LECTURES ON CERTAIN DISEASES OF THE JAWS.

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LECTURE III.—DISEASES OF THE TEMPORO-MAXILLARY ARTICULATION AND CLOSURE OF THE JAWS.

THE temporo-maxillary articulation is, like other joints, the subject of inflammation due to constitutional and local causes, to which latter its exposed position would seem to render it particularly liable. Yet it is remarkable that acute disease of the temporo-maxillary joint is hardly recorded, and I think the explanation is to be found in the fact that it is often confounded with acute affections of the ear, and that mischief beginning in the articulation may induce purulent discharge from the meatus in children. No doubt in cases of suppuration of the middle ear the temporo-maxillary articulation may become involved through the floor of the meatus, in which a hiatus often exists in children; but, on the other hand, I have seen cases in which, from disease of the temporo-maxillary joint, perforation had ensued, and the condyle had found its way into the meatus. That destructive disease of this articulation is not very infrequent is evident from the number of museum specimens extant of complete ankylosis, and of the numerous cases of fibrous ankylosis which have been met with in practice.

In his *Practical Observations in Surgery* (1816), Mr. John Howship describes a case of "scrofulous inflammation of the face followed by ankylosis of the jaw" in a man, aged 56, who dated the origin of the disease from a cold taken at the age of 4. The original illustration shows complete bony ankylosis of the lower jaw to the temporal bone on the left side. On the right side the shape of the joint is considerably modified, as may be seen in the specimen in the College of Surgeons' Museum (1949).

In the Museum of University College is another specimen (849), showing an earlier stage of the same condition. The condyle is im-

Fig. 1.

movably united to the corresponding part of the temporal bone, the contiguous surfaces being very irregular but mutually adapted, and separated in part by a thin line of shrunken fibrous tissue. Considerable portions of each of the surfaces have been destroyed, the condyloid part of the jaw is much enlarged in the antero-posterior direction, so as to lie in contact both with the glenoid fossa and the articular eminence in front of it. Also in St. Bartholomew's Hospital Museum is a specimen (I. 664), of which I have been allowed to take a drawing (Fig. 1), showing the results of disease of the right articulation for the lower jaw, a quantity of rough new bone having been formed, from which the condyle appears to have forcibly broken away.

Cases of fibrous ankylosis of the temporo-maxillary articulation, recognised and treated as such during life, have been recorded by several surgeons, but I would especially refer to two published by Mr. Spanton, of Hanley (*Lancet*, April 16th, 1881), because that gentleman proved the correctness of his diagnosis by dividing the fibrous bands with a tenotome passed into the articulation, and then suc-

ceeded in screwing open the month. The patients were girls, aged 10 and 9 respectively, and in both cases the disease of the temporo-maxillary joint had followed scarlet fever.

The only disease of the temporo-maxillary joint hitherto generally recognised by surgical authors, has been the so-called "sub-luxation" of Sir Astley Cooper. It is an affection occurring principally in delicate women, and has been thought to depend upon relaxation of the ligaments of the joint permitting a too free movement of the bone, possibly a slipping of the inter-articular cartilage. From a considerable acquaintance with this affection, I believe that it is, in many cases at least, unconnected with any slipping of the cartilage, but is due to rheumatic or gouty changes in the articulation. The fact that these patients suffer most in damp weather and when the general health is feeble shows that it depends upon an arthritic diathesis, and the relief that is obtained from counter-irritation and the exhibition of anti-rheumatic or anti-gouty remedies, proves that the complaint cannot be always due to purely mechanical causes. Professor Annandale, of Edinburgh, however, believes that, as in the case of the semilunar cartilages of the knee, the inter-articular cartilage of the temporo-maxillary joint may become displaced either by a sudden tearing of its connections, or by a gradual stretching of them. In order to remedy the displacement, Mr. Annandale has devised and practised the following operation. An incision, slightly curved, about three quarters of an inch in length, is made over the posterior margin of the external lateral ligament of the temporo-maxillary joint, and is carried down to its capsule. Any small bleeding vessels having been secured the capsule is divided, and the inter-articular cartilage is seized, drawn into position, and secured to the periosteum and other tissues at the outer margin of the articulation by a catgut suture.

