more rapidly the laryngeal stenosis has been developed, whilst if this process has taken place slowly—as, for instance, in many cases of *tabes dorsalis*—it is remarkable how great an adaptability the organism shows to the altered conditions. Degrees of laryngeal stenosis are borne under such circumstances with comparative ease, which on laryngoscopic examination would seem to be almost incompatible with the continuation of life. ¹³ This case which is important from various points of view has been described by me previously, in the *Virchow Festschrift*, and in *Brain*, Parts 59-60, 1892. ¹⁴ Fuller information on this important question will be found in my paper on Mechanical Impairments of the Functions of the Crico-arytenoid Articulation, etc., *Medical Times and Gazette*, vol. ii, 1880.

ON A SECOND CASE OF REMOVAL OF A "PRESSURE POUCH" OF THE OESOPHAGUS.

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In the year 1890 I saw, I believe for the first time, a patient with symptoms of a "pressure pouch" of the oesophagus, and in June, 1892, I removed the pouch. At that time there was, so far as I know, only one published case of operation for the removal of a pressure pouch of the oesophagus (von Bergmann's) but I think the operation had been performed in two, if not three, other cases, once by Billroth, and once or twice by Kocher. A full account of my case and of the operation was brought before the Royal Medical and Chirurgical Society, and was published in the *Transactions of the Society* in 1893 (vol. lxxvi, p. 269). The paper is illustrated by drawings of all the pouches, which are true or apparent "pressure pouches" in the museums of all the schools of medicine in London at that time. The small number of them, my own experience, and the statements of all writers on the subject led me to regard the condition as one of very great rarity, and I concluded my paper by saying: "I can scarcely hope to perform this operation again, for the affection is so rare that it falls to the lot of but few surgeons to meet with two of these cases in the course of a long surgical life." Since that time, my experience has been so peculiar, that I am anxious to bring the question of these oesophageal pouches prominently before the profession.

CASE I.—Captain X., aged 47. Symptoms of four years' duration. Seen first in 1890. Pouch removed in 1892. Case published in the *Transactions of the Royal Medical and Chirurgical Society* (vol. lxxvi).

CASE II.—A gentleman, aged 57, was sent to me by Mr. Critchett in September, 1894. For ten years he had suffered from slight difficulty in swallowing his food, and the difficulty had very slowly increased. He found it necessary to gulp his food down, and was then often able to swallow large pieces of solid food. But, in spite of every device and care, portions of food seemed to stick in his throat, and came up unchanged many hours after they had been swallowed. He had not lost flesh, and his general health was good. I had not the opportunity of passing an instrument for him. It is more than three years since I saw him, but I have just received a letter from him telling me that his difficulty of swallowing has very slowly grown worse, so that he is often unable to swallow liquids without some of them passing into the pouch. In the morning, after an early breakfast, he often coughs or chokes up fragments of meat, undigested, which he took on the previous evening. He is able by a movement of his neck to bring up these fragments of food. In all other respects he is perfectly well. No bulging has been noticed in his neck.

CASE III.—A gentleman, aged 73, tall, and a remarkably fine man, was sent to me by Dr. Ewart (Eastbourne) in August, 1895. He was thought to be suffering from a stricture of the oesophagus, which had been diagnosed by a medical man in large practice in London. The stricture was said to be due to varicose veins in his throat, and the veins had been burnt and the uvula shortened by a specialist in throat diseases in London, who is also in large practice. My opinion was sought on the question of the desirability of dilating his stricture. The difficulty of swallowing had commenced four years previously. It consisted, not only in a difficulty of swallowing, but in the return of fragments of undigested food long after they had been taken. On hearing this I went very thoroughly into his case, and came to the conclu-

sion that his symptoms were those of a pouch, not of a stricture. I suggested to him the possibility of a successful removal of the pouch, but told Dr. Ewart that the operation ought not to be performed unless it could be reasonably proved, immediately before the operation, under an anæsthetic, that no stricture was present. I also begged that swelling of the neck should be sought for directly after the taking of food, particularly of liquid food.

In November, 1895, the patient decided to be examined under an anæsthetic, and to undergo the operation if I could assure myself of the existence of a pouch.

