the female, and though the heel closed the beak would not. In the withdrawal the lithrotome must have lacerated the urethra all along. For a few days there was sharp constitutional disturbance, and on this subsiding the boy was sounded to see if any fragments remained. None were found, but the sounding, probably by tearing open the healing laceration of the urethra, set up a fresh feverish condition, from which the boy escaped by the skin of his teeth, and only after an abscess had formed over his sternoclavicular joint. The boy is now well as the others are. Notwithstanding this *contretemps*, I regard litholapaxy for small stones in boys as a very facile and attractive operation. If time should show that there is no great tendency to recurrence of stone, after this operation, owing to fragments left unremoved, it will run the lateral operation hard as the routine operation for young males. The high operation will be reserved probably for large stones unsuitable for removal by the other methods.

My remarks have been confined to the treatment of stone in children. Later I hope to have extended statistics of recent operations at all ages, when I believe it will be found that the operation which gives the best results at one age does not necessarily do so at another, and that it is chiefly in elderly people that the suprapubic operation gives results superior to the lateral.

TOTAL SUPPRESSION OF URINE DUE TO IMPACTED CALCULUS, WITH ATROPHY OF THE OTHER KIDNEY FROM A PREVIOUS SIMILAR CONDITION.

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I was sent for on the afternoon of January 2nd, 1894, to see a gentleman who had been under my care for some years for chronic rheumatic arthritis and acute gout, but whose condition had so improved during the last twelve months that he had been able to take several long railway journeys and to attend regularly to his business. He told me that he had been to a neighbouring town on business and there had suddenly become unwell, with vague backache and a general feeling of *malaise*. I could, however, find no objective symptoms, and prescribed sinapisms and a diaphoretic, thinking that, although there was no rise of temperature, the symptoms might indicate a chill. About 9 p.m. he desired to pass water, and made a pint, during the passage of which a round, smooth, faceted uric acid calculus was passed. He then felt much relieved, and went to bed.

Next morning he expressed himself as better, but I learned that he had passed no water since the previous night. He said that he had a desire to do so, but was not able. I passed a catheter and found the bladder absolutely empty. I therefore diagnosed that one kidney was blocked by a calculus, and that probably this condition had occurred passively in the other some time previously, but beyond the fact that when asked as to the position of the uneasiness he seemed to favour the right side, there was no guide to a conclusion as to which was the kidney which was just freshly blocked. I ordered diuretics, hoping to increase urinary pressure, and on the night of January 3rd about 4 ounces of urine were voided. The bowels were kept active by enemata, and a light diet ordered.

On the third day I gave oleum terebinthinæ in πx doses in capsules, the late Dr. Moxon having met with success in a similar case, but nothing at all passed from the bladder except a little blood-stained mucus. Absolutely no other symptoms intervened for six days, when I expressed my opinion that it would be desirable to operate, and on January 9th called in Mr. Henry Morris, of London, and Mr. Spanton, of Hanley (the latter gentleman had seen the patient with me for two days previously), who agreed to the proposition, and the former expressed his opinion that there was a sensation of greater volume in the right kidney region than in the left. I then, the patient being anæsthetised by

chloroform, cut down to the kidney by the usual incision in the loin, and freed it from its fat; the kidney was very large, and perfectly healthy. I was then able to feel in the top of the ureter some hard substance about the size of a small bean, on which I cut down, and removed a flattened calculus by manipulation between my thumb and finger, which had its smoothness eroded by contact with the mucous membrane. It weighed 6 grains, and measured half an inch across by one-sixteenth of an inch deep.

The stone was situated at the point where the dilated upper part of the ureter contracts to the normal calibre. Higher up in the pelvis of the kidney I felt a number of small stones, eight of which I passed down into the ureter, and removed them by the incision I had made for the impacted stone. Nothing more then could be felt in the pelvis of the kidney, and the wound became distinctly moist from the secretion of urine. Mr. Morris, however, who kindly gave me his valuable advice and assistance, advised that the kidney should be freed, brought into the wound, and incised. As I could not reach the upper end, and was not aware of the precise amount of force which might be used, he kindly brought the kidney into the wound. I then incised the convex border for one inch, and removed a triangular stone, weighing 36 grains, in which was an oval facet in which one of the other stones had lodged. There was little or no bleeding. The kidney was then returned, and the wound united for the greater part by superficial and deep sutures.

No sutures were used either for the incisions in the kidney or ureter. Before removal from the operating table a small amount of urine passed from the bladder, and the first act of the patient on recovering consciousness from the anæsthetic was to demand a urinal, but the water was passed into a napkin, and was very little stained with blood.

