was there any evidence of bronchitis. Four were fatal, and in these there was a fracture of the posterior fossa in each instance, but no mention is made of any injury to the eighth nerve.

§ *Cause of Death.*—I have had a table constructed [not here reproduced] showing the cause of death in fifty-four cases of fracture of the base. The shock of the injury proved fatal in four; that the shock of the injury, combined with that resulting from other injuries, such as fractured ribs, was fatal in six. One patient died in convulsions within the hour after admission; four with arachnoid hæmorrhage at varying periods; thirty-two from cerebral contusion, with laceration and hæmorrhage; three from meningitis at the end of the second week; one, aged 4, from uncontrollable vomiting; whilst the impaction of partly digested food in the pharynx produced asphyxia in another; delirium tremens proved fatal in one case; and only one, a patient with compound comminuted fracture of the skull, died from septic disease. Thirty of the cases died within a day after admission to the hospital. The most striking fact shown by this table is the large proportion of cases dying as a result of injury to the brain, more than half of the total number; and it is of interest to observe that of the eleven cases in which the fracture of the base was strictly limited to the posterior fossa (if we include one accidentally omitted from the table), all presented a similar condition of contused brain, with hæmorrhage as the cause of death. And I would ask you to give your attention to another fact, and that is the extreme fatality of these fractures in the posterior fossa, exactly one half of the series of twenty-two proved fatal, a proportion far beyond that met with in other fractures of the base, which, as shown by these tables, is 25 per cent. for the anterior, and about the same for the middle, fossa. In this series of cases, both fatal and non-fatal, the proportion of fractures in the posterior fossa, with regard to fractures in the other fossæ of the base, is larger than that usually observed.

Justice could not be done to the question of treatment in the short time at my disposal, and I would merely impress on some of my auditors the importance of keeping patients at perfect rest after these injuries to the head, and of employing the routine treatment by purgative, etc., and remind them that the administration of purgatives is not enough; they must see that the bowels act, and act well, for the wellbeing of the patient depends largely on this fact.

With regard to venesection, this plan of treatment has gone out of use very largely during the last forty years; but, in the earlier part of the century, it was employed in cases of fracture of the base to an extent which to us appears startling. Thus, in 1823, we find a surgeon severely criticised for not having bled a patient on the second day instead of on the third; the man had received a large scalp wound and fracture of the vault extending into the base. In 1827, we read that a man under the care of Abernethy was bled to the extent of 120 ounces in the twenty-four hours, and recovered, and that surgeon speaks highly of venesection and the administration of calomel. It was a common custom to bleed the patient to a considerable extent daily, and one is not surprised to find that the recorded cases of fracture of the base of the skull were usually fatal ones. But we are now, I think, too much inclined to neglect what in suitable cases appears a most valuable remedy, especially when the patient is a big, strong robust man and is suffering from great restlessness. Under such circumstances the abstraction of ten or twelve ounces of blood from the arm may effect a marked improvement in the condition of a patient from tossing about and kept in bed with difficulty to a state of quietude and repose; and although this improvement was not usually continued for many hours in cases in which it was employed, it was a great contrast to the previous state. The application of leeches behind the ears or to the temples, or the local abstraction of blood in some other way in certain of the cases where severe headache was complained of during the first few days after the injury, often gave great relief to the pain. In the more chronic forms of headache the use of a seton in the nape of the neck appeared to effect marked improvement in the course of a few days.

When we regard the large number of patients who die from cerebral injury with hæmorrhage from the part of the brain lacerated, the question presents itself most strongly for answer as to the advisability of using the trephine more often in an attempt to relieve them. The improved methods of operating, the slight increase of risk that is caused by the operation itself, and our enlarged knowledge as to the local condition in such cases urge the performance of the operation, and at an early date. True, there

are many factors against success, both in the condition of the brain and the general condition of the patient; but I would suggest that the cause of death is usually the presence of the blood-clot, and not the contusion of the brain. We are hardly in a position to state what extent of contusion and laceration of the frontal and temporo-sphenoidal lobes is incompatible with life. The operator must be guided by his knowledge of the effect of these injuries on the brain substance, and recollect that the fatal hæmorrhage will usually be over that part of the brain directly opposite to the part struck, and not immediately underneath it.

