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ORIGINAL COMMUNICATIONS.

ON PYELITIS.

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(*Read before the Harveian Society.*)

NEPHRITIS, or inflammation of the kidney, was the common term formerly employed to denote inflammation of any and of every one of the dissimilar structures which enter into the composition of this organ. No matter whether the diseased action was limited to the membrane which binds the component parts of the kidney into one, that is, to the capsule; whether it was limited to the kidney proper, that is, to the part in which the process of secretion is effected, or to the membrane that lines the pelvis, the first receptacle of the urine, the disease passed by one name, and Nephritis was the term given to these distinct affections. It is to Rayer that we owe our present definite knowledge on the subject; it was he who gave precision to views of which traces only could be found in the writings of preceding authors. His admirable description, rendered more precise by reference to an atlas of plates, unrivalled for fidelity of delineation and beauty of execution, and illustrated by cases occurring in his own or others' practice, fixed at once the attention of pathologists on the disease. Subsequent labourers, while they have added much to our knowledge of diseases of the kidney, have all agreed that, with respect to the complaint now under consideration, his descriptions and his drawings are unequalled.

Pyelitis is the name now used to signify inflammation of the pelvis and calyces of the kidneys; nephritis to express inflammation of the proper substance of the kidney; perinephritis, of the capsule of this organ.

CAUSES. A common cause of pyelitis is the presence of a foreign body in the cavity of the pelvis of the kidney, and then those attacks of intense pain, known as nephritic colic, are its accompaniment. But while alive to its dependence on renal calculi, we must also bear in mind that it often occurs as a consequence of the extension of inflammatory

action upwards along the ureters from the mucous surface of the bladder, the cystitis itself being sometimes excited by inflammation of the urethra.

But pyelitis may arise as a primary disease. A patient presents himself with a general sense of uneasiness, want of appetite, and a dull uneasy sensation, rather than pain, in the lumbar region. But when firm pressure is made in the loins, then pain is felt. The urine is opalescent when first passed, but on standing, it lets fall a more or less abundant sediment of a dirty or yellowish white colour. Litmus paper shows that the urine has an acid reaction. On inquiry, we learn that the patient has been exposed perhaps to wet and cold shortly before his illness began, or had not voided his urine when a strong desire to pass it had come on, in fact, had painfully checked the desire. Now let us suppose the case mistaken for one of trifling import; that the examination stops at the point we have now reached; after a while the pain in the back becomes more decided, and perhaps limited to one side, the urine becomes more and more turbid, and in the extreme stage a fulness is detected in the lumbar region, and on deep pressure on the exterior surface of the abdomen a fluctuating tumour is discovered, which, if the patient survives long enough, ultimately discharges itself into some of the adjacent viscera, as in the following case, which has been given to me by my colleague, Dr. Handfield Jones.

CASE. J. B., aged 31, complained of pain in the loins and abdomen, pus in the urine, and a rounded tumour on the right side of the abdomen. During an attack of diarrhoea, he passed a calculus about the size of a hazel-nut, consisting of uric acid and oxalate of lime: after this he continued subject to bilious attacks; was seized with pain in the head and limbs, sickness, and severe pain in the abdomen. The right hypochondrium was full, hepatic dulness increased, and cough caused great pain; urine contained a little albumen and pus. He sank exhausted. On examining the body, the lungs and heart were found healthy; slight pleural adhesions on the left side, firm and dense on the right. Kidneys not enlarged, pelvis of right, considerably distended, and contained several calculi; ureters natural. A communication existed between the pelvis of the right kidney and the upper part of the ascending colon, which was itself pushed backward by the liver, greatly enlarged by hydatids.

But supposing, instead of stopping short in his examination of the case, that the surgeon had entered a little further into its investigation, supposing he had placed a little of the urine under the microscope, he would at once have detected the presence of pus, of exudation corpuscles, and of epithelium scales; his attention would have been directed to the probable seat of the disease, and the patient, by well directed treatment, have been relieved in a short time.

Although it is sometimes the consequence of exposure to the ordinary exciting causes of inflammation of other organs, viz., wet and cold, and external injury, as blows on the loins and penetrating wounds, or of extension of inflammatory action of the mucous surface of the bladder, pyelitis is much oftener the result of other causes. Standing far in advance in point of frequency as excitants of pyelitis are foreign bodies in the pelvis of the kidney, and of these renal calculi are by far the most common. Sometimes, however, acephalo-cysts and the strongylus are found to be exciting causes.

Next in order of frequency among the causes of pyelitis is gonorrhœa. The action excited by the application of the specific virus to the mucous membrane of the urethra extends along this canal, producing simple inflammation of the mucous membrane of the bladder, and this inflammation then extends along the ureters, as though it had been primarily excited in the organ referred to.

Obstruction to the flow of urine, whether arising from stricture or any other affection, is a cause of pyelitis. Under this head should be noticed a form of this affection occurring in boys with a nearly closed prepuce, so that the urine is passed only by drops. In a case communicated to me by Dr. Golding Bird, the boy died with coma, preceded by the symptoms of pyelitis. After death, the bladder was found contracted, as in old stricture; the ureters enormously distended; the pelvis of the kidneys dilated, so as to hold more than four ounces of fluid, and their lining membrane presenting all the evidences of severe previous inflammation. The whole urinary apparatus of this boy is now in the museum of Guy's Hospital.

When the blood becomes charged, whether by absorption of the skin, or from the mucous membrane of the lungs or stomach, with certain substances, as turpentine, cantharidine, etc., it frees itself by excreting the irritating matter by the kidneys. The substances just mentioned excite an instant effect on the kidneys, and pyelitis is an occasional consequence. On carefully examining, however, the various cases which have been recorded, as examples of pyelitis produced by the absorption of irritating substances, it appears that nephritis, not pyelitis, is the effect which most ordinarily results. The poisonous substance, in fact, must come in contact with the lining membrane of the uriniferous tubes in the first instance, and these are much more sensitive of any offending cause than the lining membrane of the pelvis.

Another form of pyelitis deserves special mention from the circumstances under which it is apt to occur, and the character it assumes. It usually supervenes after the operation of lithotomy, or is excited by enlargement of the prostate gland. It is a very severe and dangerous form; typhoid symptoms often set in at an early stage, and soon end in stupor. After death, the inner surfaces of the ureters, calyces, and pelvis, are found covered with a grey or dark false membrane infiltrated with blood; and from this latter circumstance the form now alluded to has been called pseudo-membranous. Thus, then, the causes of pyelitis are—

1. Foreign bodies in the kidney.
2. Extension of inflammation by continuity of surface.
3. The ingestion of renal irritants.
4. External injury.
5. The ordinary excitants of internal inflammation.
6. Obstruction to the flow of urine.