The patient rallied well, and passed urine freely from the wound and by the bladder; the precise amount by the latter could not be determined, owing to the fact that much was passed into a napkin.

Twenty-four hours after the operation there was not an unfavourable symptom. Some bromide of potassium had been given by the rectum to induce sleep. The temperature was 97°.

Forty-eight hours after operation the heart began to fail, the pulse becoming weak but not rapid. The temperature was subnormal. The flow of urine was very satisfactory, some collected was only slightly blood-stained, specific gravity 1016; albumen about $\frac{1}{2}$. The heart slowly got worse, and the patient sank in spite of the free exhibition of stimulants, 58 hours after the operation.

I was permitted to make a slight examination of the condition *post mortem*. I found that the kidney was becoming adherent to the perirenal fat by lymph. The incision in its free border was looking well, and commencing to heal. There was no peritonitis. The left kidney was represented by a mere shell, enclosing a mass of calculous deposit weighing 360 grains.

In addition to the fact that such a case as I have just recorded is very rare, there are several interesting facts which call for remark. In the first place the patient had been under constant medical supervision for the last twenty years for gouty conditions, with which were associated a tendency to bronchitis, and a weak, flabby heart; and during the whole of this period he had not had a symptom which had led any of the medical men he had consulted at various times to suspect renal calculus.

For the last three years I had at intervals of every few weeks examined his urine, always finding it loaded with uric acid crystals, and giving a trace of albumen, but I never on any occasion noticed any blood in it, nor did his attendants at home, who constantly watched the colour of the secretion.

So that here we have a case of advanced renal calculus without either of the clinical symptoms considered diagnostic even going on to the plugging of a ureter and complete atrophy of the left kidney without a single recognisable sign. To such an extent were we in the dark as to which side to attack first, that the question of a preliminary abdominal section was discussed, but negatived on account of the weak state of the patient's general health.

The rapidity with which the urinary secretion was estab-

lished after removal of the plugging stone was remarkable.

The absence of general symptoms is the usual course of events in the early days of mechanical suppression of the renal function. Cases have been reported that have lived for sixteen or twenty-two days before a fatal end. The symptoms described in these cases are contraction of the pupils, sleeplessness, and muscular twitching, none of which were observed in my case. It is quite possible that the impaction of a stone in the ureter of one side may cause reflex inhibition of secretion in the other kidney, and cases which seem to bear out this view have been noticed.

Another point of note is that notwithstanding the fairly active life of my patient, the mass of stone in the left kidney caused no irritation or suppuration.

An important question in such cases is, How long must operative treatment be delayed on the chance of permitting the stone to pass? I remember the late Dr. Moxon, in a clinical lecture on this subject, relating a case in which after fourteen days a calculus passed, and the urinary secretion became re-established; at the same time he threw out a hint that surgical proceedings might one day be taken for such a state of things.

In these cases the onset of dangerous symptoms, however long delayed, is nearly always sudden, and rapidly leads to a fatal termination.

There will probably be a greater tendency to postpone operative measures, if there are no clear indications as to which side should be the one attacked; but the amount of extra shock from operation on the wrong side may be neglected in many cases. It is of course difficult to determine accurately the absence of calculus far down the ureter without incising the ureter and passing down a probe, and this condition could be easily passed over on the supposition that the kidney first explored had its function reflexly inhibited. I do not know whether it would be easier to diagnose the presence and position of a stone in the middle and lower parts of the ureter from the abdomen, but some authors recommend this preliminary examination.

An operation has these advantages over expectant treatment, that the cause is removed, for the probability is that more than one stone will be present, and therefore a repetition of the trouble is prevented. Further, even if the block in the ureter be not removed, life may be preserved by the passage of the renal secretion of the wound.

Whether or no the delay of an operation as long as urgent symptoms are absent increases the mortality after operation must be left for the present undecided, as the cases on which to base an opinion are happily very rare, but it is certain that the retention of the products of urinary secretion in the blood cannot be without deleterious effect.

It is probable that the mortality after operation will always be high, because the condition is one which occurs in chronic gout, and therefore in debilitated subjects. Taking everything into consideration, I feel that the earlier after diagnosis an operation be performed, the better chance the patient will have of recovery.

