Case XII. Aneurism of the left middle cerebral artery; absence of atheroma in the arteries at the base of the brain; epileptic seizures.

Case XIII. Aneurism of the descending aorta bursting into the left pleura.

Of these aneurisms, nine were situated in the thoracic cavity; and the third case is the most interesting of all. Here two aneurismal pouches were connected with the heart itself; one occupying the ventricular septum, the other the upper part of the right ventricle. The rapid progress made by the disease is not the least remarkable feature in this case. The man during the latter part of 1854, and the first week or two of 1855, had been in the Hospital with bronchitis and renal dropsy. His chest was then frequently examined, but auscultation discovered nothing beyond the bronchitis. In March, he again made his appearance, and then a murmur was heard both at the base and apex of the heart, which must have been caused by damage done to the right cavities of this organ. One of the pulmonary semilunar valve-flaps was destroyed, and the calibre of the pulmonary artery was exceedingly diminished by projection of the aneurismal pouch. The right auriculo-ventricular opening was very large, allowing of a regurgitant tricuspid murmur. Although renal dropsy was present, yet, owing to pressure on the superior cava, anasarca was most marked over the chest, neck, and arms.

In Case I, violent impulse at the upper part of the sternum, slight projection of the bone here, cough, and voice sounds indicative of tracheal obstruction, and gradually augmented orthopnoea, pointed to the affection. There was no *bruit* heard at any time over the seat of pulsation, nor was there ever any marked swelling at the root of the neck. This patient had strained himself lifting heavy loads of stone two years and a half before he sought advice.

In Case II we had only orthopnoea and pain between the scapulae to guide us, until about twelve hours before the man's death, when a swelling appeared at the root of the neck, and led to a conjecture of aneurism on the part of those who remembered the previous case.

The fourth case was a clear and straightforward one; a large prominence to the right of the upper part of the sternum; aneurismal *bruit* there, and also above the spine of the right scapula; pain and numbness in the right shoulder and arm, and occasional numbness of the fingers. From the pain in the shoulder and the pulsation of the right carotid, I am inclined to look upon this case as one where the sac encroached upon the origin of the innominate, or as one of aneurism of that artery itself. This symptom of pain in the shoulder and arm, as helping to correct diagnosis, receives confirmation from the fifth case, where the numbness, etc., was very marked long before the aneurism was as large as the pulsating swelling in the case we have been considering. At last, however, it was of prodigious size, and filled up the angle between the neck and shoulder. Here there was a systolic murmur all along. Below the clavicle and between the right scapula and spine a double murmur was heard; but as a full and complete *post mortem* examination could not be made, any attempt to explain these sounds would only be futile. The only way in which the tumour itself could have conduced to their production would have been by downward pressure of the mass on the right pulmonary artery, narrowing its passage; for this intra-thoracic sound was heard far more plainly when the patient was examined sitting or standing up than when in the prone position. The variability of the spots in which, even in well localised thoracic aneurism, murmurs may be heard, is well shown in Case VI. Systolic *bruit* was heard at first over a slight swelling to the right of the sternum, above the right clavicle, and at the inferior angle of the right scapula. Four months later, the swelling having greatly increased in size, a short, sharp diastolic click was heard over the middle of both scapulae; whilst the former systolic *bruit* had, in a great measure, vanished. Five days before death it was again heard, loud and clear. Numbness of the right arm and dilatation of the right pupil, were symptoms also worthy of note in this case. The patient was under observation a long time, and at one period hopes were entertained that the treatment might prove of permanent benefit. The progress of the tumour was from below upwards. The third rib, and part of the sternum corresponding to it, had been eaten away to a much greater extent than the bones above them.

Case VII is interesting on account of its accompanying symptoms: pain in the right side, with dullness on percussion; dyspnoea, egophony at one period, and then increase in the measurement of the affected side. There was a systolic mur-

mur at the apex (?) of the heart, but after death, all the valves were found healthy. As there was a small aneurismal sac above one of the aortic valve flaps, and another at the root of the coronary artery, the murmur most likely arose here, and the heart being pushed unduly towards the left side, a mistake was made in localising the respective sounds.

In the eighth case, where the man was brought in dead, the sac was partially empty, and contained no laminated coagula.

Case XIII does not call for much notice. It is one of those where the aneurism makes rapid progress generally, or, supposing its course to be slower, does not interfere with the action of the various organs. The man had only complained of chest symptoms a fortnight; and profuse hæmoptysis, from rupture of the sac, at once caused death.