Of foreign bodies, the most frequent are calculi; of primary inflammations, gonorrhœa; of renal irritants, the imbibition of the active principle of cantharides.

Pyelitis is almost unknown as a disease of infancy. It is more frequently observed in males than females.

SYMPTOMS. The symptoms of pyelitis are pain in the lumbar region, the character of which is dull and aching, its intensity is never very

great, the severe attack of pain in the loins, nephritic colic as it is called, which sometimes accompanies pyelitis, being due to the presence of foreign bodies, as calculi, and not to the inflammation itself. Slight tenderness exists in the seat of the pain. The urine is acid, as abundant, or nearly so, as in health, and of good specific gravity. When first passed it is opalescent; on standing, a sediment of an uniformly creamy aspect, or consisting of whitish floculi, or, if much mucus be present, opaque and mucilaginous in consistence is formed; on being boiled or tested with nitric acid, it is found to contain albumen; and, on its being examined with the microscope, pus globules are at once seen.

The inflamed mucous membrane will at first throw off its epithelium, which, under the form of columnar and scaly particles, will be found in the urine, and which has sometimes accumulated to such an amount as to be taken for pus. As the inflammation increases, exudation globules, marked by their large size, spherical shape, and opaque, oily contents, will appear; and, lastly, thin purulent matter will be found mixed with varying quantities of mucus, the former predominating more and more as the inflammation increases in violence. In this case albumen, derived from the liquor puris, will be detected in the urine, which, as Dr. Golding Bird has well assumed, constitutes the only real difference between pus and mucus, the corpuscles in each being identical, but the fluid in which they float being different.

The pus secreted by the lining membrane of the pelvis collects in more or less quantity, and becomes a source of irritation and fresh secretion. The substance of the kidney, compressed between the imperfectly yielding capsule and the purulent fluid accumulated in its pelvis, wastes, the pelvis becomes dilated, the calyces spread out, and, finally, a false abscess is formed by the collection of pus in a preexisting cavity, and yet bound by the walls of that cavity. Inflammation becomes excited around this abscess, lymph poured out, adhesions formed, and when the pus reaches a certain quantity, when the pelvis can no longer dilate, absorption of its walls at one point takes place, and thus the pus finds its way, as in ordinary abscess, either to the nearest point of the surface, or into some neighbouring viscus.

Blood discs are not found in the urine of patients affected with pyelitis, arising from exposure to cold and wet, or extension of inflammation from the bladder; while they are generally present when the inflammation is due to the presence of a calculus.

The general febrile symptoms are occasionally trifling. If the disease is of long duration, then, the continued excretion of pus, or its collection in large quantities, may destroy the health of the patient, and lead to hectic fever. The pain of pyelitis is ordinarily trifling; but not so the pain which accompanies nephritic colic. This pain generally commences more or less suddenly, yet it is sometimes preceded for a few days by an increased sense of weight, and aching in the loins; it is acute and violent, commencing in the region of one kidney; it extends in the course of the ureter to the bladder, and to the rectum, and down the thigh, which, as Chomel remarks, is often stiff and affected with tremors. In males, the testicle of the affected side is powerfully retracted towards the external ring. So severe is the agony, that the patient screams, walks the room, or

stretches himself on the ground, pressing his abdomen with the hands, and contorting himself in every possible way to get ease. The countenance indicates the suffering which the patient experiences; the surface is covered with cold sweat; the pulse is small and feeble. After a while the sufferings are remitted, to be again renewed, perhaps in a few minutes, with if possible increased violence; vomiting occasionally occurs, and is frequently followed by relief to the severity of the symptoms.

While the attack lasts, the urine is scanty, a few drops only being passed at a time, and of a deep red colour. Fits of nephritic colic are induced by sudden exertion, even by hasty movements of the trunk.

I have described the symptoms of this affection, because pyelitis is frequently the consequence of a renal calculus, and the tendency to nephritic colic is favoured by the presence of a calculus; and because a consideration of the treatment of the one, involves the consideration of the treatment of the other.

If, in consequence of more or less perfect occlusion of the ureter, either from thickening of its walls, or from the infraction of a small calculus, accumulation of purulent fluid takes place in the pelvis, the symptoms are pain and weight in the lumbar region, more or less well marked symptoms of hectic, emaciation, night sweats, circumscribed flush on one or both cheeks, and a deep-seated swelling, perceptible in the lumbar region, and from the anterior surface of the abdomen.

The following case, in a recent number of the *Gazette Médicale* (1851, p. 352), is a good illustration of this form of the complaint:—

CASE. A young woman, aged 18, by occupation a laundress, was taken into La Charité the 10th of March, 1851, under the care of M. Briguët, and died on the 20th of the same month. She had been seriously ill only three weeks, but had suffered occasionally from rather acute pains in the kidneys for three or four months. There was, however, nothing in her history which appeared to indicate that she had been suffering from nephritic colic; and she declared that she had never passed calculi or gravel in her urine. When she entered the hospital, she had slight fever, with exacerbation in the evening, shiverings, and pain in the loins, increased by pressure on percussion, and which extended throughout the region of the right kidney. Percussion in the lumbar region shewed that both kidneys were increased in size, but that the right was sensibly larger than the left. Five or six days before her admission, she passed a large quantity of blood with her urine, this being the first time that she had suffered from hæmaturia. After this discharge of blood, the urine, which continued natural in quantity, became thick and fetid, so fetid, indeed, that it emitted a gangrenous odour, especially shortly before death.

On standing, the urine deposited a purulent precipitate; but the superabundant portion did not become at all more transparent, and it yielded a copious precipitate on the addition of nitric acid. During the last two days, the tongue and skin became dry, and the latter of a lead colour; and low delirium, with all the symptoms of a severe typhoid condition, were present. The patient never had any vomiting.

The treatment consisted principally in the application of cauteries, according to the plan of Mayor, over the region of the right kidney.

