, and yet is caused by renal calculus or gravel.

C. Unsuspected Calculi with High Temperature and Great Psychical Disturbance.—This third group of cases is well illustrated by the following, the patient being desperately ill for two or three months with symptoms of a typhoid type, attended with acute but vague pains over the whole body, and with great mental prostration, the illness terminating after the discharge of a few ounces of pus and some renal calculi, presumably from the left kidney.

On June 16th, 1893, I saw, with Dr. Ewart, of Eastbourne, a male patient from Alexandria, where he occupied a position requiring great mental and bodily activity. For a few days before sailing for Europe he was not feeling well, and on his arrival at Brindisi he was so ill and in such pain when moved that he was screaming while he was carried ashore. With great difficulty and several halts he reached Aix, when he became too ill to go further. His symptoms whilst at Aix were high fever, frequent rigors, and, as he himself described them, excruciating pains all over him. Sometimes the pains were worse at one part, sometimes at another, but there was a slightly marked predominance on the left side of his trunk and left lower limb. His urine was offensive, and contained pus. It was suggested that he might have a renal calculus, but there was no indication in which kidney it was. Accompanied by Dr. Ewart he at length reached London, though once or twice during the journey it seemed impossible he could do so alive. Frequent doses of morphine had to be given to relieve pain.

When I saw him on his arrival in London he was emaciated to a marked degree, hectic, and had a high temperature with extreme general hyperæsthesia. He was tender, and complained of pains all over him; cried out or groaned when touched; but at one time he would complain most bitterly of a part which at another time seemed free of pain, and could be handled without hurting him. He was shockingly depressed, would take no food willingly, and lay always in a lethargic state, except when touched or moved, which he often tearfully resented. By his relatives he was seen to be quite changed, his temperament altered, his nerve and moral

courage lost. The specific gravity of the urine was 1015. There were neither blood corpuscles, sugar, tube casts, nor tubercle bacilli in the urine. On the following day I examined him under an anæsthetic. Nothing abnormal was detected about his bladder, prostate, or urethra, nor in any part of the abdomen or pelvis. There was no undue fullness or hardness of either kidney to be felt. Drs. Cayley and Ringer saw him on three or four occasions, but we were unable to come to any definite diagnosis except that there was some focus of suppuration somewhere within range of the genito-urinary organs, but precisely where we could not say. On the whole, it seemed most likely to be in the left kidney; but with this uncertainty, and in the serious febrile and exhausted state of the patient, I was unwilling to urge an operation which the physicians by no means encouraged me to do. He improved but little during his stay in London, and on July 15th he was removed to his house at Eastbourne.

On August 28th his temperature rose to 103° F. and he had a severe rigor. The next day he passed about 2 ounces of thick pus and a renal calculus with his urine, and at once began to improve. On October 6th he passed a good deal more pus, and the next day four little stones came away. From that time he rapidly convalesced.

He returned to his duties in Alexandria on October 20th, 1893. He was quite recovered, and was seen by Dr. Ewart in August last (1897) in excellent health and quite his natural self.

In a few cases I have witnessed marked nervous symptoms without high fever. W. C. (see Table II, No. 21) was quite melancholic, and, according to his sister's account, had become so depressed mentally, and so inert physically, that his relatives thought his nature had entirely changed. The night before his operation he spoke to strangers in the surgical home in which he was of the certainty he felt that he would not recover. The operation went uneventfully, but when he came out of the anæsthetic he was hemiplegic and aphasic. He died on the second day after the operation, and at the *post-mortem* examination thrombi were found in his cerebral vessels.

In my only fatal nephrolithotomy (see Table I, No. 14) there was for many hours before the patient's death great restlessness with mental depression and agitation. And in a case in which I removed a kidney atrophied by obstruction from a stone impacted in the lower end of the ureter, the man's nervous anxiety and alarm were prominent features throughout, at any rate, after his admission to the hospital (see Table III, No. 3).

