Nephrotomy should be performed in the gravest cases to prevent death from uræmia; in the slighter and intermittent cases, to extract a stone which may at any time produce complete persistent anuria.

Opinions have hitherto differed as to the precise time when the surgeon should interfere. To be successful it is certain that the operation should be done early and before the uræmic stage is reached. But since this stage is generally delayed till after the sixth day, some authors have advocated the fifth or sixth day as the period of surgical operation.

My opinion is that an operation ought to be performed as soon as the anuria is established and the diagnosis is satisfactorily made.

The operation is serious only on account of the condition for which it is performed, namely (1) the urinary suppression produced by the obstruction, (2) the poisoned condition of the blood produced by the suppression, and (3) the structural changes in the kidney, the consequences of the obstruction. We should operate on the side last affected when the indication on this point is clear. It is not the kidney which has longest suffered, or which has yielded most calculi, which ought to be incised. The contrary ought to be the rule, because the more the kidney is affected the more extreme its degeneration, the less the secretion which it will yield, and, consequently, the less the benefit from nephrotomy.

In the absence of exact history, drawn from the patient himself, it is necessary to try and ascertain by careful examination of the abdomen which kidney to explore. When there is no enlargement of the kidney, and no pain or tenderness, there may yet be a considerable degree of hardening from contraction of the abdominal muscles over the part of the kidney which is last involved.

In most cases it will be best to explore the kidney first, but in certain exceptional instances, as when the stone can be felt *per rectum* or *per vaginam*, or evidence clearly points to the side and precise spot at which it is impacted, ureterotomy should be done. For this nothing less than actually feeling the stone through the abdominal parietes (a most unlikely thing in persons suffering from calculous anuria) ought to satisfy. The localisation of stone, as to whether it be in the kidney or ureter, is very uncertain; most frequently, when impacted in the ureter, the symptoms it causes are referred to the corresponding kidney; but occasionally the reverse obtains, and a stone in the renal pelvis gives rise to fixed abiding pain and acute tenderness at one particular spot in the course of the ureter.

The nature of the operation performed in the 49 collected cases was as follows:

1. Operation stated as nephrotomy (in a few cases as exploration of kidney) in 36 cases. In 1 of them the operation was performed by the thermo-cautery.
2. Incision of the renal pelvis, 5 cases; 1 was done by thermo-cautery.
3. Incision of the ureter, 7 cases; 1 was performed through the rectum; in 1 additional case an attempt was made to remove an obstruction from the lower end of the ureter by means of the finger in the bladder.

REFERENCES.

¹ Specimen in St. Bartholomew's Hospital. ² Injuries of the Ureter, *Edinburgh Medical Journal*, January, 1898. ³ *Gaz. Hebdom.*, 1879. ⁴ *Mal. des Reins*, T. iii, p. 490.

(To be continued.)

A MEDICAL POLITICIAN.—Sir Charles Nicholson, Bart., M.D., D.C.L., LL.D., who lately entered on his 90th year, is one of the grand old men of Australia. He took the degree of M.D. at Edinburgh in 1833; in 1834 he emigrated to Australia and established himself in practice in Sydney, then the only town of any size in the great southern continent. Interesting himself in public affairs, he was returned in 1843 to the first rudimentary Australian Parliament, where he had as a colleague Mr. Lowe (afterwards Lord Sherbrooke). Sir Charles presided as Speaker over three of the early Australian Parliaments, and he was also largely instrumental in founding the University of Sydney, of which he was elected first Chancellor. On the separation of Queensland from New South Wales, he became the first President of the Queensland Legislative Council. He has for some years past been living in England.

THE PATHOLOGY AND TREATMENT OF GENU VALGUM.

By CHARLES A. MORTON, F.R.C.S.,

Professor of Surgery in University College, Bristol; Surgeon to the Bristol General Hospital.

