diaphragm undergoes a similar change, and perforation takes place, setting up empyema, although in other instances this arises from absorption, or, as some contend, by the passage of the pus through the pillars of the muscle. The frequency with which the lungs and pleuræ become affected should always be borne in mind. Out of seventeen cases in our records, one case presented pneumonia and pleurisy, two pneumonia alone, two empyema alone, and in two others evidences of phthisis were discovered. The state of the thoracic organs is not mentioned in the other cases, but as in some of them the kidneys are said to have been the seat of scrofulous deposit, it is not unlikely that tubercular disease coexisted in the lungs or serous membranes.

In some cases suppuration of the psoas was present; in fact, this would appear to be a not unfrequent accompaniment of the disease, for out of our seventeen cases two are stated to have presented an abscess extending from the renal region to below Poupart's ligament, and in two others abscess in the psoas muscle is especially noted. Perforation of the colon by a nephritic abscess is usually supposed to be of rare occurrence, but two such cases occurred out of the seventeen, and in one there was also an opening into the duodenum. You would expect that perforation of the peritoneum would be very apt to take place; but such is not the case, for this occurred in only one of the seventeen cases, and in two others suppurative peritonitis was present, although no opening from the abscess into the serous sac could be discovered. In Case 1 there was no disease of the kidney, but extensive fibroid thickening was discovered after death around the bones of the vertebræ, and a very similar instance is recorded in our post-mortem registers. Fibroid thickening is apt to take place in all chronic cases, and affects the walls of the abscess, constituting, no doubt, the chief difficulty to its healing. In Case 1 lardaceous degeneration was present in many of the viscera, showing that the long-continued discharge had interfered with the nutrition of the patient, and had probably been the chief cause of the fatal issue of the malady.

(To be concluded.)

CASES OF LARGE CALCULI REMOVED BY THE HIGH OPERATION.

BY SIR HENRY THOMPSON, F.R.C.S.,

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(Concluded from page 104.)

Of the four cases named in the preceding article, the second and fourth remain to be reported.

CASE 2.—W. R. P.—, a lad aged twelve, seen in consultation with Dr. Powdrell of Euston-road, on March 17th, 1885. The symptoms had not been very severe, but had become more so during the last six months. Attention had been drawn to them through the fact that the lad was forbidden by his master at school to leave the class-room to pass urine, an occurrence which led to my opinion being sought. I had little doubt as to the cause, and on sounding him found a large calculus, which, the patient's age being considered, I decided to remove by the high operation.

March 24th.—Mr. Moss gave ether; Mr. Buckston Browne assisted me, with Mr. Powdrell and Mr. Robert Priestley. The rectum bag was introduced, and the bladder injected in the usual manner. The incisions and mode of proceeding were the same as before described; one vessel only requiring to be tied. A wide flattish oval calculus weighing an ounce and a half was removed with some little trouble, owing to its form and size. The recovery took place steadily without interruption.

26th.—A little urine has passed by the urethra.

31st.—Healing of the wound has progressed rapidly.

April 12th.—He sits up daily.

15th.—All urine passes by the urethra, and he returns home to-day.

In the beginning of June the patient was brought to see me; his local and general condition being in every way satisfactory.

CASE 4.—A gentleman, aged seventy-three, previously under the care of Dr. W. M. Campbell of Liverpool, and seen by me on April 28th, 1885. The symptoms were severe, and had existed more or less during about five years.

May 2nd.—Mr. Cross gave ether, Mr. Buckston Browne assisting me; Dr. Hickman of Dorset-square and Dr. Rockwood of Colombo were present. I intended to perform lithotrity, but found the stone large, constantly slipping from the lithotrite, and the bladder by no means a very favourable one for the purpose. I decided to perform at once the high operation, and did it in the manner above described. No vessel was met with requiring either ligature or torsion; and, as in the preceding case, the dissection beyond the linea alba was made entirely with the finger-nail, a large vein or two being drawn aside. Nevertheless, in the afternoon of the day considerable hæmorrhage took place, and was arrested by firmly plugging the wound, secured by a pad and firm bandage. The stone was somewhat rounded rather than flat in its contour, and weighed rather more than an ounce and a half.

The patient was greatly troubled with hiccough for several days; he was very feeble, and his progress consequently was very slow. All the urine passed by the wound. It was a month before he was able to leave the bed and sit up. But on the 12th of June he was able to go out in a bath chair, and had acquired a fair degree of strength, his age considered. The urine still came chiefly by the wound, which, however, had much diminished in size; an india-rubber pad was arranged to cover it, enabling him to retain the contents of his bladder about two hours or so. On the 23rd inst. he left town for the seaside, in an improved condition.