DEMONSTRATION OF THE TYPHOID BACILLUS IN SUSPECTED DRINKING WATER BY PARIETTI'S METHOD.¹

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On March 30th I was asked by my friend and former hospital colleague, Dr. W. R. Morris, of Waterford, to undertake the examination of a sample of drinking water which he suspected of being concerned in a rather serious outbreak of enteric fever that had occurred in his practice. I sent him a sterilised bottle, and having received the sample, proceeded at once to make a series of plate cultures with quantities varying from 0.25 c.c. to 1 c.c. of the water, which looked pure, sparkling, and free from sediment. The nutrient sub-

stratum was the ordinary peptone gelatine, and the plates were kept at 22° C. Colonies developed with great rapidity, and proved to belong for the most part to rapidly liquefying putrefactive species. Amongst the non-liquefying colonies were several that presented a superficial resemblance to those of Eberth's bacillus, but microscopic examination failed to support their identity. Before it was possible to adequately examine the various slow-growing colonies, liquefaction had proceeded to such an extent as to destroy even the most dilute plates.

Under these circumstances recourse was had to the method proposed by Parietti.² Three tubes, each containing 10 c.c. of neutral broth, received respectively 3, 6, and 9 drops of Parietti's solution (5 g. phenol, 4 g. HCl, 100 c.c. aq. dest.) and 10 drops (a pipette delivering about 15 drops to the c.c. was used) of the water were introduced into each of the tubes which were set aside to develop at 37° C. The next day growth had occurred in the 3-drop and 6-drop tubes only, whilst the 9-drop tube remained clear. The two first-named were then plated out on gelatine at 22° C., and in forty-eight hours the "original" plates were thickly covered with uniform non-liquefying colonies, whilst the dilutions displayed most typical typhoid colonies, some of which gradually attained at 22° C. a diameter of 0.5 c.m. The wavy outline and translucent texture were very striking. A trace transferred to the hanging drop showed the organisms to be short thick bacilli with rounded ends and endowed with most remarkable powers of motility. With some difficulty I succeeded in getting the flagella stained, using the mordant prescribed by Loeffler,³ and 1 c.c. of alkali. They were very numerous, and scattered over the whole surface of the bacilli, which they greatly exceeded in length. They were also much curved. Transplanted on to potato, a typical slimy quasi-invisible growth developed at 22°; at 37° C. the result was not "typical," as a dirty-white opaque streak made its appearance along the middle of the half cylinder of potato (Globig's method), which was much discoloured. The same result was obtained by Kamén,⁴ and it is generally ascribed to the acid reaction of the potato. From my own experience in the present and other cases, I am inclined to think that culture at 37° C., by causing rapid discoloration of the potato, greatly predisposes to this atypical growth.

Finally, I applied the fermentation test as recommended by Theobald Smith, of Washington,⁵ using Southall's ureometer tubes, and 1.5 per cent. solution of glucose and lactose in neutral broth. For comparison I employed a culture of bacillus coli isolated three months ago from the spleen and mesenteric glands of a case of atypical bowel infection indistinguishable clinically from typhoid. The result was peculiar. At the end of twenty-four hours the fluid had been replaced by gas for about an inch of the two coli tubes (glucose and lactose). No evolution of gas whatever had taken place in the glucose tube that had been inoculated with the water organism, but the lactose tube showed about a quarter of an inch of gas. How to read this result as yet I do not know, for Smith does not seem to regard it as possible that an organism which could not split glucose should yet be able to split lactose. In order to exclude the possibility of air having accidentally got into the tube, I allowed the gas to escape, and carefully replaced the tube in the incubator. Next day about the same amount had collected.

Summing up the results obtained, the balance of evidence would seem to be in favour of regarding this bacillus as that of Eberth. Motility, characters, and distribution of flagella, and growth on potato at 22° C., correspond with the classical characters of the typhoid bacillus. But even should the divergence appear to some sufficient to justify separation as a distinct variety in the biological sense, still it seems to me an important matter to demonstrate in drinking water an organism which if not the *B. typhosus* of Eberth is so closely related thereto that we may suppose it with much probability to have a similar origin. It might, perhaps, be regarded as either a colon-bacillus that has undergone extreme modification in the typhoid direction on the supposi-

¹ Read before the Section of State Medicine of the Royal Academy of Medicine in Ireland, April 20th, 1894.

² *Rivista d'Igiene e Sanità pubblica*, 1890, ref. by Kamén in *Centralbl. f. Bakt. u. Parasitenk.*, Bd. xi, 1892, p. 33.

³ *Centralbl. f. Bakt. u. Parasitenk.*, Bd. vii, 1890, p. 625.

⁴ *Loc. cit.*

⁵ *Centralbl. f. Bakt. u. Parasitenk.*, vii, 1890, p. 502.