It is a question whether the nervous and mental phenomena without fever are a peculiar form of uræmic brain symptoms; or whether the renal disease, like any other serious disease, is a direct cause of the psychical disturbance. The character of the disturbance is especially one of depression, melancholia, stupor, and nervous apprehension of danger being the most frequent forms. Psychical disturbance has been often noted in Bright's and other renal diseases. I have seen it in advanced lardaceous disease, without any other affection, of the kidney. But in these disorders other unmistakable uræmic symptoms existed which have not been present in the calculous cases to which I am now alluding. Another question is, Why are these psychical disturbances in some cases associated with fever and in others not? Is it the result of some molecular transformation—excited by the local irritation—upon which the evolution of heat depends, or is it due to some special form of bacterial toxins?

I do not think this disturbance can be referred to uræmic poisoning. It occurs when there is no suppression of urine, and is absent in calculous anuria when no urine is secreted for six or eight days or more in succession. The temperature is low, not high, in uræmia.

Perhaps light may be thrown on these questions by culture experiments with the urine, and especially with that removed direct from the affected organ.

QUIESCENT CALCULUS

is little less dangerous to its possessor than the unsuspected stone. It is often said, "the stone may settle down and become embedded in the kidney; or it may pass naturally, and then there will be no further trouble." But often this is

not so. One of my objects in this lecture is to show that neither the one nor the other of these events can be looked forward to with perfect equanimity; and that in every case in which a stone is believed, or known, to be present the best course is to explore the kidney and remove the stone.

We ought not to close our eyes to the possibility of sudden danger arising from a hitherto quiescent calculus, or from one giving only slight and occasional reminders of its existence. If I am rightly informed, the insurance offices are wise enough not to do so; nor should the surgeon.

Several cases might be quoted of calculi quiescent for years giving trouble at intervals, and ultimately causing serious or fatal illness. I will refer briefly to two cases:

I. A man, aged 48, had hæmaturia as a boy of 12. For sixteen years, though following a very arduous life as a sailor, he had no return. Subsequently he had attacks of lumbar pain and hæmaturia lasting a day or two at a time—at very long intervals. Finally he became dangerously ill, and was thought to have a large malignant tumour—possibly hepatic. This proved to be the right kidney enormously enlarged from intrarenal hæmorrhage, and a calculus which weighed 10 ounces. The kidney had to be removed and the man died of shock.

II. The second case was much less severe, but was in many points essentially like the first; the blood clot and the calculus were removed from the kidney, nephrectomy was avoided, and the patient made a good recovery without a fistula. Subsequently during torpedo destroying practice a fresh hæmorrhage into the renal cavity occurred, and opened spontaneously through the scar. Recovery followed, but with a short superficial sinus which persists.

MIGRATORY CALCULI.

Lastly, I want to show the possible and actual dangers of leaving a calculus to make its own way out of the urinary passages; and in this connection let me ask what would be thought of a surgeon who advised a patient with stone in his bladder to wait a few months and see if it would pass through the urethra naturally; on the ground that it was only a little stone, and therefore would be able to make its way perhaps without, perhaps by dint of, stretching; that the process might be a painful one, or might not; that when once the calculus got into the passage the force of the pressure of urine behind would be almost sure to drive it onwards, but that if it did not do so, or alarming symptoms due either to the over-distension of the organs behind or to the sloughing of the part of the tube in which the calculus was impacted, then and then only resort should be had to an operation?

But this is precisely the line of argument daily acted upon in the case of renal calculus. And why? Not because less damage to the kidney will result from the obstruction in the ureter; on the contrary, the serious effect of a blocked ureter is much earlier and much more rapid in its progress; not because the suffering from renal calculus is less than from vesical calculus; not because extravasation of urine never occurs from obstructed ureter or renal pelvis, for witness the perinephric and periureteral abscesses and fistulae; but because of the supposed risks to life of operation on the kidney. But this reason is really no longer tenable. No operation practised for vesical calculus has a lower mortality than nephrolithotomy. Nephrolithotomy is, when properly performed, no less free from after ill-effects than lithotrity.