The researches of the late Dr. Robert Adams and Dr. R. W. Smith, of Dublin, have shown that rheumatoid arthritis occasionally affects the temporo-maxillary articulation, and the former author has, in his *Atlas*, figured the remarkable hypertrophy of the neck of the condyle of the jaw, occurring in the case of a woman, aged 30, to which I shall have occasion to refer more particularly later on.

Cruveilhier, who first described an example of rheumatoid arthritis of the temporo-maxillary articulation (*Anatomie Pathologique*, liv. ix), says: "I have never seen the disease I call wearing away of the articular cartilages better marked than it was in this case. The condyle of the lower jaw did not exist; it might be supposed to have been sawn off horizontally at the line of junction of the head with the neck and that which remained of the neck had been flattened. The

Fig. 2.

Fig. 3.

articular part of the glenoid cavity was represented merely by a plane surface; no trace of inter-articular cartilage or cartilage of incrustation existed. Both surfaces of the altered articulation were remarkably red."

I have never had the opportunity of examining a recent example of this disease, but as far as can be judged from museum specimens, the articular surface of the condyles is flattened and somewhat altered in direction in the less marked instances (Fig. 2), and absorption of the

Fig. 4.

neck, with complete wearing away of the articular surfaces (Fig. 3) occurs in the older and more advanced cases. I agree with Dr. Adams, that eburnation of the articular surfaces, or the occurrence of porcelaneous deposit in the temporo-maxillary articulation, is very rare. The description quoted from the St. Bartholomew's Catalogue by Dr. Adams, refers to preparation No. 551 in that museum (Fig. 4) and is as follows:

"There has been disease in one of the articulations of the jaw, producing absorption of the articular cartilage, with a deposit of bone around the circumference of the glenoid cavity. The corresponding condyle is in part removed by absorption; its surface is rough, except at one point, where it is highly polished and has an ivory-like texture."

Enlargement of the glenoid cavity is common in these cases, and is well seen in Fig. 5, taken from the same specimen in St. Bartholomew's Hospital. Absorption of bone must of course occur in these

Fig. 5

cases, but it is worthy of remark that, as pointed out by Dr. Adams, the bone forming the fundus of the cavity is not thinned, but, if anything, is thicker than in the normal state. The entire disappearance of the inter-articular fibro-cartilage is, apparently, an early event in chronic disease of the temporo-maxillary articulation. It had entirely disappeared in all the few recorded *post-mortem* examinations, and was absent in a case of hypertrophy of the condyle in the living subject which I successfully operated upon.

Mr. Arbuthnot Lane, who has published some original views on the mechanical causation and pathology of rheumatoid arthritis (*Pathological Society's Transactions*, 1886), describes as follows the changes which ensue in the temporo-maxillary articulation in feeble old age after the teeth have fallen out: "These changes are frequently very marked. The fibro-cartilage is very often completely removed, the only relic of it to be found being a fimbriated margin attached to the inner aspect of the loose capsule. In other cases the cartilage is rendered thin throughout its extent, and in others, again, it is perforated internally and posteriorly. The appearance presented by the articular surface of the head of the jaw, varies considerably. In some cases the head, while not diminished in breadth, loses its convexity, and is instead flattened on its upper surface, the flat facet being quadrilateral in form. It may present a partial covering of cartilage, but in very many cases the bone presents instead a porous granular aspect. In such cases the eminentia is usually quite removed, the original elevation being replaced by a flat surface, which is continuous with that forming the back part of the glenoid cavity. This surface is usually completely deprived of its articular cartilage. Sometimes the head of the jaw is much constricted transversely, and presents a slight rounded convexity, which articulates with the inner part only of the glenoid cavity, having cut for itself a longitudinal channel through the inner portion of the eminentia articularis, the outer portion of this convex surface of bone presenting but slight changes." These alterations in shape of the condyle of the jaw are well seen in the specimens before you, for which I was indebted to the late Mr. Edwin Canton, and which I propose to place in the College Museum.