On examination of the body after death, both kidneys were found

to be nearly double their natural size. This increase was occasioned by the pelvis of each kidney being distended with foetid pus. The walls of the pelvis were covered with a greenish sort of false membrane, and presented points of ulceration having a gangrenous odour. The renal substance itself was thin and compressed, but not otherwise altered. At the point where each ureter joined the pelvis, a calculus was found about the size of a bean; and a third calculus, as large as a good-sized pea, was found bathed in the midst of the pus contained in the left pelvis. The ureters were double their ordinary size, and their walls were thickened; they were also nodulated, and presented here and there sacculated dilatations. The vesical mucous membrane was thickened, of brown or violet hue, especially at the centre of the base of the bladder. The three calculi which have been mentioned, were the only ones which were found in the genito-urinary organs.

If the stone arrested in the kidney is of a size or figure which impedes its entrance into the pelvis or ureter, abscesses sometimes form to such an extent, as to destroy the whole of this viscus, and inundate the surrounding cellular tissue.

Most frequently, however, the existence of matter can only be a matter of surmise; from the signs and symptoms of the inflammation, followed by a remission, but of short duration; from the return of the pains, shivering, and irregular accessions of fever; and often, also, from a doughy swelling of the integuments of the abscess, although the colour of the skin is not changed. The surgeon ought, in such cases, to recall to his mind all the different circumstances which have preceded or accompanied this stage of the disease.

If, then, the patient has had one or more attacks of nephritis, more or less strong and frequent; if he has had total suppression, or simply diminution in the quantity of urine; if he has experienced some pain in making water; if he has passed blood, mucus, pus, even gravel or sand; or if he has found in his urine a mucous sediment, thick, reddish, and purulent; if in these intervals he has experienced tension, weight, or pains, whether dull and wandering, or severe and pulsating, or burning in the lumbar region, immediately under the last false rib, near the spine; if on pressing firmly on the part, the pain, which most frequently extends to the groins and testicles, is increased; if these signs exist, the existence of matter may be more than suspected.

Nevertheless, it ought to be observed that, in cases even of abscess of the kidney, the stone may no longer obstruct the flow of urine, because it may subside into the cavity of the abscess itself, and the passage of the urine will be free. Hence retention of the urine will not be, under these circumstances, an indication for surgical interference; the true indication must be the abscess itself. We must, however, be well assured of the existence of an abscess, before proceeding to make an opening. If an opening be made, the incision should be directed more towards the inferior than the upper part of the loins, so as to open the most depending part of the abscess, and to avoid coming in contact with the false ribs which embrace the kidney towards its top. These abscesses have sometimes two distinct situations; one in the interior of the kidney; the other externally, in the surrounding cellular tissue.

It is a matter of doubt whether one or both kidneys are more frequently attacked at the same time: if only one is attacked, it is, as far

as my experience goes, the left. M. Civiale, however, is of opinion that both kidneys are generally affected at the same time, though in different degrees, one being more severely attacked than the other. When one kidney alone suffers, he agrees with me in thinking that it is commonly the left. M. Rayer's experience does not enable him to decide this point one way or the other; nor does he think that the proofs relative to the more frequent attacks of the left kidney are at all decisive. It appears certain that, in those forms of pyelitis which are consequent on injuries of the urethra or bladder, both kidneys usually suffer. The following is an interesting case of pyelitis in both organs.

CASE. A young girl, about twenty-three years old, was admitted into the Hôtel Dieu, January 12th. For two years and a half, she had been suffering from a complaint which commenced by micturition of blood, accompanied by fixed and acute pains in the lumbar regions. Shortly after, her urine became turbid, and at length purulent; she passed it frequently, and in small quantity. After eighteen months, however, repeated applications of leeches to the region of the kidneys having been made, the patient appeared to improve; the renal pains became converted into a dense weight, constant, but not intolerable. The urine, however, never ceased to furnish a puriform deposit, but unmingled with any calculous matter. Such was her condition up to three weeks before admission, when, having taken cold, the menses became suddenly suppressed. Alarming symptoms soon manifested themselves; and when she came to the hospital, the patient presented the following symptoms: Countenance altered; eyes sunken; general abdominal pain, increased by pressure, but most severe in each lumbar region; thirst; nausea; urine purulent, voided in small quantities, and with difficulty; pulse frequent.

In spite of the means employed, the symptoms increased in severity. On the fifth day, the vomiting continued; the pulse could scarcely be felt; the limbs were cold; and, on the morning of the sixth, the patient died.

On examination, the urinary organs alone were found diseased. On cutting through the kidneys, the knife was repeatedly arrested by numerous calculi, imbedded in their substance, and surrounded by small quantities of pus. The left kidney contained nine, and the right fifteen calculi, all surrounded by pus, and enclosed in cavities lined by a mucous membrane of a deep red colour. These cavities were dilatations of the calyces and their branches. The calculi were various in form, all contiguous, and of a branched kind, radiating from a centre, where the several calculi were opposed to each other in various ways. Their colour was white or yellowish, and they consisted of uric acid and the ammoniac-magnesian phosphate. The remainder of the kidneys was compressed and small, but little altered; the ureters were of a mottled black, and their mucous membrane was thick. The bladder was columnar, and its mucous membrane was thick, and uniformly of a dark red colour. It contained a small quantity of thick puriform fluid, but no stone.

The chief characteristic signs of pyelitis are pain over the region of the kidney, and the presence of purulent matter or pus globules in the urine.

Calculus pyelitis is the most frequent form of the disease, and from its exciting cause, viz., the presence of a stone in the kidney, it might at first sight appear that such an affection must be attended by an assemblage of symptoms which would leave no doubt as to its existence. Yet such is not the case. Sometimes the patient exhibits no symptoms whatever of permanent disorder of the kidneys, at other times the structure and functions of the kidneys are considerably modified, yet the symptoms do not manifest themselves in any appreciable manner until immediately after the performance of some operation on the urinary organs. M. Civiale relates a remarkable case of acute pyelitis in a man 55 years of age, whom he proposed to lithotritise, if on sounding he detected a stone, but fortunately he had not sounded him. The attack came on suddenly, without any apparent cause, and the only symptom of the pyelitis was great prostration of strength, which supervened two days previous to death. The pelvis and ureters were filled with pus, and a small calculus was contained in one of the kidneys. These and other analogous cases, however, only show that diseases of the kidney may exist for a long time without giving rise to any striking symptoms, and such cases it is of course impossible to recognise.