It was not my intention to publish the results of my investigations into the pathology of genu valgum at the present time, but the publication of a skiagraph of the bones in this deformity in the *BRITISH MEDICAL JOURNAL* of December 4th, 1897, has induced me to do so. Mr. Tyack, Lecturer on Physics in University College, Bristol, has now taken for me skiagraphs of six cases of genu valgum, and they all show that there is no rickety curve in the lower end of femur and no elongation of the internal condyle, but that the deformity is due to curvature outwards of the tibia just below the head, associated with a corresponding curve in the shaft of the fibula, which is most marked about the middle of that bone, so that the tibia and fibula at that level are much nearer together than in the normal limb. That this is the essential change in the bones in genu valgum, and not an exceptional one, is shown by the fact that it is present in every one of the six consecutive skiagraphs. The generally received view that the deformity is due to a change in the lower end of the femur is thus shown to be erroneous, at any rate with regard to young children.

Photograph No. 1.

Skiagraph No. 1 is the first taken and the one I wrote to the *BRITISH MEDICAL JOURNAL* about on May 29th, 1897. It was taken to show the supposed changes in the lower end of the femur, and hence but little of the leg bones is seen, but there is enough visible to show where the deformity was situated. Photograph No. 1 is of the same case. Skiagraph No. 2 is also from the same case, taken after Macewen's osteotomy on both sides, and as more of the leg bones is seen it is really a better one of the deformity. Photograph No. 2 is from the same case after operation, and shows that although the curvature in the leg bones remains unaltered, the limbs are quite straight. Rectification of deformity of the limbs has been obtained by the production of slight

deformity at the lower end of the femur and obliquity of the knee-joints.

Skiagraph No. 1.

Now, although in the cases I have operated on by Macewen's method the limbs have been satisfactorily straightened, yet it seems to me that it would be better surgery to divide the bones which are curved, rather than to correct the deformity of the limbs by dividing a healthy bone and causing a certain amount of deformity at the seat of division, together with some distortion in the position of the joints, and hence I have treated one case by division of the curved tibiae and fibulae rather than by Macewen's osteotomy.

Skiagraph No. 2.

Photograph No. 3 and skiagraph No. 3 represent the case before operation, and photograph No. 4 after operation on both legs. Unfortunately no skiagraph was taken after operation. I intended to get this done, but the child was sent back to a country workhouse before I remembered to arrange for it. In all cases great care has been observed that the patellae look directly forwards, and hence that there is no masking of the deformity by rotation of the limb. The genu valgum is as satisfactorily corrected as if Macewen's osteotomy had been performed, and there has been no division of a normal bone, or production of joint obliquity. It is true that the legs are not quite so straight as after Macewen's osteotomy, because the bending of the curved tibia inwards leaves a very slight angularity in its outline just below the head of the bone, but this corresponds to the deformity pro-

duced in the lower end of the femur in Macewen's operation, and is produced in the curved bone and not in a normal one. I may mention that in this case the outgrowth of bone at the

Photograph No. 2.

Photograph No. 3.

attachment of the internal lateral ligament to the tibia present in some cases of genu valgum was very marked. There is only a slight trace of this in the skiagraph, probably because it was cartilaginous. Had it been ossified it would have appeared as if there were two symmetrical exostoses on

Skiagraph No. 3.

the tibia. The operation I performed consisted in a transverse division of the tibia, just below the junction of the head and shaft, with a narrow saw after fully exposing the bone by a transverse incision over its inner aspect. On the left side I removed a very narrow wedge of bone, with the base inwards; on the right side I simply made a transverse division. On the left side (the first side operated on) I divided the fibula about the

Photo raph No 4.