These changes, in Mr. Lane's opinion, are due to the loss of teeth, and to the consequent modification in the normal movements of the temporo-maxillary articulation, and the general atrophy of the muscles of mastication, especially of those that serve to approximate the jaws, namely, the masseter and internal pterygoid. It is owing to the action of these two muscles that the form of the angle of the jaw varies at different periods of life. As these muscles are used with

great vigour during young adult life, the surfaces of bone into which they are inserted become strong and dense, and marked by vertical ridges indicating the attachment of the tendinous insertions of the muscles, especially of the masseter, and it is owing to the action of the latter muscle that the margin of the ramus is everted. As these muscles atrophy and become almost, if not completely, functionless, the portions of the bone into which they are inserted lose their prominent ridges, and their everted margin, and become rounded and wasted in a similar manner to that in which that portion of the great tuberosity of the humerus which receives the insertion of the supraspinatus atrophies in feeble old age. It is this atrophy of the angle which causes the appearance of the jaw peculiar to edentulous old age. The atrophy of the fibro-cartilage is due partly to an atrophy common to it and the muscle inserted into it, and partly to the loss of the movements of flexion of the temporo-maxillary articulation, and to their replacement by a simple antero-posterior movement of the opposing surfaces of bone upon one another. After the fibro-cartilage is removed, the articular cartilage is also destroyed, the surfaces of bone being brought into direct contact. By their mutual friction they destroy one another, and the amount of destruction will depend on the amount and character of the movement to which the bones are exposed, and the vitality of the osseous and nervous systems.

When this normal senile degeneration in the temporo-maxillary articulation is well marked, and occurs in an ataxic patient, the condition is described as Charcot's disease. This joint, more than any other in the old subject, undergoes great modification in its form and character.

Hypertrophy of the Neck and Condyle was observed by Dr. Adams in the case of rheumatoid arthritis of the temporo-maxillary joint already referred to, and is beautifully shown in Plate 2 of his admirable *Atlas*. Though occurring in a woman of only 30, there can, I think, be no doubt, from the description and drawings of her hands and feet, that the patient was the subject of rheumatoid arthritis. It is by no means certain, however, that the hypertrophy of the neck and condyle must be considered to be the results of that disease, for, as I shall show, this same rare deformity has been found in patients otherwise healthy.

Dr. Adams's patient, M. K., aged 30, was admitted into the Richmond Hospital in the year 1835. She was altogether disabled from earning a livelihood, in consequence of her having been afflicted with chronic rheumatic disease in most of her joints. Her face was quite awry, her chin slightly advanced, and its central point passed one inch across the middle line towards the left side. The fingers of both her hands from the metacarpal joints were in the same manner adducted towards the ulnar side and strongly flexed, and the first phalanx of the little finger of the right hand was dislocated towards the palmar surface of the last metacarpal bone. She complained of pains in all her joints, but principally in her wrists, hands, and feet; but it was remarked that the toes of both her feet were distorted, and some of them elevated above the level of the rest. When interrogated particularly as to her lower jaw, she said she had a constant aching in it and in the right side of the face. She also made the usual complaint of the changes in the weather causing an aggravation of her sufferings. She seemed uniformly querulous, and had a sad expression of countenance, indicative of suffering. Speaking and eating caused her to feel some pain in her ear and in the articulation of her jaw. To open her mouth completely she felt was impossible; and she stated that whenever she moved the lower jaw she was conscious of hearing some peculiar noise in her right ear, corresponding with each motion of the joint. The previous history of her case collected from her was that she had always resided in a damp cabin in the county of Wicklow with her parents, who were very poor; that she never had anything the matter with either her jaw or her hands, nor did she remember that she ever had been ill until about five years before the period of her admission into hospital, when she had been attacked with rheumatic fever, which lasted some weeks, but from the effects of which she never recovered. In short, from her own account it would appear that the acute attack passed at once into the chronic disease now described. Her sufferings becoming daily more extended and severe, she at length came to Dublin for advice, and was for some months in hospital under treatment, which, however, as might have been anticipated in such a case of confirmed disease, was of but little use; and, being destitute and unable to support herself, she was transferred to the neighbouring North Union Workhouse. When she had been for about three years an inmate of this institution (during which her disease underwent no improvement), she became suddenly affected, on July 28th, 1840, with acute oedema of the larynx, which at that time seemed to prevail epidemically. This attack, after a few hours' illness, proved fatal to her.