It is difficult to shake oneself free of the influence of tradition, and thus for years I made it a practice, in cases in which the symptoms were slight or of only recent occurrence, to treat the patients for a time on the expectant plan. I possess several calculi which have been passed naturally; but I now regard them as the emblems of what ought to be very largely an obsolete treatment, and from which I have had one or two rude awakenings.

A patient, 33 years of age, had very slight symptoms of renal calculus, namely, occasional slight pain about the upper part of the left ureter rather than the kidney, and the passing of urine which, as often as I examined it, was neutral, phosphatic, and microscopically showed blood and pus cells and small crystals of calcium oxalate. His custom was to come to England for the summer months and play cricket for his native county, and to pass the rest of the year in Queensland, where he had a large farm. During the

summers of 1894 and 1895—when he was consulting me—he played cricket and tennis regularly, in spite of occasional mild attacks of urethral pain, and was quite unwilling to submit to any operation. Towards the end of the season of 1895 he married, and on the third day of his honeymoon, and a week or two before sailing for Queensland, he came to me one morning in great agony and unable to pass urine, owing to the calculus having become impacted in the prostatic urethra.

It was, of course, quite easy to push the stone back at once into the bladder, draw off the urine, and later in the day perform lithotrity. In two or three days he was just as if nothing of the kind had happened, and was relieved of his calculus into the bargain. But what would have become of this man had the same accident happened a few weeks later when, instead of being within a mile of a hundred able surgeons, he had been out in the bush without a doctor of any kind within two or three hundred miles of him; or if instead of the calculus lodging near the vesical orifice of the urethra, it had blocked the ureter where it crosses the brim of the pelvis, and this had occurred just after leaving port for a three or four weeks' sail? Either of these contingencies might have happened in his case.

This leads me to mention what did happen in another case from a stone blocking a ureter at this spot.

A man, aged 32, about two months after feeling pain in the right loin, had an attack of renal colic. The pain was very severe, lasted four hours, and was accompanied with retraction of the right testis and hæmaturia. This occurred three weeks before I saw him. After the attack, carriage or horse exercise and any extra exertion brought on severe pain in his right loin, accompanied by hæmaturia. The specific gravity of his urine was 1010, and it contained albumen. I advised him to go home and rest for a month, and if the pain continued, or the colic recurred, to have an operation. He did not rest long; but a week afterwards rode on horseback and carried a heavy bag along a station platform. Then he was seized with the most violent pain in the course of the ureter, where it crosses the pelvic brim, and a hard body, like a stone, could be felt there through the abdominal walls. After ten days of the most frightful suffering, during all which time the calculus could be felt in the same position, the patient declared he could bear his sufferings no longer. He made a long railway journey to London, and was operated upon by a London hospital surgeon. Cœliotomy in the median line was performed, and through this a small rough stone in the ureter was steadied between the finger and thumb of an assistant, whilst the surgeon performed retroperitoneal ureterotomy through a slightly oblique wound in the right ilio-costal space. What occurred afterwards was, I believe, this: both parietal wounds healed well, and a urinary fistula in the right loin showed signs of closing, when urine was extravasated into the pelvic tissues through the ureteral wound. No doubt the wall of the ureter where the stone had lodged was thinned and contused by the ten days' impaction of the rough surfaced calculus, and so repair did not proceed in it after the calculus was removed.

This extravasation, it appears, was followed by suppuration and discharge of a little pus *per rectum* and by symptoms of obstruction of the left kidney, owing to pressure upon the left ureter by the inflamed pelvic cellular tissue. The left kidney was explored and found much congested. No stone, but a few particles of gritty material, were found in it. A month or so later, when all seemed going well, a repetition of the symptoms in the left kidney took place, and a great extravasation of urine, requiring a large incision in the right iliac region, occurred.