DIAGNOSTIC SIGNS. The characteristic symptoms of pyelitis, as I have observed, are pain in the region of the kidney, and the discharge of purulent urine. The relative value of these two signs must be carefully ascertained, for neither of them taken separately can afford any just ground for supposing the kidney to be the seat of disease.

The lumbar pains of calculous pyelitis are far from being constant. It is also a point of great importance to remember that the bladder may be the seat of sympathetic pain, while none is experienced over the region of the kidneys. Indeed, it may be laid down as a general law, that all the symptoms commonly attributed to disease of the kidneys, may arise from the presence of a calculus in some other part of the urinary apparatus, the kidneys themselves being perfectly sound.

The pain in the region of the loins may be produced by other diseases, from which it is necessary to distinguish it. Thus, nephritic colic might be mistaken for nephralgia; but the pain of the former is much more severe, can often be traced downwards along the ureter, and ceases after the passage of the calculus into the bladder. In lumbago, the pain extends to both sides of the lumbar region, and is greatly aggravated by motion, whereas the pain is very seldom felt in both lumbar regions in calculous pyelitis.

The diseases with which acute pyelitis are most likely to be confounded are pyelo-nephritis, acute nephritis, and perinephritis. Whenever the inflammation of the pelvis is severe, it almost always extends to the uriniferous tubes and substance of the kidney, and then the symptoms of the two diseases become confounded together. The pain of acute nephritis is so perfectly similar, both in seat and character, to that of acute pyelitis, that it affords little assistance as a diagnostic sign. The pain in calculous pyelitis is, however, generally more acute, and apt to occur in paroxysms. In doubtful cases, we must be guided by the presence or absence of pus or mucus in the urine, and especially the existence of a tumour in the lumbar region; but if these signs are

absent, we can only suspect calculous pyelitis whenever lumbar pains are followed by fever occurring in paroxysms, and attended by the usual signs of nephritic colic. If we possessed any certain means of ascertaining that the bladder and urethra were perfectly sound, the presence of pus or mucus in the urine would lead to the inference that they must be derived from the pelvis of the kidney; but we can hardly ever be certain of the non-existence of inflammation in limited points of the urethra or bladder. As for nephritis, it may be concluded with a sufficient degree of certainty, that inflammation has extended to the substance of the kidney, whenever acute pain in the region of that organ is succeeded by frequent vomiting and cerebral or typhoid symptoms. Partial peritonitis of the lumbar region may be mistaken for pyelitis, and this occurs more readily if the bladder be inflamed at the same time, and the urine contains pus.

It is more easy to distinguish chronic pyelitis from chronic nephritis. In the former case, the urine constantly furnishes traces of pus or purulent mucus, and often throws down a purulent deposit. In chronic nephritis, the turbid appearance of the urine generally arises from the phosphates which it holds in solution.

The difficulty of distinguishing diseases of the kidney from other signs, has led practitioners to seek a means of diagnosis in the various conditions of the urine. These are of great utility when rightly interpreted, the only drawback being the nicety of microscopic and chemical examination which is required. And here I would remark, especially in reference to the treatment of calculous disorders, that the practitioner should never undertake any serious operation on the genito-urinary organs, without first having ascertained in a careful manner the condition of the urine. For the diagnosis of renal diseases also, it is necessary to examine the urine several times in the course of the same day; it may vary considerably in the interval of a few hours. Thus, in calculous pyelitis, the urine may be acid at one time and alkaline at another; or it may be strongly charged with pus and blood, and in a few hours afterwards present a perfectly natural appearance.

The examination of the urine is chiefly made for the purpose of determining whether the changes in this fluid arise from disease of the bladder or disease of the kidney, and likewise as a means of assistance when other signs of renal disease are either obscure or absent. Thus, when the patient does not complain of any pain in the lumbar region; when there is no tumefaction or tumour over the region of the kidney, etc., an examination of the urine may assist us in distinguishing pyelitis from cystitis. In the former we have, it is said, deposits of true pus in the urine, whilst in catarrh of the bladder the urine is glairy and viscid. This is often the case; but the pus in cystitis is not always glairy; and if the urine be alkaline, it will give a glairy appearance to the pus derived from the kidney. However, the secretion of pure pus, analogous to that furnished by an inflamed pelvis, is rare in cases of cystitis. It is also rare to find nothing in an inflamed pelvis except thick and adhesive mucus. The sedimentary deposit from an inflamed bladder, if examined under the microscope, will usually be found to contain a much smaller quantity of pus-globules than is seen in cases where the pus is derived from the kidney. Finally, in these latter cases it is not common to discover the large

crystals of triple phosphate which abound in the urine from an inflamed bladder.

The quantity of albumen contained in the urine should also be taken into account. It is much greater in cases of nephritis than in pyelitis or cystitis. It must be confessed, however, that the signs which I have now enumerated are not sufficiently characteristic to be ranked amongst diagnostic symptoms. The urine which we examine may contain pus; but the main fact to be decided, is, whether the pus comes from the bladder, the ureters, the pelvis of the kidney, or the uriniferous tubes. This can only be decided by minute examination of the urine; and even then we are only enabled to distinguish the pus of nephritis from that secreted by the lining mucous membrane of the urinary passages. Still this is an important step, for the chief danger in cases of urinary disease arises from the substance of the kidney being involved. When the urinary tubes and substance of the kidney are diseased, the epithelium is thrown off in granular casts of the tubes; when the urinary deposit depends on irritation, or subinflammation of the mucous lining membranes, it is chiefly made up of the basement epithelium. The form of the pus globules will also assist us in determining whether the matter is derived from nephritis or from inflammation of a mucous surface. In the former case, numerous pus-corpuscles will be detected entangled in the fibrinous casts of the uriniferous tubes; and this, perhaps, is the only diagnostic sign of any certainty that the inflammation involves the substance of the kidney, and is not confined to the pelvis, ureters, or bladder.

The acid and alkaline reactions of the urine are signs of little value. It has been stated that the urine is always alkaline in nephritis, and acid in pyelitis; but this is far from being constantly the case. Numerous examples of nephritis are on record in which the urine was more or less acid. The presence of pus in the urine does not, as has been often asserted, exclude the existence of nephritis. It is true that the pus from a diseased kidney almost always comes from the inflamed pelvis; but it is evident that an abscess in the substance of the kidney may open into the pelvis, and thus become the source of the matter discovered in the urine. Besides, pus-globules have been found in the urine of persons attacked by nephritis, without the mucous membrane being inflamed.