In case IX, pain was felt in the back for eighteen months before the patient took to his bed. This large aneurism was unaccompanied by *bruit*. Although there was so much displacement of the vena cava inferior, oedema did not come on until just before death, and then only over the loins; but the kidneys had been acting abundantly throughout, and at one time diabetes was suspected. The specific gravity of the urine was 1016; the albumen appeared owing to simple congestion of the kidneys.

I do not see how it was possible to pronounce upon Case X during life. Whatever pulsation had manifested itself (and there was none) would have been attributed to aneurism of the abdominal aorta.

Case XI is one of the few in which any trace of tubercle in the lung has been found, in St. George's Hospital, to accompany aneurism. No murmur accompanied the pulsating tumour on the front of the chest.

Case XIII shows a very rare form of tumour, giving rise to epilepsy. The middle cerebral artery is of considerable size; some of its branches, passing through the anterior perforated space, supply important parts of the brain; and any irregularity of the circulation here might produce more strongly marked symptoms than would arise from disease of other parts of the circle of Willis. Cases like the above, where no atheroma of the arteries at the base of the brain exists, are of very rare occurrence.

Of the two cases recorded in last week's JOURNAL from King's College Hospital, the woman's, from the similarity of symptoms to one of those in the above summary, may possibly have been aneurism of the innominate artery. The pulmonary sounds, however, were indicative of more or less pressure on both bronchial trunks. Straining or lifting heavy weights seems to have caused the pain in the chest which first drew the attention of the man to his symptoms; and herein the history resembles that of Case I in the summary. There was also the same orthopnoea and congestion of the face after coughing, but not such marked tracheal obstruction.

Original Communications.

ON DISEASES OF JOINTS.

By HOLMES COOTE, Esq., F.R.C.S., Assistant-Surgeon to St. Bartholomew's Hospital, and to the Royal Orthopædic Hospital, etc.

V. EXTENSION OF THE CONTRACTED KNEE-JOINT.

THIS subject requires special consideration, in as much as the knee-joint differs from that of the elbow, and indeed of other large articulations, in the readiness with which partial dislocations occur in every form of severe disease. It follows that when parts have got into a quiet state, so that attempts may be made to bring the limb straight, two distinct objects have to be attained; viz.,

1. The elongation, or rupture, of those structures which hold the bones in their abnormal position.
2. The readjustment of the bones to their proper bearing; in other words, the reduction of the luxation.

Let us first inquire into the condition of a limb in which the knee-joint has long been the seat of disease. In almost every case the tibia and fibula are drawn backwards by the hamstring muscles, with a strong direction outwards, due to the preponderating action of the biceps flexor cruris, the tendon of which is usually much more tense than those of the inner hamstring

muscles. Upon the removal of the integument from such a limb, we find the tendons of natural colour and appearance, but the muscles pale, and adherent to surrounding parts, or imbedded in a quantity of effused fibrine or serum. The internal lateral ligament is usually softened, spread out, and much changed from its natural structure; the external lateral ligament is softened and elongated, but entire. The anterior crucial ligament (which extends from the outer condyle of the femur obliquely inwards to the tibia, and has for its function to control or limit the rotation of the leg outwards in the flexed position) is usually very much softened and elongated, but entire; in other cases it has given way. The posterior crucial ligament is less subject to change. The synovial membrane, after passing through its period of thickening, becomes absorbed, not uncommonly contracting adhesions so as to subdivide the articular cavity into several compartments; the semilunar cartilages undergo early, and often complete, absorption. The absorption of articular cartilage is generally universal; the surfaces of bone between the inner condyle of the femur and articular surface of the tibia are rough and denser than natural; the corresponding surfaces on the outer side of the joint are generally rougher, and it is here, owing to the greater movement which exists as contrasted with the inner condyle, that we may find portions of necrosed bone or deep furrows in the osseous tissue. I have seen the opposed bony surfaces so deeply furrowed as to lock into one another. The bones are often very vascular; but when the joint is in a perfectly quiet state, the osseous tissue is found harder than natural. When from any cause, such as the extreme activity of the disease, or from want of proper treatment, the cancellous texture has been acutely inflamed, there may be an abscess in the head of the bone, or ulceration, or necrosis to a greater or less extent. Those opaque masses sometimes found imbedded in the cancellous texture, and once called "tubercle," are now more properly recognised as inspissated pus.

