am inclined to think that in the majority of such cases as he described the prime cause was not to be found in the contracted chest, but in the heart itself. A valve simply diminished in size is sometimes met with, but according to my own experience this is very rare, the contraction being usually accompanied by some indication of a previous inflammatory process. It is a curious fact that in very many cases there is a corresponding narrowing of the tricuspid valve. This might appear to prove that an endocarditis had undoubtedly at one time been present, although on the theory of adaptation the narrowing of the two valves at the same time would not be so remarkable. Two or three years ago Dr. B. Fenwick brought before the Pathological Society a large number of cases of stenosis of the tricuspid valve, and in nearly all of them the mitral was similarly contracted. The fact is one of great interest as showing the relation between the orifices of the two sides of the heart, for even if a rheumatic endocarditis had been the starting-point for the change, I cannot but think the determination of the size given to the softened and contracting valve was fixed by and was a measure of the amount of blood passing through it. Now since stenosis of the mitral is only occasionally accompanied by a corresponding narrowing of the tricuspid, but a contraction of the tricuspid is nearly always associated with a similar condition of the mitral, it may be fairly argued that the one is dependent on the other. The explanation appears easy, since in most instances of stenosis of the mitral the blood is thrown back on the lungs and right side of the heart, so that the latter becomes large and the orifices retain their natural size; whereas in primary obstruction of the tricuspid, which allows only a small quantity of blood to pass into the right ventricle and lungs, a diminished supply is sent to the left heart, and in this way its cavities, with its orifices, would become reduced in size. If this is possible, there seems no reason why a primary cause in the lungs which diminishes the amount of blood circulating in them should not produce the same effect, and by such an argument we see a justification of Dr. Barlow's theory. I might here remark that my experience accords with that of Dr. Fenwick, that in nearly all such cases of narrowing of the auriculo-ventricular valves, and more especially when it occurs on the right side, the subjects are women.

The object of the present communication is to draw more particular attention to the fact that if mitral contraction occur at a very early period of life, whether as a primary affection or secondary to a corresponding narrowing of the tricuspid, other parts of the circulatory system become accommodated to it, and that the patient may reach adult life before the narrowing shall have produced any symptoms; or, as sometimes happens, such contraction may be found accidentally after death without a history of any cardiac symptoms whatever. I saw lately a lady of forty-five years of age, suffering from cardiac dropsy, who informed me that a mitral bruit was known to exist as long as she could remember; and she had grown up conscious of it as part of her being. In various ways the effects of heart-disease are different as occurring in the growing child and adult. After a marked endocarditis in the child, resulting in thickening and narrowing of the mitral valve, there may be observed great enlargement of the left auricle, with hypertrophy of the right side, becoming sometimes so great as to cause bulging of the chest. In these cases the pulmonary artery partakes of the hypertrophy of the ventricle, and is often found thicker than the aorta. Many years ago, when demonstrating this condition, I used to teach that in all probability the second sound of the heart was produced more by the pulmonary than by the aortic sigmoid valves, and this was before I became aware of the clinical fact pointed out by Skoda that the second sound was more accentuated over the pulmonary orifice in mitral disease. But in cases where there has been no history of endocarditis, although it probably might at one time have been present, where the valves have become contracted without much thickening, and therefore retained their efficiency, these secondary effects do not and need not occur. It is evident that the whole of the blood of the body coming back to the lungs and then passing again to the left side, is measured by the size of the mitral orifice. If this be small, the blood passing through it is diminished in quantity, and it becomes a gauge of the reduced circulation. The left ventricle is therefore small, and the whole heart correspondingly diminished in size. The lungs are small as well as the chest, and the respiratory process correspondingly lowered, and with this probably the whole body is impoverished; at all

events, the organism is working with a diminished amount of blood. I admit that these simple cases of narrowing are exceptional, for most frequently with the contraction there is some thickening which in course of years manifests itself by symptoms denoting an imperfection of the valve.