And now, in concluding this my last lecture, I thank you for the kind attention you have given to what I have had to say, and would remind you that if there is anything in the lectures that you have heard of more than fleeting interest, and I think there is, your thanks are due not to me, who am merely the mouthpiece, but to those gentlemen who kindly gave me permission to use the cases that have formed the foundation of the lectures, without which it would not have been in my power to bring before you for consideration these points relating to injuries to the head.

CASES OF NEPHROLITHOTOMY, AND A CASE OF REMOVAL BY LUMBAR INCISION OF THE LOOSE AND CRUSHED-OFF LOWER EXTREMITY OF THE LEFT KIDNEY AFTER A WAGGON ACCIDENT.

By C. B. KEETLEY, F.R.C.S.,
Senior Surgeon to the West London Hospital.

CASE I.—SUPPURATING KIDNEY; LUMBAR INCISION AND DRAINAGE; REMOVAL OF CALCULI BY SECONDARY OPERATION; ULTIMATE RECOVERY AFTER RATHER PROLONGED CONVALESCENCE.

(House-Surgeon, Mr. BONTOR.)

G. D., aged 12. Admitted into Hull Ward, West London Hospital, May 2nd, 1888.

Family History.—She had lost her father (of phthisis?). Mother had had eight children and three miscarriages. Three of the children died, two of whooping-cough, one "in childbed."

Patient's History and Present State.—Scarlatina eighteen months ago; has not been strong since; is losing flesh rapidly. Has had pain in left side and loins off and on for six months; pus in urine; tumour in left loin.

May 5th. Temperature 102° last night and this morning; rose at 3 P.M. to 103.5° and at 6 P.M. to 104.6°. Her bowels not having been opened since admission, an enema of castor oil now acted freely. Much pain in tumour and all over left half of abdomen and lumbar region. Pulse 140, full and firm. Ice-bag to head; 5 grains of quinine. In the evening Mr. Keetley came and opened the kidney through a lumbar incision anterior to the edge of the erector spinæ. The tissues divided chiefly consisted of a dense white fibrous substance. The puncture into the abscess cavity was dilated with forceps, and ultimately an examination made with the finger. The pus (about 3 or 4 ounces) was thick greenish white, with white curdy flakes, and horribly offensive. The cavity was freely syringed with warm boracic lotion. The interior of the kidney felt loculated, and as if traversed with soft trabeculae. Care was taken not to break these down lest hæmorrhage should occur, as it was not desirable to have to pack this cavity in its putrid state; a thorough search of the kidney was therefore deferred, nor were the three silver sutures tightened, but merely left ready to close the wound when it sweetened. Two drainage-tubes, only one into kidney.

May 6th. Fairly comfortable. Only 4 ounces of urine (thick, with urates and some pus) passed. Highest temperature, 99.6°.

May 7th. Urine 8 ounces this morning. Wound dressed. Much foetid pus clogging tubes. Several times in the course of the next fortnight the temperature rose to 101°. Urine about 18 ounces a day, and getting clear.

May 24th (20th day). A small phosphatic concretion $\frac{1}{2}$ inch $\times$ $\frac{1}{4}$ inch, quite black externally and white internally, found in the mouth of the wound to-day. During the next week the patient was taken out of doors daily. Temperature still frequently rose to 101°.

June 2nd. Temperature up to 103.2°. Restless and in pain in

the night. The next morning a large slough was found blocking the tube, and smaller shreds with a good deal of thick greenish pus came away when pressure was made on the left side of the abdomen in front. Urine less in quantity, still with a largeish sediment of pus.

During the next few days the child did not seem so well as hitherto.