On November 29th Dr. Ewart came up from Eastbourne, and the operation was performed. But, immediately before it, I succeeded in passing a very large bulbous bougie down into the stomach, and in passing a curved sound into the pouch and feeling the end of it distinctly in the posterior inferior triangle on the left side. While Mr. Gill was administering the anæsthetic, I learned for the first time that both Dr. Ewart and the patient had noticed swelling of the neck after the taking of food. The demonstration of pouch was therefore perfect, and the operation was at once proceeded with. A long incision was made on the anterior border of the left sterno-mastoid, with its centre opposite the cricoid cartilage. The dissection was carried down between the trachea and oesophagus on the inner side and the great vessels on the outer side. The superior thyroid artery was tied, the omo-hyoid muscle divided, and the pouch was discovered lying behind the oesophagus, at its junction with the pharynx, and projecting a little towards the left side. It was cut away from above downwards, while the edges of the wound were brought together with fine silk sutures. The operation was precisely similar to that described in the *Transactions of the Royal Medical and Chirurgical Society*, and the only difference in the treatment was that no attempt was made to keep a tube in the oesophagus for the purpose of feeding, and a drainage tube was inserted in the wound of the neck instead of long strips of gauze.

Fig. 1.—From a specimen in the Museum of the Royal College of Surgeons, No. 2,291 D.

The pouch was so like that removed in my first case, that one could not be told from the other. They were practically identical in size, in shape, in structure.

On December 4th milk came for the first time through the wound in the neck; and for several days large quantities of the liquids he took passed out through the wound. But by December 12th this had almost ceased; and on December 20th he returned to Eastbourne, able to swallow perfectly well, and the wound healed.

CASE IV.—A gentleman, aged 65, was brought to me in December, 1895, by Dr. Morcom, of Dunstable. For more than a year he had experienced difficulty in swallowing, but he had not wasted, and his health was excellent, with the exception that he suffered a good deal from gout. He, like the other three patients, was able to swallow liquids with greater facility than solids; and, like them, he coughed up or choked up fragments of undigested food which he had taken long previously. He swallowed a little water in my consulting-room, and, although I was not able to discover any swelling in the neck, I was able to cause the return of some of the water into his mouth by pressing on the neck. In January of 1896 I saw him again, when his symptoms were unchanged. I passed a sound, which was arrested nine inches from the teeth, and could not be passed any further, although he was able to swallow tolerably large fragments of solid food.

I have just received a letter from Dr. Morcom, dated November 24th, 1897, saying that his patient is in much the

same condition as when I saw him. "I have not been able to detect any bulging after a meal, and the food passes into the stomach without pressure on the neck. He is just the same in regard to weight—no loss whatever."

CASE V.—A clergyman, aged 55, was brought to me by a brother clergyman in May of this year (1897), and I was told that for five years he had suffered from slight "relaxation of the throat," and some difficulty in swallowing. The dysphagia commenced really suddenly by a stoppage in his throat during a meal, and he was obliged to leave the room to vomit in order to be relieved. (Note—This is the only case in which the symptoms of a pouch appear to have occurred suddenly and for the first time.)

Ever since there had been difficulty in swallowing, and the return of fragments of undigested food many hours after they had been taken. Every morning he was in the habit of bringing or coughing up fragments of food taken the night before, and occasionally the fragments evidently belonged to a meal taken two nights previously. He drank water in my room, but I could not distinguish any swelling of the neck. A bougie was arrested about nine inches from the teeth.

I explained to the patient that I believed he was suffering from a pouch, and that he might be cured by an operation. He had been previously led to believe that he was suffering from a stricture.

In October I saw his death in the obituary column of the *Times*, and a few days later I learnt from his friend that the operation had been performed by a London surgeon, and that he had died two days after the removal of the pouch, of suppression of urine.

I called on the surgeon who had operated, as I was exceedingly anxious to know whether the diagnosis was correct. He was so kind as to show me the pouch, which was precisely similar to those which I have removed. He also told me that it had been found in exactly the same situation, and that the operation had been practised in precisely the same manner as I have described.

CASE VI.—A gentleman, aged 57, staying in London, was brought to me by his doctor, Dr. Edward F. Cushing (Cleveland, Ohio) for my opinion on the desirability of removing a pressure pouch from his oesophagus on July 15th, 1897. In the year 1891 he began to experience annoyance from the return of fragments of food from time to time. The difficulty had slowly grown greater, but he had not become thinner, and his health was excellent. He was able to demonstrate the existence of a pouch in the usual place with ease, for he was a very intelligent man, and had studied the whole subject of oesophageal pouches with great attention. He could press water which he had just swallowed out of the pouch, or, rather, empty it out by leaning forwards; could pass an instrument into the pouch (a distance of about nine inches from the teeth) and could press solid materials out of the pouch. But there was no obvious bulging of the neck after swallowing.