It is, however, the exceptional cases to which I wish to draw attention, those in which the mitral orifice, when narrowed, acts first by producing a diminished stream of blood, the amount in the system being measured by the small mitral orifice, and then, as before said, by a shrinking of other parts of the circulatory system. During the present year I have seen two such cases on the post-mortem table. One was that of a woman of middle age who had died of some long-standing disease of the brain. In her body was found a very small mitral aperture, admitting only the point of the finger, but having its edges pliable and in every way efficient as a valve. The ventricle was very small and the whole heart was diminished in size, proving that no obstruction or regurgitation had occurred at the mitral orifice. The lungs were not indurated, nor did they show in any way the congestive conditions so well known in heart disease where the blood has been impeded in its course, nor did the other organs display any indications whatever of analogous congestive processes. A very intelligent student expressed his surprise at the absence of the well-recognised conditions usually met with in obstructive mitral and other valvular diseases, and that there was not the slightest appearance in the body suggestive of stenosis of the valves of the heart. My answer to him was that there was no disease; the mitral orifice was smaller than natural, but an effective valve. The contraction had no doubt occurred at an early period of life, and so reduced the amount of blood, of which it was the gauge; that the whole heart became in consequence reduced in size, and an entirely new state of things set up. This condition is very different from what occurs when a person is full grown and becomes the subject of a stenosed mitral valve, but even then the prolongation of life is due probably in some measure to the reduced amount of blood in the system. This probably was the case in the example of the woman with dropsy before mentioned, who reached middle age before the condition arising in infancy produced any marked results. The fact is well known to all careful observers that a mitral bruit may exist for a great many years without the presence of any marked symptoms, and in such cases it is rightly said that the hypertrophy of the left auricle and enlargement of the right side compensate for the obstruction. This is no doubt true; but I wish also to show in this communication that in some cases the narrow mitral orifice cannot be looked upon in the light of disease; it has so modified the circulation in amount and caused all other parts of the system to conform to it, that a fair amount of health has existed during a lifetime. In such cases, in all probability, no bruit has existed, but merely an imperfect first sound.

CASE OF EXTRACTION OF THE BLADE OF A TOOTH- FORCEPS FROM THE RIGHT BRONCHUS.¹

By SIR WILLIAM MAC CORMAC.

PRISCILLA C—, aged twenty-four, a domestic servant residing at Barnstaple, was admitted on Nov. 23rd, 1885, into St. Thomas's Hospital, under the care of Sir William Mac Cormac. Seven weeks ago she determined to have several roots and teeth extracted previous to getting a new set of teeth. For this purpose chloroform was administered by Mr. Henry Jackson, of Barnstaple, on Oct. 13th, while she lay semi-recumbent upon a couch, the head being raised by pillows. Mr. Sanders, also of Barnstaple, extracted in succession the lower right wisdom tooth, five molar roots, one bicuspid root, and the upper right wisdom and upper right second molar teeth, ten pieces in all. A bicuspid forceps, one of Evrard's,² was then applied to the right upper second bicuspid tooth. Three outward and inward movements failed to shake the tooth, and the instrument

¹ From notes by Mr. W. F. Brook, dresser.

² Several dental surgeons who have seen the forceps are disposed to doubt that Evrard was the real maker, and from certain small differences in the forceps believe them to be a spurious imitation.

slipped slightly over the crown. It was readjusted, and again three times a lateral movement applied, always with downward pressure, when suddenly the palatine blade of the forceps broke short off at the thickest part of the shoulder-joint. At the same moment the patient made two or three deep inspirations, and on looking immediately into the mouth the bicuspid tooth was seen to be intact, while the broken portion of the instrument had disappeared. (Fig. 1.) It had passed through the glottis into the wind-

FIG. 1.

Bicuspid tooth forceps and portion broken off.

pipe. A violent fit of spasmodic coughing immediately took place. The patient became livid and much distressed. On regaining consciousness she experienced intense dyspnoea, and complained of severe pain in the chest, more especially about one inch from the sternum and

between the third and fourth ribs. Several unsuccessful attempts were made, by inverting the patient and shaking her, to remove the piece of steel. An emetic was also given. Since the accident the patient has remained in bed, suffering from fits of coughing, accompanied by a good deal of pain, and thick, yellowish expectoration, occasionally streaked with blood. On two or three occasions she believes she distinctly felt the foreign body move, and the sputum afterwards contained blood. Once a small clot of blood was brought up. Three weeks ago she attempted to move about a little, but the pain and other symptoms became much worse, and she had to return to bed. The cough and dyspnoea have always been worse after any movement.