June 8th. Under chloroform the sinus was explored after dilatation with forceps and finger. The point of the latter when passed into the kidney slipped between two calculi, which were now removed with a scoop and the finger. They were dark-coloured and of a branching shape, and, externally at least, phosphatic. There was some bleeding, and the sinus was packed with two strips of iodoform gauze, for which a large drainage tube was substituted a few hours later.

She passed only 5 ounces of urine the first day after operation.

June 10th to 13th. Passed very little urine, only 5 ounces, on each of two days, 19 ounces on the 11th, and 13 ounces on the 13th. Temperature normal that day for the first time. More sloughs and horribly offensive pus came away. Fairly good night (last night) with antipyrin.

From this time to June 25th she was much better. No deposit in urine. She seemed quite convalescent. On this day a small cylindrical calculus or phosphatic cast half an inch by one-sixteenth of an inch came through the wound; it was soft, broke up, and has not been preserved.

On July 11th she had not been quite so well for two days. She afterwards improved a little, but there was more pus in the urine; and on July 31st the sinuses were scraped and that into the kidney again examined digitally. The temperature kept down for a few days, but rose again, and did not finally drop till August 16th. Complete convalescence did not occur till she left the hospital.

Last autumn her menses appeared, but did not return regularly, and she had an attack of chlorosis, but the kidney does not trouble her, and there is no urinary fistula.

The patient was exhibited at the Medical Society, January, 1890.

CASE II.—SYMPTOMS OF STONE IN THE KIDNEY FROM INFANCY TO 44 YEARS OF AGE; LUMBAR NEPHROLITHOTOMY; REMOVAL OF 150 CALCULI FROM ONE KIDNEY; RAPID CONVALESCENCE AND DISAPPEARANCE OF SYMPTOMS, CONTINUED UP TO PRESENT DATE (FOURTEEN MONTHS AFTER OPERATION); INHALATION OF OXYGEN AS A TREATMENT OF DEPRESSION FOLLOWING OPERATION.

(Under the care of Dr. ALFRED BUCK and Mr. KEETLEY.)

June 4th, 1888. Mr. R. W. N., aged 44, married twenty-three years, four children, collector of gas rates; temperate and regular always. He is a patient of Dr. Alfred Buck. As a young child had pain in the loins, extending down to the inguinal region, up to when 7 years old. These kept away afterwards until he was 14. From that age until 19 blood passed in micturition almost continuously, and constant pain worried him. At 19 the urine ceased to contain blood, but the pain has endured up to the present time. It is generally continuous, and wakes the patient at night, rest being only obtained piecemeal. When it is worse than usual he sometimes retires to a room alone and lies on a couch until comparative relief comes; but he has not permitted illness to keep him away from work once in twenty-five years. His bladder was sounded without chloroform many times in boyhood and even in infancy, always with negative results; and at the age of 14, while under the late Mr. Solly, he passed a stone, "the size of a small bean," *per urethram*. Pain is distinctly referred to the right loin, and extends also into the right groin. Its character is sometimes throbbing, gripping as it were for a time and then relaxing. Sometimes he has "sciatica." Beer or vinegar aggravates the symptoms. Bowels very regular. Passed blood last Monday (for the first time since 19 years of age). The urine on that occasion was dark brownish red, but being passed in the closet was not preserved. The next morning it deposited a slight sediment. Patient is a tall, fair, well-built, rather stout man, giving no other indication of illness than a certain pallor of the face. The region of the right kidney is distinctly tender. It is difficult to palpate, owing to the thickness of both muscle and fat in the abdominal wall; but I believe that I can feel the right kidney to be larger than the left; it is certainly tender.