On the other hand, we are not to conclude, from the absence of pus in the urine, that pyelitis does not exist. The pus cannot be detected in the urine unless it has access to the bladder, and this may be prevented by several circumstances. Sometimes the urine is charged with pus, and in a few hours afterwards perfectly natural in appearance. This can only be explained on the supposition that the urine comes alternately from the diseased and healthy kidney. Rayer alludes to some rare cases of chronic pyelitis, in which the pelvis contracts on the enclosed calculus, becomes hard, thickened, and ceases to secrete pus. Here, if the opposite kidney remains sound, the disease could hardly be suspected during life. The urine of patients affected with pyelitis, often contains blood; and blood-corpuscles are occasionally discovered by the microscope, when they cannot be detected by the naked eye.

Pyelitis may be confounded with acute inflammation of the mucous

membrane of the bladder ; for in both affections the bladder is irritable, and the urine, in the advanced stages of the disease, loaded with pus and mucus. But there is a very distinctive mark between the two affections, viz. the intense pain which attends inflammation and ulceration of the mucous membrane of the bladder, and which soon exhausts the strength of the patient. Now in pyelitis the pain is never very severe, unless accompanied with stone in the kidney. Sometimes, however, both diseases exist together, and then the pain is very severe, and the course of the disease rapid, as happened in the following case, which I have given in my work on the bladder.

CASE. Deborah Mulloday, aged 46, complained of great uneasiness, pain in the lower part of the belly, and frequent desire to void urine. After the bladder was emptied, the pain and uneasiness usually subsided. These symptoms were at first relieved by the use of the decoction of *pareira brava*. The pain became very acute, the desire to make water more frequent ; the urine contained a good deal of pus, and on two or three occasions, it was tinged with blood. The pulse was small and quick ; the countenance pale and sallow ; and there was emaciation of the body, with occasional shiverings and cramps. She had no pain in the loins, and there was no sickness until about ten days prior to her death, when it was very distressing, and of some days' continuance. On Friday, July 26th, she was seized with paralysis, and died on the following Tuesday. Twenty-four hours after death, the body was examined. The mucous membrane of the bladder was ulcerated in several spots. The bladder, which was thickened and contracted, contained a good deal of pus ; the vesical extremity of the left ureter was ulcerated ; the substance of the left kidney, in some parts, was completely destroyed by ulceration, and its pelvis full of pus ; the right kidney was in a state of atrophy, and its interior contained a deposition of chalky matter ; the urethra was inflamed, but not ulcerated.¹

THE MORBID APPEARANCES which are found after death vary. Supposing the disease to have been acute, and of short duration, the mucous membrane lining the pelvis will be found abnormally vascular, the firmly injected capillaries will be seen coursing over it in all directions ; and accordingly, as a fewer or greater number of these capillaries are distended with blood, the injection will be capillary or uniform. In one of M. Rayer's plates there is delineated a kidney attacked with acute pyelo-nephritis. The internal membrane of the pelvis and calyces is highly injected, the blood-vessels forming on the surface of that membrane a remarkable network. At some points it has a yellow tint. The distended pelvis contained turbid purulent urine ; the pelvis and the calyces were dilated ; the extremities of some mammillæ were slightly effaced. In the cortical substance, either at the base of the cones, or in their intervals, there were points of bright redness, and other points white or yellowish, from whence pus could be squeezed out. A certain number of bright red and purulent points were also visible on the surface of the kidney.

M. Rayer has also given a drawing of a vesicular eruption from the internal surface of the pelvis, in a case of chronic pyelitis. These vesicles, resembling sudamina in size and form, were scattered irregu-

¹ On Diseases of the Bladder and Prostate Gland, 4th edit., p. 153.

larly over the lining membrane of the pelvis, and some few existed in the ureter; they contained a thin transparent serum; the mucous membrane of the calyces had an unhealthy bluish rose colour; the calyces were deformed and diseased; the mammillæ were effaced; the cortical substance was sound, but in several spots its thickness was sensibly diminished.

This able physician has also delineated a case of chronic pyelitis, with polypoid excrescences from the surface of the mucous membrane of the pelvis and ureter. The mucous membrane of the pelvis and dilated calyces offered, in an extreme degree, the thickness and unpolished white aspect which is observed in a great number of cases of chronic pyelitis; the polypoid excrescences were pediculated, soft, spongy, and of a yellowish-red colour. In another drawing, the thickened walls of the pelvis are seen scattered over with rather deep ulcerations of different dimensions; these ulcerations were specially visible in the calyces. The mammillæ offered a very rare alteration, and which probably precedes the ulcerations; in fact, several mammillæ appear transformed into a yellow opaque substance, mingled with another transparent matter resembling colloid disease. The extremities of the other mammillæ were whitish, and irregularly ulcerated. This singular alteration was prolonged into the tubular substance, in the direction of the apices of the cones, at whose base there was a well-marked morbid redness.

Here and there a few large vessels give rise to the redness termed "ramiform", while the rupture of a few over-distended capillaries produces the appearance sometimes termed "punctiform" redness. Its depth of colour varies from a rather bright pink to a deep mahogany red. The polish of the membrane is gone, and its surface is more or less roughened; sometimes it is raised from the subjacent tissue in the form of little vesicles, identical in appearance with those so often seen on the skin in phthisis and some other diseases, and termed, in that situation, "sudamina", or miliary vesicles. If the inflammation has continued for a longer period of time, the hue of the membrane is of greyish red, grey, or even slate-coloured; it is considerably thickened, and this increase of thickness is not limited to the mucous membrane only, it affects the submucous tissue, and even the external fibrous coats of the pelvis. The extremities of the pyramid, the mammillæ of the kidney, are also by this time, if not earlier, of a deep red colour. Ulceration of the membrane, and even gangrene, have been observed in some cases. Now one of two changes ensues. Supposing a free exit to exist for the pus from the pelvis of the kidney into the ureter, then the cavity of the former is diminished by the contraction of its thickened walls. This contraction of the pelvis may be either local or general. Sometimes only one calyx and a part of the pelvis are more or less closed up; at others, the whole of the calyces and pelvis is pretty equally affected. If the contraction, however, be limited to the vicinity of the opening into the ureter, then the calibre of this duct may be so far diminished as to offer an obstacle to the free exit of the urine still secreted in quantity by the kidney, or to an accumulation of the pus poured out by the inflamed mucous membrane of the pelvis. In either case the ultimate result is the same, viz. great distension of the walls of the pelvis of the kidney, and a multilocular cyst