A week later I was asked to see him. He had then undergone three operations and had four long scars, two on the front of the belly, and one in each loin, with a fistulous track, from the injured ureter, opening in the right loin; and there was, I understood, another abdominal operation contemplated, but this, it is to be hoped, was not done. Here was a case of a professional career checked, if not permanently ruined, by a little calculus weighing not more than two or three grains. A long convalescence certainly was before him; possibly, later on, nephrectomy for an intractable fistula, or, if not, then gradual destruction of the kidney from stenosis of the ureter at the seat of impaction and operation.

Such a case, even if but one in a thousand, teaches a grave lesson; and my reflections upon it, and upon that of the colonist above quoted as well as upon some few others, convince me that the expectant treatment—excusable because inevitable before nephrolithotomy was proved to be the safe operation it is—is no longer justifiable.

SUMMARY.

The conclusions at which I have arrived are the following:

- (1) That the aim of the surgical treatment of renal calculus should be to extend the application of nephrolithotomy, and thereby restrict the necessity of nephrotomy and nephrectomy.
- (2) That more frequently than not the failure to find a stone is not in reality a failure of treatment, because there are so many curable morbid conditions which mimic renal calculus, and which are discoverable only by exploration.
- (3) That the theory that a stone in one kidney, whether that kidney is itself painful or not, reflects or transmits pain to the opposite kidney is quite unproven; that it is a dangerous theory, calculated to lead to very erroneous practice; and that the surgical principle with regard to exploratory operations should be that with pain, paroxysmal or continuous, on one side only, the kidney on the painful side should be explored.
- (4) That nephrectomy for calculous conditions is not often called for, and should be done only in exceptional cases. Nephrotomy for calculous pyonephrosis is the proper operation, at any rate as a primary operation, because of the frequency of double calculous disease. Experience has shown that kidneys from which stones weighing 830 gr. and 1,300 gr. have been removed are functionally sufficient to maintain life during the blocking of the ureter or suspended action of the kidney of the opposite side.
- (5) That nephrectomy whilst the opposite organ is occupied by calculus is fraught with the greatest danger to life; whereas nephrectomy, after the opposite kidney has been freed of stone, will probably be followed by recovery from the operation and possibly by very good health for many years afterwards.
- (6) That when renal calculus causes reflected or transferred vesical or ovarian pain, the removal of the calculus will be followed by complete cure of the bladder or ovarian symptoms.
- (7) That in some cases renal calculous conditions are attended by very remarkable nervous symptoms, sometimes with, sometimes without, high temperature, and that information as to the cause of these symptoms is needed.
- (8) That unsuspected renal calculi are a source of very real danger to their possessors; and when, whether by accident or by the systematic examination of the urine, we have cause to suspect the presence of a calculus, we should recommend its immediate removal, regardless of the fact that it is not causing renal or transferred pain.
- (9) That quiescent calculus is as dangerous to the individual as unsuspected calculus, and ought to be removed by operation.
- (10) That the hitherto accepted teaching, that a renal calculus, if causing only mild symptoms, or attacks of severe colic of only recent occurrence, should be treated on the expectant plan, ought to be discarded as unsound in theory and dangerous in practice.
- (11) That the same principle should be applied to renal calculus which has long been the rule in regard to vesical calculus—namely, when suspected it should be searched for, when known to exist removed, without waiting in the hope that it may become encysted or spontaneously expelled.
- (12) That the very low mortality of nephrolithotomy puts this operation upon the same footing for renal calculus as lithotripsy in the most experienced hands for vesical calculus.

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A HOSPITAL for Cancer is about to be erected in Moscow. Funds to the amount of 200,000 roubles have already been subscribed for the purpose.

LOCOMOTOR ATAXIA IN HUSBAND AND WIFE.

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THE following instance of locomotor ataxia in a married couple presents certain features of interest. I am indebted to Messrs. Phillips and Robinson, Resident Medical Officers at the Dispensary, for some of the notes of the cases.