Dr. Alfred Buck and myself agreed in the diagnosis of calculus in the right kidney; and after very careful consideration, not only of the medical and surgical aspect of the case, but also of the social relations and duties of the patient, advised nephrolithotomy,

or, at all events, an exploratory operation. The patient had brought up his family; he was now more likely to get worse than better if left alone; he was in danger of getting into a less and less favourable condition for operation. Even the mere passage of time carrying him from middle into old age would do this. He was a man of singularly quiet courage and force of character, but he had suffered enough, and deserved that an end should be put to his thirty years of pain. It is desirable that this should be a mere circumstantial narration of facts, but it is difficult to avoid reference to the near approach which the conduct of his life had made to heroism. Before taking a decisive step it was thought well to have a third opinion, and the patient saw Mr. Henry Morris, who agreed both with the diagnosis and the proposed treatment.

The patient was at this juncture comparatively comfortable and free from symptoms. He was passing from 4 to 5 pints of urine *per diem*. A specimen contained 11.2 of urea per 1,000. There was a certain amount of cloudy sediment of mucus or muco-pus.

On the morning of November 1st, 1888, nephrolithotomy was performed at the Fitzroy House Hospital, in the presence of Dr. Alfred Buck, Mr. Henry Morris, Mr. Horace Sanders, and Dr. Sidney Bontor, Mr. R. W. Lloyd administering ether. The lumbar operation was employed, and the patient being both fat and muscular, the tissues were incised very freely. There was a good deal of perirenal fat, and the kidney lay mainly, if not entirely, high up under the ribs. It was at once felt to be cystic, and a Morris's grooved trocar was thrust in, drawing off some fluid, not pus. Both with this and with the finger end calculi could be felt. A puncture was made and dilated with the forceps and the finger, and one collection of stones picked out. Another could be felt in front of this, but separate. This was opened by the finger thrust from without through its very thin anterior wall, and emptied. One large rough calculus could now be felt, more or less entrapped, probably almost in the mouth of the dilated ureter. This was extracted with forceps. Other stones were picked out of the kidney above this, and, after prolonged and careful douching, searching and pressing, it was believed that no more calculi or gravel remained in the organ.

Except possibly in its upper half, there did not seem likely to be much of the secreting structure of the organ left, and the question of nephrectomy was raised.

I believe it was fortunate that we went no further, for when the patient came to himself (after etherisation) there commenced a period of alarming depression which lasted the whole afternoon; and that, although scarcely any blood had been lost, and the operation had not been unduly prolonged.

Two drainage tubes were used, one passing into the kidney, the other up to it. Whatever tendency to bleed existed was checked by a light packing of iodoform gauze. A large wool pad and mass of absorbent wool were placed to receive discharge, and secured loosely with a flannel belt.

In the operation Mr. Henry Morris gave advice and help of the greatest value, for which I take this opportunity of thanking him.

During the latter part of the period of depression just referred to, and occasionally during the first day or two, oxygen inhalation was practised as a stimulant, and also on the hypothesis that it might assist the lungs to do some of the work proper to the temporarily disabled kidneys. The event of one case of course does very little to prove that the procedure was of any value.

The after-history was uneventful. The iodoform gauze packing was removed on the third day, one of the drainage tubes on the ninth and the other on the eleventh day, both having been gradually shortened from the fifth day. Once the evening temperature reached 100.2° and several times 100°, but never went above normal after the eleventh day. The albumen and the mucous cloud in the urine gradually diminished. The urine ceased to come through the wound, and began to diminish in total daily quantity about the seventh day. On and after the twelfth day it was only 60 ounces, instead of 90 or 100 ounces as formerly.

Convalescence was rapid and free from pain. On January 5th of this year, 1890, the patient writes: "I am pleased to inform you that my health still continues first rate; no return of the old trouble in any shape or form. In fact, my present life is a perfectly new existence and experience for me."

He attended the Medical Society, January 12th, 1890.

CASE III.—LOWER END OF LEFT KIDNEY CRUSHED OFF BY A WAGGON WHEEL; NO EXTERNAL WOUND; SEVERE HÆMOR-

RHAGE (RECURRENT?); COLLAPSE; LUMBAR INCISION; CLOTS AND LOOSE PIECES OF KIDNEY REMOVED; BLEEDING POINTS COMPRESSED; RAPID RECOVERY, WITHOUT EITHER URINARY FISTULA OR HYDRONEPHROSIS, ALTHOUGH THE INTERIOR OF THE KIDNEY HAD BEEN OPENED WIDELY BY THE ACCIDENT.

