The calculus consisted of two portions, one consisting chiefly of a part of the outer covering of the stone, which was also found partially encysted in the prostatic portion of the urethra. It formed, however, no obstacle to the introduction of the catheter or staff; but, during the operation, it obstructed the passage of the knife into the bladder, and had to be removed with a pair of forceps. With this exception, I experienced no difficulty in the operation, and the boy made an excellent recovery. Notwithstanding the absence of any recent deposit on the smaller fragment, its edges were smooth, and showed that the fracture must have taken place at some remote date. The appearance of the calculus itself confirmed this view; for it was so encased with phosphates, that it was difficult to discover where the other portion was originally attached until a section of it had been made. The entire calculus weighs 2 drachms 15 grains; the smaller fragment, 10 grains.

The subject of Mr. Luke's case was a man in his sixty-fourth year. He was admitted into the London Hospital in September 1855, with the usual symptoms of stone. A catheter was introduced into the bladder, and struck against a soft and apparently large calculus. An attempt was made to crush the stone; which, however, was so large as to slip once or twice from between the blades of the lithotrite without any apparent effect. Lithotomy was afterwards performed; and a large soft stone, in the shape of a wedge (Fig. 3), having one rounded surface and two smooth facets, was removed, from which it was inferred that there were two more calculi in the bladder. The forceps were, therefore, again introduced, and another stone seized, which broke into several

Figs. 3 and 4.

pieces (Fig. 4). On placing the fragments in their original position, the stone proved to be precisely similar in shape to the first, and about the same magnitude. The facets of each were found to correspond so exactly, that they must have folded upon one another in the various movements of the bladder, for no other stone was discovered. They were both composed of triple phosphate.

REMARKS.—Phosphatic and other concretions, having the appearance of portions of calculi, are frequently passed without surgical interference. In many cases, the concretions evidently are only secretions from disease of the mucous coat of the bladder; but occasionally distinct portions of the nuclei of calculi are found incorporated with the soft friable phosphatic materials, showing the existence of more than one stone in the bladder at the same time. Their being passed during the administration of remedies has been supposed to prove their solvent power; but, except in cases where the concretions are undoubtedly the products of a diseased bladder, there has generally been sufficient evidence to prove that the fragments have been detached from more than one calculus. Hence we may fairly infer that their disruption is to be attributed to the stones striking against each other through certain movements of the body, or to their compression by the action of the muscular coats of the bladder. This view is confirmed by a case recorded by Mr. Liston, of a medical man who had laboured under the symptoms of stone for a considerable period. Being suddenly called to an urgent case of midwifery, he ran quickly down a steep street, and, as soon as he reached the bottom, was seized with a strong desire to pass urine, which he did, but only in small quantity, mixed with blood. Some pieces of stone, with sharp angles, were voided; retention of urine supervened, and the urethra became much obstructed; suppression followed; and, after a few days of excruciating agony, death terminated his sufferings. On post

mortem examination, numerous fragments of calculi were discovered in the bladder and urinary passages. (*Elements of Surgery*, p. 638, 1840.)

In each of the cases I have brought forward, there being clear evidence that there was but one calculus, we must look for other causes of the fractures. Not only were they single, but, at the time of the fracture, two of them were composed almost entirely of lithic acid and oxalate of lime—materials not likely to be affected by any degree of force which might be applied to them in the movements of the body or from the action of the muscles of the bladder. As the calculus in Mr. Luke's case was composed chiefly of triple phosphate, the lithotrite may possibly have contributed to its fracture, although there is no evidence to that effect; but in the other two, though each patient had been sounded before he came under my care, the stone had not been detected. Nor could any injury have led to their fracture from my examination, for their structure was too compact to be affected by the sound; and, moreover, their surfaces plainly show they must have been broken some weeks at least before I discovered them. The cause of their fracture must, therefore, be sought in the calculi themselves. It may probably have taken place through the generation of some gaseous agent, from chemical changes in their earthy constituents; or through the decomposition of the animal mucus of which their cementing material is formed, and which exists in various quantities in different calculi. This view seems to be confirmed by the appearance sometimes, though rarely ob-

Fig. 5.

served in calculi where the fracture is limited to the internal layers, of which there are two excellent specimens in the Dupuytren Museum at Paris, the separated portion of one appearing to have become again cemented together, and encrusted with a subsequent deposit. (Fig. 5.)

ON A CASE OF ABDOMINAL ANEURISM WITH DICROTIC PULSE.