I believe this gentleman has made up his mind to have the pouch removed, if he has not already undergone the operation.

It thus appears that I have seen six patients suffering from the symptoms of pressure pouch of the oesophagus. I have myself removed the pouch in two of the cases, and have seen the pouch which was removed in a third case, so that the diagnosis in three of the cases is beyond question. The symptoms in the other three cases are so decided that I cannot for a moment doubt that the patients are suffering from the same condition. Such an extraordinary experience can only be accounted for in one of two ways. Either chance must have been strangely disposed towards me, or pressure pouches of the oesophagus cannot be so rare as they have been supposed to be. While I quite admit that I may have been unusually fortunate, I cannot but believe that the rarity of the condition has been greatly exaggerated, and for this reason: The symptoms of the pouch are not generally known, and are usually mistaken for those of a yet rarer condition—pouching of the oesophagus above a stricture, whether innocent or malignant. Both in Whitehead's¹ and in Chavasse's² cases, gastrostomy was performed under the impression that the patient was suffering from stricture of the oesophagus, and the real nature of the condition was only discovered after the death of the patients. In four out of the

six patients I have seen, many medical men had been consulted, but no one had suggested the possibility of a pouch, and one patient had been treated by a throat specialist for stricture of the oesophagus. Indeed it seems to me that these pouches have been so long regarded as the rarest of pathological curiosities, that we have not taken them seriously as possibilities of practice, and their symptoms therefore have not been studied as they deserve to be. In this belief I am publishing this paper, and will set down the typical symptoms as briefly as possible in the hope of drawing attention to the subject.

But, first, let me say that the true pressure pouch of the oesophagus is practically always situated at the back of the junction of the pharynx with the oesophagus, and that it opens into the gullet by a longitudinal opening in the middle line, about an inch in length. It has been noticed

Fig. 2.

more frequently in males than females. All my own patients were men, and the youngest of them was more than 45 years old; while in every one of them the symptoms of the pouch were first noticed after 40 years of age.

RETURN OF FRAGMENTS OF UNDIGESTED FOOD is the one constant symptom in every case; not immediately after the food has been taken, but many hours afterwards. In more than one case the fragments which came up were at once recognised by the patient as portions of food taken several meals previously. For instance, one patient told me that he had coughed up a fragment of fish which he had taken several days previously, and he was quite sure of this, for he had not taken any fish since. The fragments may be coughed, or choked up, and sometimes liquids taken at night will run out and make the patient cough, when he changes his posture, during the night.

PRESSURE ON THE SIDE OF THE NECK in the posterior triangle (usually on the left side) causes fragments and liquid to return into the mouth: and, if not, yet causes the escape of gas, which is developed and collects in the pouch, and occasions much annoyance by gurgling up at frequent intervals during movement of the head and neck. If the pouch produces bulging in the posterior triangle about the level of or below the cricoid cartilage, this is a very im-

portant symptom, but the absence of bulging does not in the least affect the diagnosis.

A BOUGIE is arrested at a distance of about nine inches from the teeth. It may, perchance, pass into the stomach, gliding over the orifice of the pouch. But the rule is, that it passes into the pouch; and, as the affection becomes more pronounced, it may be impossible to pass an instrument down the oesophagus. If the bougie be of metal and slightly curved, its end may be made to project, so that it can be felt and seen, in the side of the neck (always almost left side) behind the sterno-mastoid muscle.

WASTING AND LOSS OF WEIGHT are rarely, if ever, observed until the late stages of the disease. In fact, the patient may suffer from unmistakeable symptoms of a pouch for years without any sensible loss of weight. Of course, in those cases in which the condition is gradually producing death by starvation, wasting slowly occurs during the last months or years.

The course of the disease is, in every case which I have seen or read of, very slow. The symptoms had been noticed for several years in five of the six cases before I was consulted. In the remaining case, the trouble had existed only for a year. Naturally, I am now wondering whether I could readily make the diagnosis of pouch if I were consulted within a few weeks or months of the first appearance of the symptoms.