is formed, the loculi being composed of the dilated calyces. At the bottom of each loculus a depression may be seen, from which radiate numerous vessels in every direction; this appearance is produced by the expansion or flattening of the mammillæ, which, in the normal kidney, project into the calyces. At the same time that the pelvis undergoes this distension to a multilocular cyst, the proper substance of the organ diminishes in amount, and becomes atrophied. As the pelvis continues to dilate, a mere trace only of the pyramidal and cortical substances of the kidney may remain, and even ultimately that little may disappear, and the membrane of the pelvis and the capsule of the organ, both considerably thickened, lie in contact. As the inflammation is produced by the pressure of the distended pelvis in the tissues around, especially the loose cellular tissue in which the organ is embedded, one of two results may ensue: either healthy lymph is effused, and adhesions formed to adjacent parts; or a pyoblastema is secreted, and the whole being resolved into pus, the sac formed by the distended pelvis of the kidney is bathed in that fluid, and subsequently a fistulous communication may form between the two collections of pus. Instead, however, of owing its origin to inflammation thus excited, the pus found round the kidney may be due to the distended pelvis giving way, and its contents being poured out directly into the loose cellular tissue referred to. I need hardly point out the fact, that the multilocular cyst formed by the dilated pelvis and calyces, is a totally distinct thing from the multilocular cysts sometimes found in the substance of the kidney. Inflammation affecting the pelvis of the kidney sometimes extends to the substance of the organ, and then purulent deposits in the organ, as well as other consequences of nephritis, ensue.

In certain cases of calculous pyelitis, says Rayer, the ureters are contracted, sometimes even obliterated. Such obliteration is frequently produced by the deposit of a white organized material adhering strongly to the walls of the ureter, and which appears to be either solid pus, or half-organized false membrane. Sand and gravel are sometimes entangled in this white matter. Below the obliterations, the ureter is frequently transformed into a fibrous cord. More often a calculus is found wedged in a part of the track of the canal, which is rough, and sometimes covered with a black matter, or with altered blood.

When such a calculus is close to the pelvis, pus accumulates in this reservoir; and the kidney is changed into a large purulent pouch, which may contain some pounds of fluid.

In kidneys attacked with calculous pyelitis without the lodgment of a stone in the ureter, or obstruction or obliteration of this canal, frequently not only is no increase of size observable, but they present sometimes a remarkable diminution. Now and then the calculus is impacted about the middle of the ureter, while at other times it is retained at the vesical mouth of this canal. When complete, or nearly complete, obstruction exists, the part of the ureter which is situated above the obstacle filled with urine, blood, pus, or gravel, becomes gradually dilated; and this has in one or two instances terminated in rupture. The kidney rarely presents, when such conditions are present, that large size which it frequently acquires when the ureter is obstructed near the pelvis.

Supposing the pelvis of the kidney to have been dilated into a large pouch filled with pus, the pus to have been evacuated by nature or by art, and the patient to have been restored to health—what is the condition in which this pouch will be found after death? Contraction will have followed the escape of the pus, and a fibro-cellular substance with the tissues puckered around, will be all that remains to indicate the situation occupied by the kidney, even in the case supposed of the enormously dilated pelvis of this organ.

CONCOMITANT DISEASES AND COMPLICATIONS. Whether we consider pyelitis and other diseases of the kidneys as the result of a morbid condition of the blood, or taking them as the primary cause, reflect on the effects which disease of the urinary secreting organ must produce on the circulation and general health, it is natural to conclude that they should be accompanied or followed by several more or less important lesions; and experience proves this to be the case. I shall therefore now briefly allude to some of the principal concomitant diseases and complications which have been observed during the course of pyelitis.

Infinitely the most common complication of pyelitis, is inflammation of the uriniferous tubes or nephritis; and this can be readily understood. Indeed, it may be affirmed that this compound disease is of much more frequent occurrence than pure pyelitis, the inflammatory action of the latter, if at all severe, being seldom confined to the lining membrane of the pelvis. Chronic pyelitis, again, may be followed by atrophy of the kidneys; or, in the calculous form, by perforation of the pelvis, calices and kidney itself. These, however, strictly speaking, may be regarded rather as effects of the disease than complications. The opposite kidney may become involved by sympathy with the inflamed one, in cases of calculous pyelitis originally confined to a single kidney, or it may remain sound and present the character of hypertrophy.

The concomitant disorders of the genito-urinary apparatus, in cases of pyelitis, are very various. They are generally primary, that is to say, have preceded the development of inflammation in the pelvis of the kidney. Thus, when certain morbid conditions of the urethra, prostate gland, or bladder, give rise to pyelitis, they do so by acting through the ureter, along which the primary inflammation ascends to the pelvis of the kidney. The ureter in such cases is often found dilated and of unequal calibre at different points, the walls being thickened in one place and attenuated in another. In severe cases of calculous pyelitis, the ureter, on the other hand, may be found contracted or even obliterated at a certain point. This latter is evidently the effect of chronic inflammation, for the walls of the ureter are here considerably thickened and lined with a false organised membrane, in the interstices of which particles of gravel or a calculus may be found engaged.

The connexion between pyelitis and diseases of the bladder or urethra, is established under two different circumstances. In some cases, those of gonorrhœa, etc., for example, the inflammation extends by continuity along the ureters. In other cases, and these are the most common, some impediment exists to the flow of urine from the urethra or bladder, the fluid stagnates, is thrown back on the pelvis, becomes a source of irritation, and inflammation sets in. In some

rare cases, according to M. Rayer, the inflammation may descend from the pelvis to the ureters, and thence to the bladder, giving rise to cystitis. When pyelitis is a consequence of stricture at any part of the urinary passage, the quantity of pus contained in the urine is seldom so great as when the disease arises from the presence of a calculus in the pelvis.

The complications of pyelitis are not confined to the genito-urinary apparatus. Organs in the neighbourhood of the kidney may become involved, or the derangement in the urinary secretion, consequent on inflammation of the pelvis and calices, may give rise to serious constitutional disturbance and disease in the principal organs of the body, as the head, chest, or abdomen.

Of the former class, peritonitis is the most frequent. This complication is, for the most part, confined to cases of calculous pyelitis; and the inflammation of the serous membrane may arise, either from perforation of the kidney, whereby the purulent matter escapes into the cavity of the abdomen, or from any cause which may excite inflammation round the sacculated collection of pus in the dilated pelvis. In a few cases, the peritonitis appears rather to have been the consequence of certain operations performed for the relief of the disease in the kidney.