1. A. L., aged 55, married thirty-six years, began to suffer from pains in the legs some twenty-seven years ago. A year later she had difficulty in walking, and a sensation of loss of feeling in the feet and legs. Twenty years ago she was in the Leeds General Infirmary under Dr. Eddison, and five years ago she was again admitted under Dr. Barrs with an arthropathy of the left knee. She has been confined to her bed for more than two years and a half. Nearly a year ago she sustained a spontaneous fracture of the right leg.

Present Condition.—The patient is a rather stout woman with marked myosis. The pupils do not react to light. She can no longer walk or even stand. She suffers from occasional attacks of pains in the legs, but they are not as severe now as formerly. There have been attacks of gastric pain and vomiting, but not during the past few months. There is no girdle pain. There is no very definite loss of tactile sensation as tested by the brush except perhaps over the outer side of the thighs. Here also the skin and subcutaneous tissue can be strongly pinched without causing pain. At times she is unable to hold her water, and at other times she has to strain to pass it. Both knees are swollen and the left is considerably deformed, but there is little evidence of fluid in them. There is some slight creaking on passive movement, but there has never been much pain, if any, in the knees apart from the legs. At the site of the fracture of the tibia there is a considerable amount of callus present, but the union appears firm. The arms are unaffected with the exception of occasional pains, and she can sew with ease.

2. J. L., aged 58, first had lightning pains some twenty-six years ago. Difficulty in walking soon followed, and the inco-ordination ultimately became so marked that he could only follow his occupation on his knees. He was also in the Leeds General Infirmary some twenty-three years ago under Dr. Eddison. He has been confined to his bed for the past fourteen months. Less than a year ago he was seized with a left hemiplegia, which soon, however, began to improve.

Present Condition.—The pupils are small and unequal, the right being the larger; they do not react to light. There is marked inco-ordination in the legs. The knee-jerks are absent. The patient has more severe pains than his wife, but has no gastric symptoms. There is no certain loss of tactile sensation. He has occasional difficulty in passing his urine. There is some degree of inco-ordination in the arms. The left arm and leg are distinctly weaker than the right, but there is no trace of rigidity.

There have been twelve children, of whom only three (Nos. 1, 3, and 4) are now living. No. 2 died of rheumatism and cardiac disease, aged 15. Nos. 4, 6, 7, and 9 died in infancy. No. 5 died at birth, and No. 10 was a miscarriage. There is now marked loss of sexual power in both patients, and in the man it is nearly abolished.

The diagnosis in these cases requires no discussion, for it is obvious, but there are two points that may be referred to here, namely, the hemiplegia in the man and the occurrence of the double arthropathy and spontaneous fracture in the woman. Both temporary and permanent hemiplegias have been noted in the course of locomotor ataxia. Minor has specially dealt with this subject. They have been looked upon as syphilitic manifestations, and to some extent as confirmatory of the part played by syphilis in the causation of locomotor ataxia. In this case the weakness still persists, but it is not marked. As far as is known, there has been no return of the knee-jerk here, as has been noted by some observers. An interesting case of arthropathy with spontaneous fracture was reported by Pitres and Carrière,¹ with special reference to the morbid changes in the nerves to the parts affected.

The onset of the locomotor ataxia was apparently within ten years of marriage. It is interesting to note the interval between the commencement of the disease in the two partners, so far as it is possible to fix the onset of so insidious an affection as locomotor ataxia is. In the above instance this interval appeared to be one year and a half; in other recorded cases, as far as can be ascertained from the notes, it has generally been from two to five years, but occasionally it is stated that the disease has existed in one partner for many years. Apparently the longest interval precisely stated (twenty years) is in Pearce's case, but there is admittedly some doubt here as to the nature of the disease in the husband.

The number of cases in which locomotor ataxia has been noted in married couples is comparatively few. Such cases have been recorded by Erb,² Strümpell,³ Goldflam,⁴ Dawson Turner,⁵ Moebius⁶ (3 instances), Mendel⁷ (2 instances), and Pearce and Weir Mitchell⁸ (4 instances). There have been other cases in which one of the partners has suffered from