(House-Surgeon, Mr. ARKWRIGHT.)

H. C., aged 17, brought to hospital at 10.30 A.M., having fallen down at 8.45 A.M. in front of a heavy van. The left side of his abdomen and lower thorax had been trapped under one of the wheels. When first seen he was rather pale and cyanosed, but the pulse good. He complained of pain in the left side of the abdomen and down the left thigh and leg. He could stand. Eighth, ninth, and tenth left ribs broken. No pain on compressing pelvis. Some impairment of resonance at base of chest (left side). 12.30 P.M. (four hours after accident). Pulse much smaller; pallor much greater; some lividity of mucous membrane. Has frequently vomited food and mucus since admission. In respiration, thorax moves well, but abdomen hardly at all. Breath sounds at base of left lung very feeble. Left loin is the seat of much pain, and very tender, especially over its lateral aspect, where there is dullness on percussion and increased resistance. Three-quarters of a pint of urine drawn off with catheter, of dark purple colour, blood intimately mixed. 3.0 P.M. (that is, six hours after accident). Patient worse; frequent sighing; more pallor; much collapse. Area of dullness increasing.

Operation.—3.15 P.M. Under ether. Full antiseptic precautions. Incision 4 inches long, parallel to last rib, half way between ribs and crest of ilium. On dividing deep lumbar fascia and fascia transversalis much blood clot, of about size of patient's fist, found, which was scooped out, and torn kidney felt to thoracic side of clot. A loose and broken piece of kidney, about 1 ounce in weight, removed; no large bleeding point found; one pair of Wells's forceps put on a bleeding point in the kidney; no ligatures used. Blood continued to well up from a point not visible, deep in the interior of a kidney. The gland lay open, as it were, owing to lower end being crushed off. Wound plugged with three antiseptic sponges, one above the other, the lowest receiving counter pressure from the iliac bone. Dressing of iodoform gauze and wood wool pads; large drainage tube.

Immediately after operation almost pulseless. 4.30 P.M. Pulse improved to 110. Enema of Brand's and beef tea. 6.30 P.M. Pulse 154; respiration 46. 7.30 P.M. Very much cyanosed. Pulse 124, irregular. 9 P.M. Much better colour. Pulse improved. Continually sick.

July 19th. 9 A.M. Less pallor. Temperature 101.8°. Last night 8 ounces of urine since operation; last quite free from blood. 12 noon. Sponges removed; strips of iodoform gauze as plugging. 5.30 P.M. Drainage tube instead of gauze plug.

July 20th. No vomiting since last night, when an ice-cap was applied to head. Milk and beef tea taken; nutrient enemata since operation. Twelve ounces of urine in last twelve hours.

July 21st. Good colour; feels well; takes food well. Temperature 100.3° last night. Pulse 92, good. Thirty-four ounces of urine in last twenty-four hours.

July 23rd. Headache. Dressings damp. Dressed. Tubes washed and returned. Urine forty-one ounces in twenty-four hours; specific gravity 1020, slightly acid; large red deposit of uric acid crystals.

July 25th. No urine in dressing.

July 27th. Sutures removed; tube removed; red lotion to wound.

August 2nd-10th. Temperature above 102° every night.

August 8th. Urine has some uric acid crystals still; amount varies from 30 to 58 ounces.

August 14th. Temperature below 99° at night for first time since admission.

September 28th. Discharged. Wound in side almost healed.

November 1st. Well in every way.

CASE IV. — GREATLY ENLARGED, THICKENED, AND PARTLY MOVABLE RIGHT KIDNEY; MUCH PUS IN URINE; DEEPLY PIGMENTED SKIN; LUMBAR EXPLORATION UNDER COCAINE LOCALLY; AFTERWARDS, UNDER ETHER, LUMBAR NEPHROLITHOTOMY AND REMOVAL OF A CALCULUS.