I do not know how many cases of oesophageal pouch have been treated by removal of the pouch, but I know that von Bergmann operated on one case, Billroth on one case, Kocher (Bern) on two cases, Bayer (Prague) on one case, Mixter (United States) on one case, while I have operated on two cases, and one more case has been operated on in London. Only one of the operations proved fatal, and from an unexpected cause—suppression of urine. The relief afforded in all cases has been, so far as I am aware, complete and permanent. The patients have been relieved of distressing symptoms, and of the fear of death from slow starvation, which has occurred in a considerable proportion of the recorded cases. Before the operation is performed, while the patient is under the influence of an anæsthetic, it is desirable to pass a curved metal instrument into the pouch from the mouth, and to make its end appear in the posterior triangle of the neck, which affords the clearest proof of the existence of a true pressure pouch. And, if possible, to pass a large bougie past the orifice of the pouch into the stomach, to prove that there is no stricture of the oesophagus.

REFERENCES.

¹ *Lancet*, 1891, vol 1 January 3rd. ² *Path. Trans.*, vol. xlii, 82, 1891

ROENTGEN RAYS AND LOCALISATION.

AN APPARATUS FOR EXACT MEASUREMENT AND LOCALISATION BY MEANS OF ROENTGEN RAYS.

By JAMES MACKENZIE DAVIDSON, M.B., C.M. ABERD. London.

THE Roentgen rays in many of their applications are now great facts in surgical practice. However much they may find acceptance in other directions and in other fields their place there is secure, and must become more and more important. As their practical value was first realised in surgical practice, so because of their usefulness and their supplying what was long needed, it is not too much to say that it must grow. Any simple method by which their application may be rendered easier, and their scope wider and more certain is thus of the utmost practical value, and this must be my excuse in inviting attention to a simple method of localisation which will enable the surgeon to find a foreign body with precision.

It is not enough for the surgeon to have a fine photograph or skiagraph of the part of the human frame showing the presence of a foreign body. He wants more than that to enable him to operate with complete confidence. He wishes to know the size of the object and its position and depth from the skin at any point he may select. The extended use of the x rays has led to an increasing need for some simple method of localisation which can be at once readily carried

out, and at the same time be reliable. The method I have devised I believe is of this character and I have had an apparatus constructed which fulfils these requirements. It was, of course, obvious from the first that taking a skiagraph from two or more points of view was the necessary starting point to any method of localisation. But the question was how the resulting photographs were to be dealt with to give the desired information as to the precise position of the foreign body. This remained a difficulty except to the comparatively few who were sufficiently familiar with geometrical drawing and mathematics.

Taking stereoscopic skiagraphs is a beautiful method, but it is somewhat difficult and tedious to carry out, and while giving a picture in relief, yet the relations of the parts are only relative and not precise enough for practical guidance in a surgical operation. Besides stereoscopic skiagraphs are only useful to those who possess binocular vision. My method is as follows: I take two skiagraphs from two different points of view. In order to carry out the adjustment and movement of the Crookes's tube I use a horizontal bar with a scale upon the front of it graduated in millimetres with 0° at the middle point of the bar (Fig. 1). This bar slides up

Fig. 1.—Showing the apparatus in position.

and down upon the two brass rods which rest upon the floor, each with a base similar to those in standard lamps. Further the bar can be readily detached at one end and opened like a gate so that a patient might conveniently lie under it to be photographed. There is a small holder for the Crookes's tube which slides horizontally along the bar, and there are two sliding checks, which can be fixed by means of a small screw at any desired points on the scale, thus enabling the tube to be quickly and accurately moved from position on one side of 0° to a corresponding point on the other side.

In case it is desired to adjust the Crookes's tube to any particular height, there is a small bar which slides vertically up and down and carries the tube with it and acts as a fine adjustment; a small thumb screw clamps it. There is a small spirit level fixed on the top of the carrier of the Crookes's tube. As far as this part of the apparatus is concerned, it is simply a convenient method of enabling the tube to be displaced in taking the skiagraphs, and somewhat similar arrangements have been in use by other workers.

I shall now describe the method of taking the skiagraphs. In the first place, it is important to note that the kathodal rays in a Crookes's tube (with a proper vacuum) give rise to the Roentgen rays at the point where they first strike solid matter. Fig. 2 illustrates in a diagrammatic way what takes place in the tube. The kathodal rays converge to a point, and then, strange to say, go on in a perfectly straight line and strike the anode at the point x . It is at this point that the Roentgen rays originate. The position of this point is ascertained by observing the spot which begins to get red hot on the platinum anode. This, then, is the point we have to deal with. It is the point from which all the x rays diverge in straight lines into space; just as with a candle, instead of a Crookes's tube, in studying the shadows produced we would have to know that the light rays come from the flame, and it alone.