middle of the bone, but it was deeply situated, and was so closely approximated to the tibia that it was quite difficult to do so without wounding the anterior tibial vessels and nerve. On the right side I divided the fibula lower down where it was near the skin, and this was, of course, quite easy, and the result was as good as on the other side. Esmarch's bandage was not used, and no vessels required ligation. There seems to be no risk of wounding any important vessel if the tibia is carefully divided with a small Adams's saw from the inner side, after free exposure of the bone, and if the division of the fibula is made at the lower end. In many cases no doubt the fibula could be easily broken across after division of the tibia. It is essential that it should be divided. We must remember that in Macewen's operation there is always a risk of damage to the popliteal vessels. I put the limbs up (as I do all cases after Macewen's operation) with a wedge placed between the leg and the outside splint, with the base of the wedge about an inch thick, placed between the outer malleolus and the splint. It is made of jaconet stuffed with wool. Its insertion tends to push the ankle inwards, and thus helps to maintain the correction of the deformity after osteotomy. The wounds were all sutured, and healed by primary union.

There is no difficulty in keeping the upper fragment of the tibia in a good position, as Mr. Footner suggests there might be, but we have to adopt special precautions in putting up the limb to overcome the rotation outwards which is always present under anaesthesia, and is, in fact, the position of rest of the limb. In any case in which the bones of the limb are divided, it is impossible to correct this rotation in the portion of the limb above the section of the bone by a slight twisting of the foot to the middle line. In Macewen's osteotomy, for instance, the foot, leg, and knee-joint are put up without external rotation, but there is no doubt the shaft of the femur is left slightly rotated outwards. When the limb is put up on the splint, after the division of the bones below the knee-joint, rotation outwards is noticed by the position of the femoral condyles. It cannot be corrected by twisting the foot, and we must overcome it by the way in which we bandage the thigh. The bandage must first be carried several times around the thigh from without inwards, and then in the same direction round the limb and splint. This rotation of the femur outwards would not matter if the leg and foot were allowed to remain also rotated out, but it would be inconvenient to apply the splint in this position. In putting up the limb after Macewen's osteotomy the rotation outwards of the leg and foot is corrected, but the shaft of the femur must remain rotated out, and hence, after this operation, when the patient gets about again, and this rotation outwards which is the position of rest, is corrected, a corresponding abnormal rotation inwards of the bones below the level of section will be produced.

It is often stated that the deformity in genu valgum disappears when the knee-joint is flexed, because the tibia then passes on to the back of the elongated internal condyle. For many years before we began to take skiagraphs of these cases, I have again and again demonstrated to students that this is incorrect. When the knee-joint is flexed in genu valgum there is an unconscious rotation outwards of the femur, slight, but enough to mask the deformity. If the surgeon is careful not to rotate the femur outwards in the slightest degree, he will not correct the deformity by flexion of the knee-joint.

The slight obliquity in the head of the tibia present in Mr. Footner's skiagraph is also present in some of mine, but it is evidently not the essential condition, for with a genu valgum of equal degree on the two sides it is seen on one side and not on the other, and the curvature of leg bones is marked in both. Moreover, it would be easy to produce this obliquity in the skiagraph by the position in which the limb was placed on the plate. If the limb was adducted or abducted from the middle line, the knee-joint would appear as if oblique instead of horizontal. It is not an elongation of the inner tuberosity of the tibia, but a general obliquity of the upper surface of the diaphysis (as is clearly seen in skiagraph No. 3), and is probably corrected by the shape of the epiphysis, otherwise there would be a compensating obliquity in the lower end of the femur, and the line of the joint would be oblique, and such obliquity would tend to correct the deformity, as it does after Macewen's osteotomy. Now the

lower end of the femur, in skiagraph No. 3 is quite straight, and the obliquity of the upper end of the diaphysis of the tibia must be compensated for by the shape of the cartilaginous part of the epiphysis, for otherwise a wedge-shaped space would be present in the knee-joint. This obliquity is evidently due to the curvature of the shaft, as is clearly seen to be the case in skiagraph No. 3, and it is probably of no importance. In Mr. Footner's skiagraph of the bones after osteotomy this obliquity (though present before operation) is not apparent, but then the whole outline of the upper end of the tibia is blurred.