Post-Mortem Examination.—Having, through the kindness of Dr. Gordon, first procured a cast of her face, the articulation of the lower jaw was then exposed by dissection. When the thickened capsular ligament was cut into, the condyle of the lower jaw was found divested of all cartilaginous covering; it presented a rough, scabrous-looking surface. The neck of the condyle was more than an inch long, and was double the size of the neck of the opposite condyle. From its inner side a large bony spiculum, about one quarter of an inch long, grew upwards and inwards immediately in front of the internal lateral ligament. The inter-articular fibro-cartilage was altogether removed, as well as all cartilaginous covering from the articular portion of the glenoid cavity, which was smooth, and expanded to nearly twice its normal size, at the expense of the maxillary eminence and root of the zygoma. The right ramus of the lower jaw, from its angle to the head of the bone inclusive, was not only an inch longer than natural, but was also much thicker than the ramus of the left side, and was also bowed outwards—circumstances which accounted for the swollen appearance of the right side of the face and the projection of the chin to the left. (R. Adams, M.D., *On Rheumatic Gout*, p. 268.)

Fig. 6 shows a lower jaw so like that figured in Adams's *Atlas* in every respect, that the preparations are evidently identical in their

Fig. 6.

nature. It was presented to the College of Surgeons' Museum (2205) by Mr. Jeremiah McCarthy, and is thus described by Mr. Eve:

"A lower jaw with a mass of bone, having somewhat the form of an inverted pyramid, attached to the thickened neck of the right condyloid process. The upper surface of the mass, corresponding to

Fig. 7.

the base of the pyramid, is flat and smooth, as if it had been covered with fibro-cartilage (Fig. 7). Upon its inner side is a deep indentation, from which a fissure extends outwards and downwards nearly to the external surface of the bone. The indentation and the fissure constitute the upper boundary of a portion of bone which, from its form and position, might be taken for an enlarged condyle. The right half of the jaw is larger in all its dimensions than the left half, the breadth of the horizontal ramus in front of the angle being double that on the left side, which, from the slenderness of the coronoid and condyloid processes, appears atrophied. From a middle-aged man, who died with apoplexy. There was a remarkable deformity of the face from the deviation of the symphysis from the middle line; and the projection of the enlarged condyle was considerable. The base of the skull was not examined, and nothing was found in the *post-mortem* examination except atheroma of the vessels. Nothing unusual had been noticed about his mouth in childhood, nor could any account of an injury be obtained."

A remarkable example of hypertrophy of the condyle of the jaw was placed in the Museum of the Westminster Hospital by Mr. Pearce Gould, and is described in the *Pathological Society's Transactions*, vol. xxxiii. I am enabled to exhibit both the preparation and drawing, from which it will be seen that the whole bone is remarkably asymmetrical, the left side being much larger than the right. It was removed from a woman, aged 24.