On admission, the patient complained of distressing spasmodic cough, pain in the right breast, especially after coughing, radiating to the right shoulder, down to the elbow, and up the right side of the neck; much dyspnoea, especially after coughing. Respiration is accompanied by general rhonchi. A rough, harsh, whistling sound can be heard both with expiration and inspiration, and this most distinctly over the right second intercostal space, just outside the sternum, and posteriorly on the right side on a level with the spine of the scapula. Râles are to be heard over the rest of the right lung; the left is comparatively free. Both sides of the chest move freely and there is no dulness.

Nov. 24th.—The patient woke up last night with an attack of dyspnoea, which lasted about ten minutes. There was no cyanosis. The expectoration is not abundant.

25th.—The patient has been much troubled with cough, which keeps her awake at night. She thinks the pain gets worse and the shoulder more painful. From the history and the tolerably clear evidence afforded on auscultation, Sir William Mac Cormac concluded that the broken blade of the tooth forceps was probably lodged in the right bronchus, and that there was no chance of its spontaneous evacuation. The plan of treatment decided upon was first to open the trachea very freely, and then to try to extract the piece of steel with forceps, the chief difficulty expected being that it would probably be found embedded in the wall of the tube, and from its smooth surface, with little to catch upon, would be difficult, perhaps impossible, to extract. A pair of strong polypus-forceps, slightly bent laterally near the extremity, was selected, as most likely to hold, being chosen from a number of others by trying which of them would hold best on a tooth-forceps blade.

Nov. 26th.—The patient being under chloroform, Sir Wm. Mac Cormac performed tracheotomy. The shoulders were well raised, and the head thrown back and steadied by an assistant. The incision through the skin extended from the cricoid cartilage nearly to the notch of the sternum and

was about three inches and a quarter long. On dividing the skin and fascia, two large anterior jugular veins were seen. Cutting between these, the fascia stretching between the sterno-hyoid muscles was recognised and divided, and these muscles separated. The sterno-thyroid muscles were also pulled aside. There was but little difficulty in exposing the trachea below the thyroid body. Above the isthmus there were many veins, some of which bled when attempting to divide transversely the fascia from the upper margin

FIG. 2.

Diagram of the relations of the trachea in an adult female, half natural size, with the foreign body in the right bronchus, where it was believed to have become impacted.

of the thyroid. The trachea, therefore, was cleared in the lower part, and in order to give ample room it was decided to divide the thyroid isthmus. This was done by passing an aneurysm-needle, carrying a double silk thread, from below upwards, tying the tissue of the gland on each side and dividing between. It would have been otherwise impossible to manipulate the forceps, as was afterwards done. The isthmus of the thyroid was large, and covered three or four rings. As soon as it was divided the trachea became thoroughly exposed and accessible throughout its cervical portion. There was very little bleeding; several large veins had been seen and avoided, others clamped before division, and the wound was practically dry. A central incision was now made into the trachea from below upwards, an inch and a half long. Violent spasmodic coughing immediately ensued, but this failed to dislodge the forceps blade. A loop of silk thread having been introduced on each side into the margins of the tracheal incision, they could be widely drawn apart; the superficial soft parts were held aside by retractors, and it was possible to see some distance down the tube. The pair of forceps previously selected were then passed down the trachea; at first the blades were kept shut, and the instrument was used as a searcher. The septum at the bifurcation could be distinctly recognised, and the instrument passed on into the left bronchus, which felt empty. By reason of its curved extremity the forceps could be also readily passed into the right bronchus, and there it seemed to strike against the foreign body. At first the sensation was not distinct, the blade of the tooth-forceps being, it was believed, more or less buried in the wall of the bronchus, granulations having probably formed around it. Attempts to grasp it at this stage failed. A gunshot probe was introduced, and a metallic sound became audible to the bystanders, the body being struck about four inches below the wound. A series of unsuccessful attempts to extract the forceps blade was