(House-Surgeon, Mr. ARKWRIGHT.)

The fourth case is that of a young woman, J. E., aged 25, single. It may be summarised as follows: Her symptoms began two years and a half ago, with increased frequency of micturition. In July, 1889, micturition became still more frequent, pain was felt in the

vulva, and the urine was observed to be thick. In November Dr. Crombie, of Brentford, discovered and pointed out to her an enlargement in the right loin, and, diagnosing the case to be one of either tuberculous kidney or renal calculus, sent her into the hospital for operation.

She was admitted on November 22nd. A movable tumour, probably renal, very hard, not very tender, was palpable in the right loin. Much pus was passed in the urine, which in amount was about 40 ounces in twenty-four hours, alkaline, and of specific gravity 1010. Patient's skin was deeply pigmented to a degree almost suggestive of Addison's disease.

On November 28th, with a view to nephrotomy, ether was administered. Respiration became very difficult; chloroform was tried; no better. Anaesthetist advised postponement of operation.

On December 6th, 1 grain of cocaine in 10 per cent. solution was injected, partly just beneath the skin of the loin, and partly deeper nearer the kidney. Five minutes afterwards an incision about 2 inches long, and of considerable depth, was made down to the posterior outer and lower part of the tumour. It was palpated on this aspect, and felt very hard. A smooth harelip pin was inserted in different directions, and once or twice thought to touch a calculus. From the sequel I have no doubt that it did so, but the pin, not being long enough, and the kidney being so much enlarged, barely reached the stone. Very little pain was felt, except in the kidney, into which it was not thought prudent or desirable to inject cocaine then, especially as I now quite made up my mind to open it freely at a future period, and search for a calculus.

On December 20th this was done, the wound having in the meantime been kept open down to the kidney by two large drainage tubes and a plug of iodoform gauze. I ought to have mentioned that an aspirator drew off a small amount of purulent urine at the operation under cocaine, and that the temperature, rising to 103.4° on the afternoon after operation, was easily brought down with antipyrin (20 grains).

Nephrotomy was performed by scraping and sponging away all granulations; by enlarging the original examination wound forwards parallel with the iliac crest, then forcing a pair of polypus forceps into the gland, dilating them, and letting out some pus and purulent urine. By their side a steel director was now passed in. While Mr. Ballance held one instrument I carefully pressed the other away from it, at the same time insinuating my forefinger between the two. Then the forceps was withdrawn, and when the finger end was well into the kidney, the director. The orifice of another cavity being felt with the finger tip, a probe was passed through it and reached a calculus. This orifice was dilated by polypus forceps till the finger end passed through, and the latter was used to enucleate the calculus, which seemed to fit rather tightly in a small walled cavity, doubtless the renal pelvis. No sooner was it enucleated than it slipped away out of its original seat; a probe and then cholecystotomy scoop found it again, but sequester forceps were found more convenient to take it out with. Very little bleeding. Kidney packed with a plug of iodoform gauze, moistened with 1000 sublimite. Plug removed in three hours. A little bleeding then, stopped by three minutes of sponge pressure. Drainage tube.

Same night: Temperature 103°; pulse 130; respiration 38. Urine blood-tinged, but in good quantity. Antipyrin brought the temperature down in twenty-four hours, and it did not rise again as high even as 99.5°.

Drains removed on fifth day. They were not in the kidney itself, the wound in which must have healed by first intention, as little or no urine came through until, curiously one day last week, when a little seemed to ooze through the wound, now contracted to a fistula.¹

The patient lost all pain, and recovered her appetite at once, and the kidney is much diminished; but the pus, which decreased greatly at first, has now (three weeks after operation) increased again. Perhaps it would have been better to have drained the kidney itself, and not to have allowed it to close at once. I confess I did not expect the latter event to happen, as the wound was large, lacerated, and kept open three hours with a plug of iodoform gauze.