By WILLOUGHBY FRANCIS WADE, B.A., M.B.,
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A GLASS-CUTTER, aged 30, with a history of syphilis ten years previously, was found to have abdominal aneurism. His gums showed the blue line of plumbism common in his trade. His first symptoms were characteristic pains in the back and belly. The tumour was of vast size, with two murmurs, one merging into the other without any interval of silence. The first murmur was heard over the whole sac, and was attended by marked thrill at the site of the aneurismo-arterial opening. To this spot the second murmur was limited. He died, after a year's illness, from the sac opening into the left lung.

POST MORTEM EXAMINATION.—The aneurism occupied almost the whole left half of the abdomen and the lower third of the left chest. Some vertebræ were eroded. The sac contained much old and recent clot. The aneurismo-arterial orifice had smooth rounded edges, and was about three inches long by two wide. The heart was normal.

The case was under the care of my senior colleague, Dr. Evans, who has kindly allowed me to make use of it. Annexed is a woodcut of the right radial pulse-trace.

My space being very limited, I propose to pass by all other considerations, and endeavour to show what I believe to be the true explanation of the extraordinary dicrotism (c).

It has long been known that a single contraction of the left ventricle may produce two beats of the pulse. To this phenomenon, the term "dicrotism" has been applied (*δικροτος*, double-beating); *bis feriens* is its Latin synonym. This kind of pulse has been generally found in

"typhoid" conditions of the system; while, on the other hand, in many cases, it is entirely absent. It has been attributed to a want of arterial tension; and this view was confirmed by experiments with the sphygmograph when that instrument was added to our *armamentarium*. Probably, too little heed has been given, in discussing this point, to the just distinction, first pointed out by Stahl, between a quick pulse and a frequent pulse; *i.e.*, between a rapid contraction of the left ventricle and a frequent repetition of its contractions. The sphygmograph has also discovered the very curious fact, that in most persons' pulses there is a

A The ordinary pulse-beat; B. The ordinary dicrotism; C. An extraordinary dicrotism. These three elements were all produced by one beat of the heart. (D to E and E to F are each single heart-beats.)

slight amount of dicrotism, too slight to be sensible to the touch of even the most skilled finger. Whilst by this instrument dicrotism has been detected in many cases of aneurism, this is the first, so far as I remember, in which it has been palpable to the unaided finger. There are also certain peculiarities in this case which serve to prove, almost to demonstration, that this dicrotism was directly due to the aneurism itself. Such a possibility suggested itself to the ingenious mind of M. Marey; but the circumstances of his case did not afford means of proof; and the dicrotism of aneurismal patients has been commonly held to be due to a relaxed state of the arteries, consequent upon the withdrawal of blood from the general circulation to fill the sac.

The double-beating of the pulse in this case was discovered not by the sphygmograph, but by the finger. The pulse was counted, and the heart-sounds and heart-beats were counted, and the rate of the first was found to be twice that of the last. The instrument did two things. It detected the minor dicrotism (B), and it gave a faithful and permanent record of that and of the major dicrotism (C).

Whilst there was at all times palpable dicrotism in all other parts of the arterial system which could be reached, there was none at any time in the aneurism itself, though the single pulsation of this was very forcible. It is not necessary to enter into the vexed theories of normal dicrotism; it is enough for us to know that all explanations refer it either to the elasticity of the aorta, or to waves or impulses reflected from the periphery of the circulation (the capillaries) or from the aortic valves.

Particular attention is now invited to the fact that, at the usual part of the pulse-trace, there is to be found an ordinary amount of dicrotism; whereas, subsequent to this, there appears a dicrotism, not only in itself of very unusual height, but also, which is much more remarkable, far transcending in altitude the previous dicrotic ascent. From this fact I infer, without hesitation, that the two elevations must depend upon different causes. For it is a physical fact that, in all intermittent effects of elasticity, the first is the greatest. For example, if an India-rubber band be stretched and allowed to contract an inch at a time, the force of the first contraction will be greater than that of any subsequent one. If, therefore, normal dicrotism depend solely upon aortic elasticity, it is impossible that a secondary dicrotic wave can exceed in height a primary one.

Again, in the case of all reflected waves, whether of fluids or liquids, the primary reflection is necessarily higher than any single succeeding one. An echo is a familiar example of this law. If, therefore, ordinary dicrotism depends solely upon reflection from the periphery, it is equally impossible that any secondary wave can exceed in height the primary one. The two waves, then, here cannot be due to the same cause; and, as we may assume that the minor is the normal wave, the major must be due to an abnormal cause. In seeking for this, we naturally turn to the aneurism. We find that it alone, of all parts of the arterial system, is monocrotic. We see, feel, and by the murmur hear, it contracting whilst other parts are expanding. We can estimate the force with which it contracts by feeling that with which it expands. We cannot doubt that this force is adequate to produce the secondary dicrotic wave, or, as we might term it, the tricrotism. We seek for an unusual cause; we find an unusual apparatus of adequate power; is it unreasonable to conclude that here is the cause we seek. If we admit this, it remains for future observation to determine how far this phenomenon may in future assist in the diagnosis of obscure internal aneurisms. At present, I restrict myself to averring that we know of no other disease capable of producing a secondary dicrotism, the trace of which exceeds in altitude a primary one.