Inflammation of the large intestines often supervenes likewise during the last stage of the disease, the patient being carried off by obstinate diarrhoea. Here the complication may result from communication between the abscess of the kidney and cavity of the intestines; or the bowel complaint may be one of the many general disorders which are so apt to arise in persons broken down by long continued disease of the kidneys. Whenever the pelvis and kidney give way, under the presence of accumulated matter, it is evident that inflammation must be excited in those parts which are in contact with the pus; and hence secondary inflammation may arise in other organs, as well as the intestinal tube.

The digestive apparatus often suffers sympathetically in cases of pyelitis: vomiting, occasional diarrhoea, and other derangements of the digestive organs, are frequent accompaniments of calculous pyelitis. Many cases of this kind are on record. A patient is received into the hospital with vomiting and chronic diarrhoea; the attention of the surgeon is exclusively directed to the state of the gastro-intestinal organs; the urine is not examined; the patient dies, and after death pyelitis is discovered, though never suspected during life.

Abdominal dropsy has also been mentioned as one of the complications of pyelitis; and it is said chiefly to occur in such cases as are accompanied by remarkable diminution in the secretion of urine. I would, however, rather refer this dropsy to inflammation of the substance of the kidney, than to uncomplicated pyelitis.

There certainly exists some connexion between pyelitis and the puerperal state, although the precise mode of relation may not be easily made out. When pregnant women are the subjects of pyelitis, they are much more liable to griping pains, than females suffering from the disease, who are not pregnant. Pyelitis is a predisposing cause of abortion. It has often been observed to set in soon after delivery, and especially after difficult labours. Here we may reasonably admit the existence of some injury to the bladder, uterus, or

extra-peritoneal cellular tissue, producing inflammation in these parts, and the extension of such inflammation to the pelvis of the kidney. The symptoms of the renal disease in such cases are often very obscure; and tumours of the uterus, or other conditions, etc., may complicate pyelitis, or rather become an exciting cause of that affection. Such cases I would refer to the same principle as those arising in the male from stricture, etc. The uterine tumour opposes the free passage of urine into the ureters and bladder, and thus excites inflammation of the pelvis, from stagnation of urine in its cavity. Lastly, it may be observed, that the disease of the kidney sometimes observed in puerperal females, may be referred to purulent absorption occurring immediately after delivery. In such cases, however, the substance of the kidney will be found to be the seat of purulent deposit, as well as the pelvis.

The respiratory organs often become implicated during the progress of chronic pyelitis. M. Rayer informs us, that he has frequently observed chronic bronchitis and pulmonary consumption supervene on long-standing inflammation of the pelvis and ureters. But here a distinction of some practical importance must be made. So long as the inflammation is strictly confined to the mucous membrane of the pelvis and ureters, it seems to exercise little influence on the respiratory system, or on the general health, provided no obstacle exists to the flow of urine into the bladder: on the other hand, whenever chronic inflammation of the pelvis of the kidney is followed by chronic nephritis, the constitution soon suffers, and the patient sinks under some affection of the pulmonary organs. Phthisis does not appear to be a predisposing cause of pyelitis: the kidneys act on the lungs, but the influence is not reciprocal. Amongst four hundred and fifty-two phthisical patients treated by M. Rayer, from 1837 to 1840, he only observed two cases of pyelitis.

Various disorders of the nervous system have been met with as complications of pyelitis. The principal are epilepsy, convulsions, delirium, paralysis, and, above all, the well-known disease called apoplexia venenata. It seems probable that these various effects are produced rather through the medium of the blood which becomes poisoned, than directly, on the organ implicated in the secondary attack. The cerebral symptoms often supervene in a very rapid and unexpected manner; in fact, the patient may be struck down and die from an attack closely resembling one of apoplexy, yet the cerebro-spinal system shall present no signs of disease after death. In other cases, some effusion may be discovered between the convolutions of the brain, or into the ventricles: in a few others, hæmorrhage had taken place between the coverings of this organ; and here the cerebral attack was preceded for some time by pain in the head, convulsive movements, and paralysis. The comatose state arising from the suppressed excretion of urine by the kidneys, is too well known to require any description here. I shall only observe that, in the majority of cases of cerebral disease supervening on pyelitis, the secretion of urine is more or less suppressed, and that the cerebral complications may therefore be referred either to the effects of impeded excretion, or to deranged secretion from the extension of the disease to the uriniferous tubes. On the other hand, the practitioner must ever bear in mind that retention

of urine, and the pyelitis consequent thereon, may be an effect, and not the cause, of disease of the brain. The history of the case, and the order in which the symptoms become developed, must here be our main guides in forming a diagnosis.

The connexion between diseases of the kidney and functional disorders of the spinal marrow, is now generally well known. Patients affected with pyelitis are sometimes attacked with pain over the lower part of the spine; and this is soon followed by more or less weakness of the lower extremities, occasionally amounting to complete paraplegia. The urine is sometimes alkaline, sometimes acid, during the progress of the case; often strongly ammoniacal; it contains pus and blood globules, and more or less of dysuria generally exists. In some cases, the kidney and spinal marrow appear to have been attacked simultaneously; at least, no symptoms of renal disease have been observed previous to the muscular debility and pain in the spine: at other times, the paralysis supervenes many weeks or months after the establishment of the primary affection.

In one remarkable case, recorded by M. Rayer, the patient had enjoyed apparent health, when he was suddenly seized with pain over the dorsal spine, soon followed by paralysis of the lower extremities. There was retention of urine, and, when drawn off, it was found to contain numerous pus-globules. The patient died; and the most careful examination failed to detect any change of structure in the brain or spinal marrow. The pelvis of the kidney contained pus, and the substance of the organ was likewise inflamed.

In this and similar cases of paralysis connected with disease of the kidney, it is difficult to attribute the complication to any other cause than vitiation of the blood through the urinary secretions.

TREATMENT. If the disease is recent, blood should be freely taken from the loins; warm fomentations, or a large poultice of linseed meal, be constantly applied to the lumbar regions; and strict rest in the recumbent position rigidly enforced: if possible, the patient should be confined to bed. A full dose of opium, in conjunction with a mercurial, should be given at once, and followed by an aperient, castor oil being preferable. The diet must be low, and various demulcent drinks may be allowed *ad libitum*; warm baths are useful addenda to other remedies.