Ossseous ankylosis is a rare occurrence. The very fine and comprehensive collection of "diseased joints" in the museum at St. Bartholomew's Hospital contains only seven specimens in which osseous ankylosis has taken place in the knee; and of these one is very partial, and four illustrate that occurrence the more commonly seen, namely, union of the patella to the outer condyle of the femur; thus there are few specimens in which the tibia and femur have "grown together by bone."

There are two methods by which we may render straight a contracted knee-joint:

1. By forcible extension.
2. By gradual extension.

With either of these may be combined the subcutaneous section of such tendons or ligamentous bands as interfere with the object in view.

In former times, surgeons looked only to the immediate effects produced by the manipulation as regarded the shape of the limb. We now take into consideration the morbid condition of parts within the joint, and study to obtain those changes which will allow the bones to resume their normal position, bearing in mind that the semiflexed condition of the joint is one which gives the patient ease during the acuter stages of disease. No surgeon in his senses would now forcibly tear through morbid adhesions, and, bringing the contracted limb straight, attempt to keep it so by putting it into an immovable case. He would know, or at least ought to know, that, even if he could keep the limb straight by means of apparatus (a question extremely doubtful), the ends of divided tendons and torn ligamentous bands are held apart, widely separated, and can never again unite so as to serve as supports to the limb. He also is aware that should the apparatus require removal, owing to erysipelas, or any inflammatory disturbance, and the leg again become bent so as to permit of the reunion of the divided and torn structures, the new matter will again contract like any other cicatrix. The violent extension of the knee-joint, combined with the subcutaneous division of tendons and fasciæ, as practised by Dieffenbach and Louvrier, was followed, as is well known, by even fatal results, and, so severe was the pain that I doubt whether other surgeons would have prosecuted the inquiry, had it not been for the discovery and employment of anesthetics. In vol. xl. of the *Transactions of the Royal Medical and Chirurgical Society*, my colleague, Mr. Brodhurst, has suggested a practice, of which the following are the steps. He first subcutaneously divides those tendons likely to interfere with the extending process. When the punctures are healed, namely, from the sixth to the eighth day, the patient is placed under the influence of chloroform, and the adhesions are ruptured by flexing, and again extending the

limb. The limb is then bandaged and put in a trough splint, and subsequently again flexed almost to the same angle as before the operation. In the course of two or three days gradual extension is commenced and continued. Passive motion under chloroform is subsequently practised at intervals of from two to three days. He thus divides the tendons, and tears through the adhesions subcutaneously; then readjusting the divided and torn structures, he allows adhesion to take place, and subsequently extends the soft uniting medium.

Although I think, as probably does Mr. Brodhurst, that this proceeding is unnecessarily severe for the greater number of contracted knees, and is more particularly adapted for those cases where bony ankylosis resists the ordinary extending force, I fully concur with him in his introductory remarks where he says, that "the excision of articular surfaces is at present of so frequent occurrence, and is undertaken not solely as a substitute for amputation, but is performed where amputation would never be thought of, that I beg to call attention to the forcible rupture of ankylosed surfaces in cases where the active disease has subsided." Excision of the bones of the knee has lately been twice performed in London under these circumstances; in both there has been a fatal result.

The gradual extension of a contracted knee, either with or without the subcutaneous division of tendons, combined with the application of force, from time to time, sufficient to rupture any bony union, or more than usually resisting band, appears to me the safer and more effectual proceeding. It has been proved, by long experience at the Orthopædic Hospital, by Mr. Tamplin, that scarcely any structures, however hard, can long resist the action of moderate, yet unremitting force. The firmest bands will yield; and in the case of fibrous cords, this passive elongation is permanent, i. e. there is no fear of re-contractions. The tendons alone require subcutaneous division, for extensions might elongate a muscle, which would become shorter as the force ceased to act.

Another advantage resulting from gradual extension is as follows. By the application of a proper instrument, in which mechanical provision is made not only for flexion and extension, but likewise for abduction, adduction, and rotation, the displaced bony surfaces may be so acted upon as to be directed into their normal relations, and thus to lose their dislocated position.