July 15th.—The patient called on me. He now passes all the urine naturally, and the wound has all but cicatrised. His health and strength are remarkably good.

Remarks.—At the close of these four successful cases of suprapubic lithotomy, I would remark that there appears good reason to believe that this operation with recent modifications furnishes the desideratum which an increased employment of lithotrity has recently created. Lithotrity at a single sitting has been rendered capable of dealing efficiently and safely with almost all the cases of stone which adult patients furnish. It is frequently competent to remove uric acid calculi weighing from two to three ounces; and is so almost invariably where there is a capacious urethra, such, indeed, as is usually present in the elderly adult—that is to say, one which admits without unduly stretching a No. 16, 17, or sometimes a No. 18 of the English scale.

Our experience of oxalate of lime calculi scarcely enables us to say how large an example may be dealt with by lithotrity. The largest I have crushed weighed 640 grains, or nearly an ounce and a half, a very considerable stone. The problem thus left remaining for solution is, What is the best cutting operation for hard calculi (urates and oxalates) which weigh from about two ounces and upwards, as well as for those not quite so large, which are so peculiar in form (as occasionally but very rarely happens) that the lithotrite fails to grasp or retain them? I think there is no doubt about the answer—viz., that it is the suprapubic, and not the lateral operation. By the former procedure, with the modifications referred to, the effect of the inflated rectal bag and of full vesical distension is first to make the bladder an abdominal organ, and to place the stone directly under the line of incision; secondly, to carry the fold of the peritoneum to a considerable distance above the symphysis pubis, and leave an interval there which may be safely utilised by the operator for making an opening sufficiently large to extract a calculus of very considerable size. In addition to these advantages, the incisions of the suprapubic operation are more safe and easy of performance than are those of the lateral operation, and, granted that the peritoneum is out of harm's way, they involve no structure of importance. These conditions present a striking contrast to those which characterise the line of incision necessary for the removal of a large calculus through the perineum.

The source of hæmorrhage also is widely different in the two operations. In the lateral it is arterial, often formidable in amount, and in rare instances has been fatal. In the suprapubic, on the other hand, arterial bleeding is not an incident to be reckoned on; none but the smallest twigs are met with; any bleeding likely to be encountered is venous, and this may be considerable. My experience is at present small, but it suffices to furnish me good grounds for a belief

that the use of the finger-nail in dividing and drawing aside the tissues will generally enable an operator to avoid the difficulties which have hitherto been described as attaching to the operation from hæmorrhage.

A good deal has been written also in relation to the number and nature of the tubes to be introduced into the wound for the purpose of giving exit to the urine. I have never used one, and believe that they are wholly unnecessary—useless for the purpose named, and injurious as local irritants. After the first twenty-four hours I have placed the patient on either side alternately every six hours, to facilitate the outflow of the urine, and to prevent excoriation of the skin by thus frequently changing the direction of the current.

Finally, I think I am quite justified in believing that unless the operator has had a large experience of lithotomy—and there are not many of whom this can be affirmed—the high operation would generally be a safer proceeding than crushing for a calculus which is hard and much above an ounce in weight.

Wimpole-street, W.

LARGE URINARY CALCULUS: THE HIGH OPERATION.

By PROFESSOR HUMPHRY, F.R.S.

THERE is in the pathological museum of the University of Cambridge, to which it has lately been transferred from the library of Trinity College, a lithic acid calculus, which is larger than any of those mentioned by Sir Henry Thompson in last week's LANCET. It is, I believe, the largest of that composition known to have been taken from the human bladder. It is spheroidal, slightly oval, and flattened, its circumference measuring in one direction 15 in., and the other $13\frac{1}{2}$ in. The analysis given by Professor Cumming in the Cambridge Philosophical Transactions, vol. i., p. 347, is as follows:—"The nucleus is lithic; to this succeeds a considerable portion of the oxalate of lime variety; this is followed by layers of the triple crystals, covered by a thick coating of lithic, which is occasionally broken by a layer of the triple crystals, and the external surface is principally composed of the fusible calculus. Its present weight after being sawn is 32 oz. 7 dr.; the specific gravity 1.756, which after being two days in water became 1.768." He further adds that "it is more than nine-tenths lithic acid." The density of the calculus, and the small proportion of phosphates contained in it, indicate it to have been of slow formation and attended with little irritation of the bladder; and this is corroborated by the account given by Dr. Heberden in the forty-sixth volume of the Philosophical Transactions, from which it appears that the stone was taken from the wife of Thomas R—, a locksmith in Bury, after her death, by Mr. Gutteridge, a surgeon of Norwich, and was presented to Trinity College, Cambridge, by Mr. Samuel Batteley, who was M.P. for Bury, and had possession of it soon after the woman's death. "She had felt much less pain than might have been expected from so large a stone; and might probably have lived much longer with it if she had not thought herself well enough to attempt a journey on horseback, for while she was riding she was suddenly seized with violent pains that obliged her to be taken off the horse immediately, after which she could never make water unless the stone was first moved, and she continued in great agonies till she died. This happened in the reign of Charles II., who, being then at Newmarket, had the stone brought to him, some part of which was chipped off from one of its ends to show the King that it consisted of various coats formed one over another, as animal stones usually do." "This monstrous stone weighs 33 ounces 3 drachms and 36 grains, Troy weight. There appears to have been at least an ounce broken off on the occasion before related, not to mention what it must have lost by mere wear in fourscore years." Heberden had heard of calculi in Paris of equal weight, and of one "mentioned by Dr. Lister in his journey to Paris, which he says was taken from a monk A.D. 1690, and weighs 51 ounces"; but no further account is given of these, and nothing is said of their composition.