[Since this paper was sent for publication I have operated on another case in this way. The deformity was easily and satisfactorily corrected, but the limb is still on the splint.]

SOME OF THE MEDICAL USES OF THE ROENTGEN RAYS.*

By FRANCIS H. WILLIAMS, M.D.,
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It gives me great pleasure to have the honour of being present at the meeting of this Association and of reading a paper before this Section.

During the past year I have spoken several times on the subject of the Roentgen rays and their uses in medicine¹; in the few minutes at my disposal to day I shall only attempt to review briefly some of the clinical questions the x rays assist us to look at from a new standpoint (thus lending confirmatory evidence to our older methods of examination), and also to some of the few ways in which the x ray examinations can place new evidence at our disposal. To consider the surgical uses would be out of place here, and to touch upon all the medical ones would take too long, therefore, by way of example, I will speak briefly of certain uses of the fluoroscope in diseases of the chest. But first let me remind you that the differentiation which the rays make between different tissues in the body depends upon differences in bulk and in chemical composition. This point is illustrated by these radiographs, which explain themselves.

The chest offers an excellent field for examination with the fluoroscope because it contains so much air that the contrast between the normal lungs, which are light, as seen in the fluoroscope, and some pathological conditions, which make them darker, renders many abnormal conditions readily visible, and, further, the motions of the organs in the chest may be studied with this instrument; this cannot be done with the radiograph. The physician can make an examination in his office by means of a suitable apparatus with such readiness that it is far more practicable than any method involving photography. I have been using the fluoroscope regularly as a means of examining the chest as I do the stethoscope, and find that the two instruments supplement each other.

To illustrate the uses of the fluoroscope let us consider certain outlines of the organs in health as seen in the fluoroscope, and then take up the ways in which they may be changed in disease. In health the diaphragm lines move as follows: Quiet breathing, half an inch; full inspiration, two and one-half to three inches, a little more on the right than on the left side.

In health the outlines seen on the left of the sternum are as follows: A part of the aorta in some patients may be observed in the first intercostal space; in the second intercostal space a portion of the pulmonary artery; the left border of the ventricle is chiefly seen in full inspiration when the apex and a portion of the lower border are also visible; the maximum pulsation is at the point corresponding to the cavity of the ventricle about where its outline crosses the fourth rib; during full inspiration the heart moves downward and toward the median line about an inch.

To the right of the sternum the outline of the large vessels is seen, and, less distinctly, the right auricle between the second and fourth ribs.

Let me enumerate some of the diseases in which the changes that have taken place in the diaphragm lines may be

seen in the fluoroscope: such are tuberculosis, pneumonia, pneumothorax, carcinoma, etc.

Fig. 1.—Tracing from a man, aged 23, showing position and movements of heart and diaphragm during expiration and in full inspiration. Line B the position of the ventricle during full inspiration. Line C the position of the ventricle during expiration. The dotted line, S, indicates the border of the ventricle in systole during full inspiration. The curved line A, the right auricle. Lines D, D, indicate the position of the diaphragm in full inspiration. Lines E, E, indicate the position of the diaphragm in expiration. Line F indicates the position of the diaphragm on the right side in inspiration during quiet breathing at which time the heart was as in expiration (C). I, II, III, IV, V, VI, VII, indicate parts of the ribs seen in the fluoroscope during inspiration; during expiration only those parts above lines E, E, and outside of C are visible.

Fig. 2.—Normal thorax. Diagram showing the heart and the outline of the diaphragm of normal chest, as seen in the fluoroscope during full inspiration. The broken lines show position of heart and diaphragm during expiration.

In many cases of pulmonary tuberculosis (see Fig. 3) the range of movement of the diaphragm is shorter than in health; it does not descend as far as it should, and this shortening of the excursion precedes in some cases the increase in density of the lungs (which makes these organs appear dark in the fluoroscope), and sometimes is one of the

* Read in the Section of Medicine at the Annual Meeting of the British Medical Association held at Montreal in September, 1897.