I affirm that sufficient attention has not yet been paid to the gradual extension of contracted joints, especially as regards the knee. Surgeons seem to me to have wanted patience; to have neglected improvements in surgical apparatus; in former times to have had recourse to amputation with the same premature haste as they now perform excision. I know a patient, at the present moment under the care of my colleague Mr. Tamplin, who came to the Royal Orthopædic Hospital at the age of twenty seven, having had contracted knee for twenty-five years. The leg came down with properly applied and moderately powerful extending force, and the patient, who had never walked without a crutch, has now perfect power of progression. In the *BRITISH MEDICAL JOURNAL*, January 30, I have related the case of a girl in whom, after subcutaneous division of the biceps flexor cruris, I brought down the leg, after fourteen years contraction, by the application of moderate force. In the same number are the particulars of a young girl in whom a limb, once so much contracted that amputation was proposed, is now becoming straight by the same means.

William L., aged 19, is attending, under Mr. Tamplin, as casual out-patient at the Orthopædic Hospital, whither he walks unaided from some distance, having suffered from most severe disease of the knee-joint. Six years ago, the patient stated, there were thirty fistular openings, leading to diseased bone, in and about the knee, and amputation was recommended both in public hospitals and by private practitioners, a measure which was steadily declined. At the present time, the limb is nearly straight, held so [by the usual apparatus; all the openings have healed but two. There is no pain, and the natural health has returned.

We are told in most positive terms that there are certain thickened conditions of the synovial membrane, which are in their nature incurable. I deny the proposition. The thickened membrane will in time be removed, leaving the knee bent and ankylosed. In this condition, at the proper moment, steady extension, without violence, will enable the surgeon, in by far the greater number of cases, to straighten the limb so that it may again be used by the patient as a means of locomotion.

I know that in thus condemning the forcible extension of contracted joints, except in very exceptional instances, I lay myself open to the reply which the numerous cases of re-

ported cures in the public journals afford. In answer, I could speak of forced extension five times repeated, and unavailing at last, but productive of high constitutional derangement; of erysipelas succeeding a similar attempt, and of the rapid recontraction of the limb; of dormant disease roused with such activity, that thoughts of amputation came uppermost in the surgeon's mind. Such dangers cannot be ignored; they perplex and distress the surgeon; and I feel strongly that any plan, which offers some security against their occurrence, is worthy of the support and consideration of the profession.

PLASTIC OPERATION FOR THE RELIEF OF STRUCTURAL CONTRACTION FROM A BURN.

By ALBERT G. WALTER, Surgeon, Pittsburgh, Pennsylvania.

AMONGST the many established surgical operations, there are few which are more gratifying in their results or less hazardous in their consequences, and which yet have contributed more to advance surgery to its present pre-eminence, than plastic operations, and those for the relief of deformities in general; for we find that, in the execution of the various operative proceedings belonging to that department, artistical skill and ingenuity have necessarily become handmaids to the accomplished surgeon.

A narrative of the following case, from the high degree of deformity, the tender age of the patient, the extent of the incisions necessary for remedying the contraction, and its successful result, will not fail to be interesting to the professional reader.

Mary, daughter of Henry Hainz, of Sharpsburg, Alleghany County, Pennsylvania, aged six years, was placed under my care for the relief of a most distressing deformity, resulting from the effects of a severe burn received some eighteen months ago. The following history of the case was given me. In the absence of her mother she was playing before the fire, when her clothes ignited, and before assistance could be had, or the burning garments extinguished, the whole face, fore part of the neck, and breast were deeply burnt. Sloughing ensued, followed by suppuration and slow cicatrisation, which, after a period of six months, was completed. No mechanical means to prevent contraction having been employed, the neck shortened upon itself in front, giving to the face a most unsightly appearance.

When she was brought to me, the front part of the neck was occupied by a firm callous cicatrix, running in bridges from the chin and entire edge of the lower maxilla to the sternum, and so confining the parts, that the distance or space from point of chin to sternum was less than an inch. The head being thus firmly bound down to the sternum, any rotation of the neck was prevented; the angles of the mouth and lower eyelids were drawn down; the lower lip was everted; the mouth constantly open, causing dryness of the fauces during sleep, and continued restlessness. The alveolar process of the incisor teeth had yielded to the constant strain, everting it, and giving the teeth, thickly coated with tartar, an outward direction. Saliva was secreted, profusely wetting and chafing the neck and breasts. As mastication could not be performed, the child had subsisted on milk and other nutritious liquids. Though pale and emaciated, her general health had been good. Having decided on attempting relief by dividing the cicatrix through its whole extent, and on transplantation, on January 12th, 1854, in presence of Drs. Reynolds, Murdoch, and several others, the patient being fully under the influence of chloroform, I made a transverse incision, commencing on one side of the neck a little below the angle of the lower jaw, and carried forward to the other side, terminating at a point opposite to where it was commenced, care being taken that the terminal ends of the incision should be in healthy skin. The cicatrix being thus completely severed, the platysma myoides, being found contracted, was divided to the same extent in the line of the first incision, together with a layer of fatty substance, which was found shortened and thickened by fibrous bands stretching across it; there was very little bleeding, and of a venous character. The sternal portions of both sterno-cleido-mastoid muscles were shortened, and had to be divided. The head now liberated assumed its natural position; the jaws could be closed, though the incisors did not meet. An open wound, five inches in a vertical and seven in a horizontal direction, was left to be filled up by a flap of skin borrowed from the right shoulder and upper arms for this purpose. From the right angle of the wound in the neck the