In the 34th volume of the *Pathological Society's Transactions* will be found the record of a remarkable specimen of hypertrophy of the neck and condyle of the jaw, removed by myself from a woman, aged 36, whose face had for ten years become gradually more deformed, by the increasing displacement of the chin to the right side and the projection outwards of the left condyloid process. The movements of the jaw were restricted, and the length of the left ascending ramus was three inches, that of the right one inch and a half. She had an attack of hemiplegia, implicating the left side of the face, when she was 25 years of age, and from this affection her limbs had recovered perfectly and her face partially.

The appearance of the patient (who was sent to me by Dr. Williams, of Sherborne) is seen in Fig. 8, and the piece of bone removed is

Fig. 8.

accurately shown in the drawing (Fig. 9), the hypertrophied condyle measuring one inch and three-quarters from before backwards, and one inch across, and being covered with fibro-cartilage. A section of the preparation shows it to be composed of cancellous bone with large rounded spaces, and its walls are formed of a thin layer of compact bone. The fissure observed in Mr. McCarthy's case does not exist in this specimen. If the condyle thus shown is compared with Fig. 7, which represents the condyle of Mr. McCarthy's case, of the natural size, there can be little doubt that my preparation, Mr. McCarthy's, and Dr. Adams's all belong to the same category; and yet in Mr. McCarthy's probably, and certainly in my own case, this was the only joint affected. It must be concluded then, I think, that hypertrophy of the neck and condyle may occur in otherwise healthy patients, and I believe that I saw, in consultation with Mr. Nathaniel Stevenson,

the early stage of this curious condition in a young healthy lady, aged about 20, in whom the lower teeth had gradually become displaced from no known cause, so as to disarrange the normal bite. I here detected, what was then new to me, some hypertrophy of the neck of the jaw on one side, and recommended blistering and a course of iodide of potassium without any marked benefit, except that the deformity has not increased. In the patient whose portrait is given in Fig. 8, the deformity was so great as to warrant surgical interference, and the result has been very satisfactory, the face being brought straight and the patient having free movement of the jaw.

Fig. 9.

The treatment of inflammation of the temporo-maxillary joint has hitherto been, in chronic cases, the application of blisters and the use of a bandage—particularly an elastic bandage at night. Dr. Goodwillie, of New York, has, however, contrived an ingenious method of fixing the lower jaw effectually in cases of arthritis, which will be best described in his own words (*Archives of Medicine*, New York, June, 1881):

"The method that I employ is as follows: In this case the patient is under the anæsthetic effect of morphine and nitrous oxide. If there is any rigidity of the muscles, cautiously force open the mouth and take an impression of either the upper or lower teeth, and a rubber splint is made from the cast to cover over all the teeth in one jaw. Upon the posterior part of this splint is made a prominence or fulcrum (*D*), so that when the mouth is closed the most posterior teeth close upon it, while all the anterior teeth are left free. The next step is to take a plaster-of-Paris impression of the chin, and from this make a splint (*A*). On each end of the splint is made a place for

Fig. 10.

fastening elastic straps (*B*) that pass up on each side of the head to a close-fitting skull-cap (*C*). (See Fig. 10.)

"When the apparatus is in place and the elastic straps tightened so as to lift the chin, then pressure is brought to bear on the fulcrum at the posterior molar tooth, and so by this means extension is made at the joints, and the inflamed surfaces within the joints are relieved from pressure; then immediate relief is experienced."

I have no experience of this method, but it appears to be based upon sound surgical principles, and the cases illustrative of its use given by Dr. Goodwillie attest its usefulness.

In the cases of fibrous ankylosis resulting from the cure of arthritis, it is open to the surgeon to have recourse to mechanical means to break down the adhesions; and to illustrate the difficulties to be overcome, I may refer to another case of Dr. Goodwillie's (*New York Medical Journal*, July, 1875):—The patient was a girl, aged 10, who, five years before, had fallen over the bannisters, breaking and dislocating the jaw, with the result of the jaws being firmly closed. The apparatus employed is seen in Fig. 11.