now made with every instrument available. It was seized by the forceps several times, but each time slipped out of their grasp, and this was evident both by sound and sight to those present. The blade could each time be reached at the same place; it did not change its position. Its proximal extremity was, so far as one could judge, an inch and a half below the bifurcation, in the right bronchus or one of its primary subdivisions, and, as previously mentioned, quite four inches below the lower extremity of the tracheal opening. (See Fig. 2.) There could be no doubt whatever as to the exact position of the body, for it was felt again and again, and the forceps introduced to extract it slipped again and again from its smooth surface. A piece of fine drainage-tube was slipped over one blade, in hopes that a better hold might be obtained on the piece of steel; but this failed. The patient had been placed in an almost inverted position, so that if loosened the piece of steel might fall towards the opening in the trachea. She was also well shaken, but without result. A wire loop was passed, in the hope of getting beyond and dislodging it, but this plan likewise failed, and the forceps were again resorted to. Urethral forceps and others were used, but with the same result as before, until the pair of polypus-forceps first selected were again introduced. This time they fortunately retained their hold, and the piece of steel was at length successfully withdrawn. The blades had grasped the narrow claw of the tooth-forceps; the larger end had probably lodged in the subdivision of the bronchus. The broken portion of forceps is shown in Fig. 1. It is about an inch long, with sharp margins and very irregular form. The weight is sixty-three grains. The position it was believed to occupy is indicated in Fig. 2.

Some trifling bleeding took place from the interior of the air-passage. It was decided, however, to close the wound. The loops of silk thread were withdrawn and the edges of the trachea brought accurately together by silk sutures; two drainage-tubes were put into the external wound, and the latter closed by four silk sutures and dressed with iodoform and iodoform gauze. All this time—about an hour and a half—the patient was kept partially under the influence of chloroform administered through the tracheal opening by a tube. She was conscious enough, however, to murmur thanks the moment the blade was extracted. When the patient was taken back to the ward a steam kettle containing water and some eucalyptus oil was placed at the head of the bed, which was screened off.

27th.—The patient had little sleep until early this morning, when a hypodermic injection of one-third of a grain of morphia was administered. When she coughs she complains of much pain and soreness in the right side of the chest, especially just above the level of the right nipple. She has coughed up a little blood and mucus. The wound was dressed, and presented a healthy appearance. At first air passed through it when the patient coughed; very little appears to pass now, and there is no emphysema of the neck. The tongue is clean; the pulse 112. Temperature at 8 A.M., 100° 8'; respiration 20. She has a tranquil appearance; no anxiety or respiratory distress.

28th.—The patient slept well after two morphia injections, one at 4 P.M., the other at 10.30 P.M. She still complains of great soreness in the chest and right shoulder, especially on swallowing or coughing. There is no impairment of resonance over either lung; no difficult respiration, but scattered rhonchi are audible over both lungs, and moist sounds at the base of the right. There is but little cough; the expectoration is muco-purulent, and scarcely stained with blood. The temperature at 8 A.M. was 100° 2'; pulse 112; respiration 21. The wound is looking healthy, but is gaping a little between the sutures below, and some air escapes through it. There is no emphysema.

Dec. 3rd.—The sutures were removed, and the upper part of the wound supported with strips of adhesive plaster.

5th.—Temperature, pulse, and respiration are reported normal. Expectoration very slight, with the merest trace of blood-staining. She feels well, and the wound is healing satisfactorily. Some air still escapes from its lower end, but there never has been any other trouble.

Very soon after the 11th, the wound was reported completely healed, save a very small opening below, through which a little air escaped. The patient seemed quite well.

The history of the case may be summed up very briefly. Except at the lower part the wound soon healed; here for a short time some air passed in and out, but by the middle of December the wound had all but closed, a slight amount

of air gaining exit only on the patient coughing forcibly. The pain and other chest symptoms gradually and steadily abated, and had completely disappeared by December 10th.