knife was entered and carried down and forwards in a curve over the shoulder and external surface of the upper arm to near the elbow, thence returning upwards along the posterior face of the arm and shoulder to behind and below the first incision, leaving a pedicle of over three inches as the matrix for subsequent nourishment of the flap. By short and rapid strokes of the knife, the skin circumscribed by these incisions, together with its layer of cellular tissue, was separated from the fascia from below upwards, thus entirely denuding the upper arm and shoulder. The flap was purposely made much larger than the space to be filled up by it required, in order that union by first intention might not be prevented by the inherent power in transplanted skin of contraction upon itself, and which is so likely to occur where the flap is too limited, as well as to allow for any sloughing that might ensue. Notwithstanding the extent of wound, the loss of blood was inconsiderable. All oozing of blood having ceased, the flap, twisted at its pedicle, was placed in its new position in front of the neck, and secured by several interrupted sutures and Carlsbad needles; the spaces between them were carefully brought together by narrow stripes of adhesive plaster, surrounding the neck, and making gentle pressure, approximating the transplanted skin to the bottom of the wound and its edges, thus facilitating the early and free inoculation of the minute blood-vessels, and speedy intervention of that adhesive inflammation, without which a successful result could not be obtained. The wound on the shoulder and arm was treated with warm water dressing; the head was thrown back, and retained in that position by a small bolster placed between the occiput and shoulders, and by a bandage. The patient was placed resting on her back, and compresses wrung out of a warm infusion of camomile flowers were kept upon the front of the neck to aid, by genial warmth, the circulation and vitality of the flap, and promote its adhesion.

To effect this was, during the first day after the operation, exceedingly difficult, from frequent vomitings that ensued, consequent on the inhaled chloroform; and much anxiety for the safety of the flap was occasioned by rather free bleeding from a vein over the trachea which took place, and which would necessarily have prevented adhesion, and been followed by suppuration or sloughing. To avoid this, some of the stitches were cut out, and the coagulated blood removed. All bleeding having been arrested, the flap was again laid down, and confined by stripes of adhesive plaster. No further bleeding after the first twenty-four hours having occurred, and the vomiting having ceased, the condition of the patient became more favourable. Very little fluid nourishment, given in tea-spoonfuls only, was allowed, and every care was taken to guard against speaking; sleep and quietude being secured by sulphate of morphia, in one-sixteenth grain doses at intervals of two or three hours, or as occasion required, to allay the restlessness which not only the wound but the position occasioned. The protracted posture of the patient on her back for some days was very irksome and uncomfortable; the craving for food and drinks was distressingly urgent; reaction was moderate.

On the fourth day after the operation, adhesion having taken place in the greater extent of the wound, six sutures and needles were removed; and over the neck and arm light linseed-meal poultices were substituted for the water-dressings. The adhesions were earlier and firmer on the right side; towards the point of the flap, they were slow in forming, and less firm. A small portion below the skin sloughed, from adhesion failing to take place between that part of the new flap and the old cicatrix. Suppuration, however, eventually closed the wound; the last suture was removed on the tenth day, when the wound had nearly closed. The shoulder and arm duly suppurated and granulated; milk and broth in tea-spoonfuls, given frequently, being the only nourishment allowed.

Two weeks after the operation, the flap was completely adherent, except below the skin, where the part was being filled up by granulation, which, a week later, was completed. The patient was now permitted to change her position; and, owing to the pale and flabby condition of the granulations on the arm and shoulders, and her feeble constitutional powers, wine and solid food were substituted for the liquid diet.

After another week, all functions being normal, and the wound of shoulder healing kindly, she left her bed. Two months later, this too had closed, and the girl was restored to her natural condition; the head was erect and moveable, with well formed neck; her jaws approximated, and the lips were closed; the features were completely freed from that distressing expression which she had presented before.