Fig. 11.

One of the chief sources of interruption in treatment is periodontitis from the great amount of force used on the teeth. To prevent this, Dr. Goodwillie protects them with an interdental splint of hard rubber. These splints at first are necessarily very small, and confined to the front teeth; but, as the case progresses, longer and more perfect ones are made. In this case the rubber splints were enclosed in metal splints made of German silver, as this metal is tough and unyielding. These splints were made fast to the teeth by straps that passed from strong wire arms at the sides to a skull-cap, and the lower one was strapped to a pad on the chin. This pad was also attached to the lower splint by means of a ratchet and spring.

From the point of each splint an arm, three-fourths of an inch broad, extends out one inch and a quarter, and to these is clasped the oral speculum when in use (Fig. 12). The inclined planes of the speculum pass in between these arms, and they are held by clasps. The inclined planes are attached by movable joints to a distending forceps, so that when the handles are approximated, the inclined planes are separated at their attached ends. Each handle is made in two sections, and the spring that separates the handle is enclosed between them to protect them from injury.

In forcing the speculum between the splints, the instrument is grasped by one of the handles, and when in place both handles are approximated. If more force is desired, or the mouth is to be held open at any point, the screw at the handle may be used.

In stretching the masseter and temporal muscles, Dr. Goodwillie uses an oral speculum, devised by him some years ago (Fig. 12). It

Fig. 12.

consists of a shaft, to the flat end of which are attached two wings or inclined planes, upon which the teeth rest. The other end of the shaft has a thread cut on it, and a screw; this passes through as handle, one end of which is wedge-shaped. By turning the screw on the other end of the handle, the inclined planes diverge or converge. Fig. 13 represents a spiral-spring speculum for the patients to employ by placing it between the teeth and biting upon it. Longer springs are used as the mouth gradually opens.

It need hardly be said that treatment by this method would extend over many months, and would severely try the endurance of both patient and surgeon. A simpler method is the division of adhesions formed between the condyle and glenoid cavity, as practised by Mr.

Spanton in the cases already referred to, in both of which, as I learn from that gentleman, a good result ensued.

Fig. 13.

The first was a girl, aged 10, Ada M. R., who was admitted into the North Staffordshire Infirmary in April, 1880. About six years before she had scarlet fever, which resulted in hip-joint disease, and in a subsequent closure of the mouth, which had never been relieved. On admission she was very thin and ill-nourished, owing to her inability to masticate food. The mouth was firmly closed, and under chloroform it was found impossible to open it, although one tooth was broken in the attempt. There were no marks of cicatrices either in the mouth or externally; the digastric muscles were fully developed, and there was no unusual rigidity of the masseter or temporal muscles, nor was there any glandular swelling or other apparent cause for the condition of the mouth. The right hip was dislocated from disease of the joint, coincident apparently with the temporo-maxillary affection, but in a perfectly quiet state. She was able to take only liquid food, or such as she could squeeze with her fingers between the teeth.

Believing that the immobility was dependent on an ankylosed state of the temporo-maxillary joints, with probable contraction of the ligaments surrounding them, and failing to make the slightest impression by means of a gag with any justifiable amount of force, Mr. Spanton passed a very narrow tenotomy knife into the temporo-maxillary joint on each side, immediately in front of the temporal artery, and then passed it freely round the condyle of the inferior maxilla as far as he deemed prudent, dividing completely the external lateral ligament of the joint, and partially the insertion of the external pterygoid muscle, keeping the back of the knife towards the temporal, and carefully measuring the depth of the incision so as to avoid the middle meningeal artery. Very little hæmorrhage occurred; and as soon as this procedure was effected, Mr. Spanton found that the joints yielded at once to the gag, and the mouth could be opened to the extent of more than an inch. For a day or two some soreness was complained of, but the gag was used almost daily, and seven weeks afterwards the patient left the infirmary able to open the mouth fairly well and to masticate her food. As a result of this her general health greatly improved. She continued well, and was able to go to school, but the use of the gag was from time to time neglected, and by degrees the stiffness began to return. At the end of November she came under Mr. Spanton's care again, very much improved in health, but with the mouth closed so far as only to admit the tip of one's finger. He accordingly repeated the operation, taking care to divide the structures, especially anteriorly, more freely than on the former occasion; and the result has been much more marked than it was before. She can now open the mouth to some extent without assistance, and with the use of force it can be opened wide without causing pain. There is, however, very slight lateral movement.