If the disease has arisen immediately after the sudden suppression of a gonorrhœal discharge, hot baths should be employed, and the return of the discharge promoted. Supposing the disease to have become chronic, then, if the general health has not yet given way, slight depletion from the region of the kidney may be advantageously employed. Subsequently, considerable benefit may be derived from the administration of some of the vegetable acids, especially the citric. If the inflammation be of long standing, and unaccompanied by the slightest tenderness, even on firm pressure, in the loins, and attended by profuse discharge of pus, then I have seen the employment of terebinthinate remedies and astringents, which pass off by the kidneys quickly, induce considerable improvement in the local condition. In these cases, the diet must be more generous; meat may be taken daily, and even in some instances stimulants allowed. Should the health have begun to fail, the patient be losing flesh, his general

strength be diminishing, and perhaps night sweats commenced, then abstraction of blood must be avoided, and the surgeon's chief aim be to restore the general powers. Decoction of bark, with a few drops of dilute nitric acid, may be given two or three times a day; and small doses of iron, as of the tincture of the sesquichloride, are often extremely beneficial. Gallic acid is a most useful astringent in some cases of this description: it may be given dissolved in water, about five grains three times a day, or in some combination in which it exists naturally. Ura Ursi is very useful, and also the pareira brava in decoction. The patient should take carriage exercise daily, and spend as much time as possible in the open air without fatigue.

If the occurrence of attacks of sharp pains in the loins, etc., lead the surgeon to believe that the *fons et origo mali* is a renal calculus, then, in addition to the employment of the means before recommended, the chemical characters of the urine may afford some indications. Thus, should it be loaded with uric acid, temporary relief may in some degree be expected from the employment of alkalies; the condition of the digestive organs, especially the stomach and liver, being carefully attended to.

Attacks of nephritic colic imperatively demand the employment of large doses of opium; and, in these cases, it is surprising to see the large doses the patient will take, without being brought under its influence: a grain every hour has for many hours been given, without having produced a trace of narcotism. Chloroform may in such cases be employed, with the expectation or considerable benefit; it should be given so as to relieve the suffering, without rendering the patient insensible: inhalation is the only certain mode of producing the desired result. Chloroform has, however, been taken internally as an anodyne, and it is said with success, in allaying the pain of nephritic colic. Terebinthines and antispasmodics, as ether, camphor, assafoetida, musk, and castor, are also sometimes serviceable.

After pus has accumulated in the pelvis of the kidney in sufficient quantity to cause a tumour perceptible to the eye and hand, it is desirable that an exit for the fluid should be afforded, because, if left to itself, it may, by bursting into the cavity of the peritoneum, rapidly prove fatal to the patient. In order to lay open the abscess, the patient should lay on his sound side, bending the trunk slightly forward, an assistant making pressure on the anterior side of the abdomen, so as to bring the distended pelvis of the kidney as near as possible to the surface. An incision should then be made through the skin and subcutaneous cellular tissue, from the last rib to near the crest of the ilium, and about half an inch external to the mass of the lumbar muscles. The finger should now be introduced into the wound, and the depth of the latter gradually increased until a fluctuating spot is distinctly perceptible; a bistoury may then be passed into the abscess, and the matter evacuated. It must be borne in mind, that an abscess external to the kidney sometimes coexists with a collection of pus in the pelvis, and that, in such case, it is essential that the latter be opened. A calculus frequently escapes at the same time with the pus; should it not, a probe may be introduced, and its existence or not ascertained. Several objections may be made to the methods of opening these abscesses sometimes adopted, viz. by the introduction of a trocar, and by

the use of caustic potash. Not the least advantage is gained by either of these proceedings; and while the first is rash and uncertain, the latter is slow and painful; and by neither is a free opening effected for the exit of any foreign body, the removal of which is so desirable for the recovery of the patient. A fistulous opening sometimes remains, through which a constant discharge of pus takes place. In such case careful examination must be made to ascertain whether there is any foreign body in the cavity of the abscess; and several cases are recorded in which calculi in the kidney gave rise to abscesses, which were opened, and from which the foreign body was extracted.

Several cases are related of patients who have been cured in this manner,—a result which would never have been anticipated, if the stone had remained in the kidney, and nature herself had not appeared desirous of affording relief by facilitating to art the means of help. But there is no author who explains in a more clear and precise manner the formation of these kinds of abscesses than M. Le Dran. He says, that if the size of stone formed in the kidney, or some sharp points, prevent it descending into the pelvis, it enlarges in the substance of the kidney, remains there always, and is often the cause of very great suffering. It often happens, if the stone drops into the pelvis, it does not take the course of the ureter; the disease then terminates very often by the destruction of the kidney, or by an abscess. If an abscess takes place, the spot which the stone occupies in the kidney decides the site of the matter; if the stone is situated in the pelvis, or in the mammillary substance, the abscess may open into the cavity of the abdomen. But if the abscess occupies the medullary substance, quite close to the cortical, the abscess is continued even into the adipose tissue. Then it is not impossible that it may manifest itself externally below the false ribs, three or four fingers' breadth from the spine. If the slightest fluctuation be perceptible, the abscess must immediately be opened, and almost always the stone is lodged in a great quantity of pus. M. Le Dran records a case, in his *Observations de Chirurgie*, of an abscess in the loins, after the opening of which a calculus of the size of a pea escaped.

In cystitis, as I have before observed, the inflammatory action sometimes spreads up the ureters and leads to pyelitis. I was at one time inclined to think that the inflammatory action is always propagated upwards, from the bladder to the ureter, from the ureter to the pelvis of the kidney, and from the pelvis to the lining membrane of the uriniferous tubes. But this opinion, although generally correct, is too exclusive. The passage of a calculus downwards may excite inflammation successively in the pelvis, ureter, and bladder. Certain substances, as cantharides, so act on the uriniferous tubes in the first instance, and subsequently on the pelvis. Besides, Dr. George Johnson¹, in his interesting Gulstonian lectures, relates a case which appears to establish that the passage of morbid secretions may influence the uriniferous tubes primarily, and the lining membrane of the pelvis secondarily:—an occurrence which he thinks not rare in other instances of renal disease. Rayer also admits the extension of inflammation from the substance of the kidney to the pelvis and ureters.

¹ Medical Times and Gazette, April 24, 1852.