ABSTRACT OF A CLINICAL LECTURE

ON THE

PATHOLOGY AND TREATMENT OF THE TYPHOID STATE IN DIFFERENT DISEASES.

By CHARLES MURCHISON, M.D., F.R.S.,

Fellow of the Royal College of Physicians; Physician and Lecturer on the Practice of Medicine at the Middlesex Hospital; etc.

I PURPOSE in the present lecture to direct your attention to several cases of disease, widely different in their nature, but in all of which there has been a similar group of symptoms, constituting the condition ordinarily known as the "typhoid state."

CASE I.—William D., aged 23, admitted October 26th, 1866, on the seventh day of an attack of typhus fever, with well-marked eruption, a dry, brown tongue, great delirium, and restlessness, and signs of congestion of the lungs. Marked improvement on the fifteenth day. On the eighteenth day, return of the febrile symptoms; an inflammatory swelling over the left parotid, and albumen in the urine. On the nineteenth day, frequent attacks of convulsions, which continued to recur until death by coma on the twentieth day.

After death.—Blood dark and fluid; great hypostatic congestion of lungs; spleen large and soft; kidney presenting the characters of a recent acute nephritis. A large quantity of clear fluid, containing urea, beneath the arachnoid, and in the lateral ventricles.

CASE II.—John F., aged 27, admitted December 3rd, 1866, on the ninth day of an attack of typhus, with well-marked eruption, a dry, brown tongue, and albuminuria. On the thirteenth day, violent delirium, followed by stupor, floccitatio, and involuntary evacuations, which continued until death on the seventeenth day. No convulsions.

After death.—Blood dark and fluid. Extreme hypostatic congestion of both lungs, the two together weighing sixty-eight ounces. Both kidneys greatly enlarged, weighing together fifteen ounces and a half, their surfaces smooth, and capsules non-adherent, their cortices extremely congested, and the tubes gorged with granular epithelium. Much clear fluid, in which a considerable quantity of urea was detected, at the base of the brain, and in the lateral ventricles.

CASE III.—John S., aged 44, admitted into the London Fever Hospital, on October 12th, 1863, on the seventh day of an attack of typhus, with copious eruption. On the ninth day, acute delirium, followed by stupor, complete unconsciousness, low muttering delirium, and involuntary motions. On the thirteenth day, urine very scanty and smoky, containing epithelial and blood-casts. During the following night, a fit of convulsions, lasting a quarter of an hour, and death by coma half an hour afterwards.

After death.—Blood dark and fluid. Extreme hypostatic congestion of the lungs. Spleen large and soft. The two kidneys together weighing fourteen ounces and a half, their capsules separating readily, and their cortices quite smooth, but very friable, intensely congested, with blood dripping in large quantity from the cut surface; all the uriniferous tubes gorged with opaque granular epithelium, and many of them containing extravasated blood. Much clear fluid in the lateral ventricles and at the base of the brain, which was not examined for urea.

CASE IV.—James P., aged 73, admitted November 13th, 1866, with an eruption of pemphigus over the greater part of the body. Many years before, he had suffered from "typhus," and from a rheumatic attack, but he had never had dropsy. Two years before, the eruption had appeared on his legs, and within the last three months it had spread over his body. Two or three days after the patient's admission, he became very restless and delirious at night; his tongue was dry and brown, and coarse moist *rôles* could be heard over the back of the lungs; the urine was scanty, but, though examined repeatedly, contained not a trace of albumen, and there was no dropsy. Death by coma occurred on November 21st.

After death.—The blood dark and fluid. The kidneys contracted and granular, their capsules firmly adherent, and their cortices having well-nigh disappeared. Edema and hypostatic congestion of the lungs. Much clear fluid, containing urea, at the base of the brain, and in the lateral ventricles.

CASE V.—John K., aged 49, admitted October 27th, 1866, with a gangrenous ulcer of big toe, the result of an injury, jaundice, and albuminuria. About November 15th, the patient became very restless and delirious at night; the tongue was dry and brown; there were signs of hypostatic congestion of the lungs; and the gangrene began to spread up the leg. On November 20th, convulsions occurred, and, after about twenty fits, the patient died comatose on the 21st.