The second case is that of a girl, aged 9, Sarah Ann B., who was brought to Mr. Spanton in November, 1879, for a closed mouth. She was a delicate-looking child, had been deaf from early childhood, and about two years and a half before had scarlet fever, after which the gradual closure of the jaws took place. This was naturally accompanied by a corresponding decline in her health and strength, for which her friends sought relief. The mouth was quite firmly closed, and with no legitimate amount of force could it be moved. Under chloroform Mr. Spanton operated as in the former case, and by means of a screw-gag opened the mouth freely. No untoward symptoms beyond some swelling and tenderness about the temporo-maxillary joints occurred, and by the frequent use of the gag by the patient's friends at home, she can now open her mouth sufficiently to take any kind of food, and is recovering very fair lateral movement also. She can open it to the extent of more than half an inch without assistance, and is able to masticate her food thoroughly. This has led, as was hoped it would, to a corresponding improvement in her general health.

In cases of fibrous ankylosis there is the possibility of removing the

condyle, as has been done by Mr. Davies-Colley, and probably by others; or, as proposed by Dr. Ewing Mears (*American Journal of Medical Science*, October, 1883), of dividing the ramus of the jaw, and excising the condyle with the coronoid process and sigmoid notch, through the mouth.

The method of operation is as follows: a straight sharp-pointed bistoury is introduced beneath the masseter muscle on a level with the last molar tooth of the lower jaw. Into the wound thus made the blade of an Adams saw is passed, and the ramus sawn through. The periosteum, with the overlying masseter muscle, is raised by the periosteal elevator, and the wound thus enlarged. The insertion of the temporal muscle is now divided by a probe-pointed bistoury. The tissues on the inner surface are separated by the elevator, the bone seized by the lion-jawed forceps, and an effort made to dislodge it by forcibly twisting it outward. If it yields at the neck of the condyle, the process is afterwards chiselled out. If sufficient space is acquired without removal of the firmly ankylosed process, it is permitted to remain, the object being to provide ample space for the formation of an artificial joint. Section of the masseter muscle is made if its tense condition demands it. Hæmorrhage, which arises from the division of muscular arterial branches, and possibly of the inferior dental artery, is controlled by pressure effected by packing the wound-cavity with sponges. Wounding of the internal maxillary artery is to be avoided by careful use of the instrument in close contact with the bone in the upper and inner portions.

A case of removal of both condyles for fibrous ankylosis is quoted by the *Wiener Med. Wochenschrift*, of July 6th, 1872, from the proceedings of the Royal Academy of Medicine in Bologna. It occurred in the practice of Dr. Bottini. The patient was a lad, aged 17, who, at the age of seven, had fallen on the jaw, and had gradually lost the power of opening his mouth, so that at last, for some months, he was unable to separate the jaws to any extent. Dr. Bottini introduced wedges, but these were very irksome to the patient, and were removed. Resection of the articular head of the bone was then performed on one side; this had no noticeable result, but on the operation being repeated on the other side, the jaw could be moved freely. At the end of six weeks the wound had healed, and the motion of the jaw was normal. The only morbid change that could be discovered was absence of the inter-articular fibro-cartilage.