The calculus has been beautifully divided and chemically examined by my friend, Dr. Thudichum. His report is annexed:

¹ This ceased in two days, and has not recurred up to date (January 30th). The pus in the urine is also again diminishing. Patient improves daily, and has gone home, with strict injunctions as to woollen clothing and diet.

"Qualitative Analysis of a Renal Calculus Extracted from the Living Subject by Mr. Keetley.—The weight of the calculus was 3.27 grammes; its shape was irregular; its surface tuberculated. The substance was very hard. On section it was found to contain many small cavities, with crystalline trabeculae. The saw-meal only was examined. When heated it blackened, and the residue effervesced in acids, indicating the presence of oxalate of lime. Excess of ammonia precipitated masses of phosphate of calcium. In the filtrate of this oxalate restored the natural oxalate by precipitating the calcium again. It contained neither uric acid nor urate. It contained an albuminous substance insoluble in strong nitric acid, becoming orange with ammonia (casts?) The phosphoric acid was isolated by ammonium molybdate. The calcium was isolated as molybdate, and by fusion of this with soda, as carbonate. Magnesia was present, but its proportion was not determined. Oxalic acid was further proved by permanganic acid. The calculus is therefore mainly a crystalline phosphate of calcium calculus, with some oxalate of calcium, some magnesium phosphate, and albuminous matter. There is also a small amount of soluble matter in it, but it gives no urinous smell on heat being applied. This calculus is deposited from subacid, not from alkaline, urine, and is the result of a digestive trouble, in consequence of which crystals of phosphate and oxalate of calcium are deposited in kidney tubules, pelvis, or bladder. It is rare in man; occurs sometimes in pigs, as I have found myself.

"January 12th, 1890.

"J. L. W. THUDICHUM."

REMARKS.—The calculi removed from Mr. R. W. N. are, so far as I know, the largest number recorded as having been removed from one kidney during life. In all probability, the large rough stone had acted as a ball valve to prevent the other calculi forming behind it from passing into the ureter. The resistance the patient's constitution showed to a lifetime of suffering and kidney irritation is remarkable.

The large stone in question weighs 159 grains. Three others weigh together 91 grains, three more 64 grains, four more 59 grains, and so on; the remainder diminish in weight steadily until the number of sixty are counted. Beyond that the remaining calculi, though as distinctly formed as the others, weigh less than a grain each. Only fifty-five of these were preserved, but thirty-five more were originally counted by the nurse. The total weigh 1 ounce and 18 grains, exclusive of the very small calculi, *débris*, and "sand" not preserved.

In the other two cases the surfaces, at least of the calculi, were phosphatic, and they were associated with more or less pyonephrosis. Why was the pus so intensely offensive in one and not in the other? Why was the kidney dilated in one and thickened in the other?

Stones rolling loose in the kidney, even if smooth, seem to cause more pain than rough impacted stones. The excessive secretion of urine (90 to 100 ounces daily) in Case II was perhaps caused by the calculi acting as a mechanical diuretic.

The oxygen inhaled by Mr. R. W. N. may or may not have done good, but its administration was very easy. An iron-tube bottle of the concentrated gas was fitted with a rather long india-rubber tube of large calibre, and the tap partially turned until sufficient gas began to come through. The patient simply put his mouth to the rubber tube while inhaling, and compressed the tube to prevent waste. After a few minutes' inhalation, the tap was turned off until the next *séance*. Both the patient and myself believe it did good, and I recommend its trial in cases in which a patient, after operation, seems to have been depressed by either shock, hæmorrhage, or anæsthetic. In renal cases it may also help the lungs to assist the kidneys.

Iodoform gauze packing seems to be as harmless as reliable in the kidney as elsewhere. It need not be left more than a few hours in most cases. It is not thoroughly antiseptic or even aseptic unless moistened in a germicide solution. It should be dipped in sublimate lotion, for Mosetig-Moorhof says that carbolic and iodoform together are dangerous in any kind of operation.