Dec. 24th.—The patient may now be pronounced quite convalescent. The wound is perfectly closed, the cicatrix being linear. She has been up and about for the last week, and is enjoying her usual health. The chest sounds are normal. She says she feels perfectly well; her appetite is good; she sleeps soundly; and, in short, is in no respect different from what she was before the operation. Discharged.

Remarks.—This interesting case affords another example of the greater relative frequency with which foreign bodies in the air-passages find their way into the right bronchus. So far as I can learn, the accident here related is absolutely unique. Teeth have passed into the trachea, and tooth-forceps have broken many times before now, but the broken portion has fortunately not been inspired. The forceps in question has the imprint, at all events, of one of the very best makers. In this case the nature of the foreign body, its size, and pretty surely its exact position, were all known beforehand. This is very often otherwise in the case of foreign bodies supposed to be in the air-passages; the history is generally imperfect, the symptoms frequently obscure, or at times they may be altogether absent, so as to render the presence or absence of the foreign body doubtful. Yet, with all the knowledge we in this instance possessed, the extraction of the blade was only accomplished with the greatest difficulty. In an analysis of 1000 cases of foreign bodies in the air-passages, published in Vol. I. of the Transactions of the American Surgical Association, Dr. Weist states that "when the foreign body is impacted in one of the bronchi the chances of expulsion at the time of operation are small, and attempts at extraction by instruments generally end in failure." The measures at first employed in this case—inversion and emetics—cannot be regarded as free from the most serious risk of sudden death, unless the surgeon is prepared at once to perform tracheotomy; indeed, I consider tracheotomy should always be first performed before either is resorted to. Probably the body was in this case firmly impacted from the first, as it certainly was when attempted to extract it. The only means, I think, untried was a magnet, and that, although thought of, could not be obtained. I do not know of any other method more likely to succeed than by means of a forceps such as I first thought of, which ultimately proved successful. To this and the free opening of the trachea are due the credit of success. It is fortunate that so sharp and angular a body had not produced more serious ulceration. The air-passages bore the prolonged manipulation well, and the reaction afterwards was moderate, being limited to some localised broncho-pneumonia, that soon passed off. There was no hæmorrhage of any importance. The patient was kept under the influence of chloroform throughout, by a tube introduced from time to time through the opening in the trachea.

The drawing of the trachea and its relations is from the hand of my colleague, Mr. Anderson. It represents an average female trachea, half the natural size, and the position the body was believed to be in. The septum of bifurcation is from half an inch to three-quarters higher inside than it shows outside, so that the body is really much further from the bifurcation than the drawing apparently indicates. From the position it occupied between the blades of the forceps after extraction, it must, I think, have lain in the bronchus as it is represented in the figure, and its larger extremity had doubtless passed some distance into the principal subdivision of the bronchus, which is practically a continuation of the main tube.

Harley-street, W.

PATHOLOGICAL SOCIETY.—The following is the list of Officers and Council proposed for election for the year 1886:—President: Dr. Bristowe. Vice-Presidents: Dr. Charlton Bastian, Dr. Cayley, Dr. T. H. Green, Dr. George Johnson, Mr. Marrant Baker, Mr. Hulke, Mr. Sydney Jones, Mr. T. P. Pick. Treasurer: Mr. John Wood. Honorary Secretaries: Dr. Coupland, Mr. Butlin. Council: Dr. Carrington, Dr. Finlay, Dr. Goodhart, Dr. Hadden, Dr. Longhurst, Dr. Norman Moore, Dr. Semon, Dr. Seymour Sharkey, Dr. Charleswood Turner, Dr. Samuel West, Mr. Arthur E. J. Barker, Mr. Bowlby, Mr. Watson Cheyne, Mr. Henry Hugh Clutton, Mr. Frederic S. Eve, Mr. Golding-Bird, Mr. John Hammond Morgan, Mr. Henry Morris, Mr. Samuel G. Shattock, and Mr. Charters Symonds.