I am glad to find that Petersen's method of raising the bladder by distending the rectum with an indiarubber bag filled with fluid, as practised by Sir Henry Thompson, is

giving an impulse to the high operation of lithotomy; for it has always appeared to me that it is the operation best suited for the removal of large stones, and I have been surprised that it has not been more frequently practised. In the case of a lad on whom I performed it in 1848¹ I found no difficulty in reaching the bladder with the knife and the fingers, although the viscus was not distended, simply taking care to keep close to the ossa pubis after the linea alba had been cut through and the attachments of the recti muscles had been divided; and no ill consequences followed the infiltration of urine, which must have taken place to some extent. The lad quickly recovered, and four years afterwards, there being a recurrence of symptoms, I removed by the lateral operation three phosphatic calculi, one of which was adherent to the forepart of the bladder, where the incision had been made into it in 1848. The patient soon recovered, and was quite well a year subsequently. Some of the papillomatous and other growths in the bladder, which cannot be removed through a perineal incision, might be extirpated if the bladder were opened above the symphysis pubis.

REMARKS ON

THE CIRCULATION OF THE BLOOD.

MECHANISM OF THE ESTABLISHMENT OF VASCULAR CONGESTION: AN EXPERIMENTAL RESEARCH, DEDICATED TO STUDENTS OF MEDICINE.

By T. WHARTON JONES, F.R.C.S., F.R.S.

(Concluded from p. 108.)

FROM what has been said, it appears that the general blush of vascular fulness of the eye and side of the head in a dog or rabbit after section of the sympathetic nerve in the neck, and of the posterior extremity of the frog after section of the ischiatic nerve, is quite different in nature from the circumscribed deep-red vascular congestion (stasis sanguinis) which has here been spoken of. In the former case, the arterial walls having become paralysed by the section of their vaso-constrictor nerves, the blood, freely entering, distends their calibre, and flows in full force into the capillaries and venous radicles, distending the calibre of these vessels also, and causing a general blush of redness of all the parts under the influence of the divided nerve. In the latter case, the vascularity with intense circumscribed redness of the part is owing, not to an increased afflux of blood, but to a retarded flow in the small vessels, permitting of retention and stasis of blood in them by accumulation and aggregation of the red corpuscles. Such, it is to be observed, is the real nature of the circumscribed patch of congestion in the sclerótica and conjunctiva, which is excited by injury of the adjacent part of the cornea referred to in my article on Cohnheim's alleged emigration of white corpuscles from the vessels into the corneal substance.²

It remains now to make some remarks on blood-pressure, as directly manifested in nature, and not through the medium of hæmodynamometers, sphygmographs, and other curious instruments. By the blood flowing in the vessels under the influence of the propelling force of the heart's systole, distending pressure is exerted on the walls of the vessels from within, whilst, on the other hand, constricting pressure is exerted on the streams of blood by the muscular contractions of the walls of the vessels. In the case of the veins of the bat's wing, the constricting pressure on the blood by the rhythmical contractions of the walls of these vessels supported by valves, operates in aid of the propelling force of the heart's systole, as does also, indeed, the constricting pressure on the blood by the tonic muscular contraction of the walls of veins generally, backed by valves, though in a less degree; whereas, in the case of arteries, the vaso-parietal constricting pressure on the streams of blood operates as a controlling and even resisting force. Nay, we have seen that the calibre of a small artery may become constricted to closure by the tonic contraction of its muscular wall under vaso-motor nervous influence. In such a case of vaso-parietal pressure the stream of blood is not only arrested but is actually regurgitated in opposition to the propelling

¹ Provincial Medical and Surgical Transactions, vol. xviii.

² See article Phlyctenular Ophthalmia and Keratitis in my Ophthalmic Medicine and Surgery.