All my patients were kept between blankets, and great pains taken to preserve external warmth by hot-water bottles, etc., during as well as after operation.

I am satisfied that a kidney can be palpated and searched with a needle very well under cocaine, and if I could have been certain of the diagnosis, I could have removed the calculus in Case IV under cocaine. It would then have been necessary to have injected a little into the kidney itself; but one does not know how

far one may have to go in kidney operations, and a nephrectomy under cocaine would be trying.

Was the cutaneous pigmentation present in Case IV due to pressure on or irritation of the suprarenal capsule? The patient was unfortunately not sufficiently convalescent to be shown. The other patients attended.

The crushed kidney partially removed occurred, it will have been noticed, in a case of (possibly) recurrent hæmorrhage. Many cases of crushed kidney recover without interference. I was therefore in no hurry to meddle in the case here related. But a large proportion die; half the cases collected by Edler, of Metz,² were fatal. There was danger of hydronephrosis as well as of death, and there were also severe chest injuries (three broken ribs and dulness at left base) in my case.

I found a difficulty in scooping out the blood clot with my fingers; it ought to be done rapidly for obvious reasons, and I wished I had provided myself with a dessert spoon.

Lastly, I am sincerely thankful that in none of the calculus cases, not even in Case I, whose convalescence was very tedious, was I tempted to perform nephrectomy instead of nephrotomy. The crushed kidney case may, of course, be regarded as one of partial nephrectomy.

NOTE ON POISONING BY MUSSELS.

By SIR CHARLES A. CAMERON, M.D.

ON June 30th Mrs. O'Connor, her five young children, and her maidservant, residing at Seapoint, County of Dublin, partook of a meal of stewed mussels. In about twenty minutes after the ingestion of the mussels some of the children stated that they felt a prickly ("pins and needles") pain in their hands. Graver symptoms rapidly supervened, and in less than an hour one of the children died, the mother and three other children succumbing two hours after eating the mussels. The chief symptoms were: Vomiting, dyspnoea, swelling of the face, want of co-ordination in movement, spasms, principally in the arms. The patients appear to have died asphyxiated, their faces being intensely livid. One of the children and the maid—the latter had eaten but few of the mussels—recovered. Medical assistance came rather late and was not of much use.

The mussels had been procured from a small sheet of water to which the sea had access, but which received fresh water and some sewage. Examinations of the water at low and high tides showed that its saltness was twice as great when the tide was in. This land drainage would necessarily, from local conditions, be impure. It was deemed necessary for judicial purposes that the cooked mussels and the matters vomited by the patients should be examined for ordinary poisons. This was done with negative results. The uncooked mussels compared with mussels of the same size from the open sea appeared to have much larger livers, and their shells were very brittle. An attempt to extract an alkaloid was made. The generic tests applied clearly proved the existence of a leucomaine, which, indeed, was obtained in crystals, visible under the microscope, and corresponding to those described by Brieger as existing in the poisonous mussels which he examined. The quantity of material available did not, however, yield a sufficient quantity of the leucomaine for a thorough examination. I am procuring a supply of mussels from the pond in which the mussels were found, and hope to be able to extract from them a substantial quantity of the leucomaine, which will probably be found identical with Brieger's mytilotoxine ($C_6H_5NO_2$). The Seapoint case is another instance of poisonous mussels being procured from foul or stagnant water. In this case the opinion of M. Dutertre, that the liver of poisonous mussels is the seat of disease and the generator of the poisonous leucomaine, seems confirmed, but I cannot agree with the French observer that the disease is never the result of the poisonous nature of the food of the mussel. I have read all, or nearly all, the cases of mussel poisoning on record, and I gather from such details as are given with respect to the places in which the mussels were found that they were in contact with sewage or stagnant water.

² *Arch. für klin. Chirurg.*, 1887, Bd. 84, Heft iv; and *Annals of Surgery*, vol. vi, p. 440.

THE amount available under the will of the late Mr. Handel Cossham, M.P., for the building of the Kingswood Hospital will be nearly £50,000.