In cases of rheumatoid arthritis in which the suffering is great, excision of the condyle seems to offer the best means of giving relief. The first removal of the condyle was by Professor Humphry, of Cambridge (*Association Med. Journal*, 1856), and was undertaken for chronic rheumatic arthritis. He exposed the condyle by a curved incision from the side of the orbit across the zygoma to the ear, passing a little above the temporo-maxillary articulation, and a second incision from the termination of the first directly upwards in front of the ear across the zygoma again, avoiding the temporal artery. The flap thus made was reflected, and the neck of the condyle cut through with a narrow saw.

In cases of complete fixation, resection of the condyle appears to offer one of the best and safest methods of treatment. In 1874 Dr. Gross, of Philadelphia, resected the condyle with a portion of the neck of the jaw in a girl aged 7, but does not mention the method he pursued. Mr. Croft has lent me the photographs of a child in whom he resected the condyle on both sides consecutively, with very good results; and I am indebted to Mr. Davy, of the Westminster Hospital, for the loan of three condyles, two of which he removed from living patients with the best results. Mr. Davy's first case was in a woman aged 50, who had complete closure of the jaws, and from whom the left condyle was removed in October, 1878. She made a rapid recovery with perfect mastication, but died from the bursting of an aortic aneurysm on December 8th, and the remainder of the jaw was then obtained. Mr. Davy's second case was in a man aged 47, who recovered perfect use of the jaw. The third specimen is a *post-mortem* one, and illustrates the changes due to chronic rheumatic arthritis already described.

In 1883 I exposed the ankylosed joint in a boy aged 7 by an incision in front of the ear, and with a chisel divided the neck of the bone, and removed half an inch of bone in the situation of the condyle, with very good results as regards movement, and with no obvious damage to the facial nerve.

A case of complete synostosis of the jaw was successfully treated by a different method by Dr. James Little, of New York, in 1873. The patient was aged 19, and had some years before suffered from suppuration of the temporo-maxillary articulation, leading to ankylosis. Dr. Little made an incision along the lower border of the jaw, and turned up the masseter, when the neck of the condyle was seen to be very much enlarged, and continuous with the temporal bone.

A trephine half an inch in diameter was then applied, and a button of bone three-eighths of an inch in thickness was removed. The portion of bone on each side of the opening was then cut through with a chisel, and the neck of the condyle cut away piece by piece, so as to leave no portion projecting from the temporal bone. The result was quite satisfactory.

A similar operation, but performed by a different method, was successfully undertaken by Dr. Robert Abbe, of New York, in a boy aged 10, who had suffered from otitis media and suppuration of the joint some years before. A vertical incision was made in front of the ear, and a horizontal one meeting its upper end was carried along the lower border of the zygoma. The parotid, with the facial nerve, was drawn down, and with a periosteal elevator the posterior fibres of the masseter were cleared away, and the articulation exposed. A narrow osteotomy chisel was now applied to the neck of the condyle, and carefully driven half through the bone, and by forcibly opening the mouth the bone was broken through. The neck of the condyle was then carefully removed piecemeal, but the condyle was left *in situ*. The result was satisfactory.

Sédillot mentions that in a case of true ankylosis of the temporo-maxillary articulation, M. Grube, in 1863, carried a straight chisel through the mouth to the neck of the jaw, which broke by hammering. Some months later he divided the masseter subcutaneously, and the cure, by the formation of a false joint, was permanent. In 1879 I performed the same operation in a child aged 6, but the results were unsatisfactory. Suppuration was set up, and required an external opening, and the movement, which was free at first, became as limited as before the operation, and I subsequently excised the condyle. It would appear, therefore, that mere division of the neck of the bone does not offer such good prospect of a permanent false joint as removal of the neck or the condyle, though these operations are necessarily more severe.

Esmarch's operation of removing a wedge in front of the masseter is of course as applicable to cases of ankylosis from disease of the joint as to cases of cicatrix, and Fischer (*Archiv für Klin. Chirurgie*, Bd. xiii, Hft. 3) appears to have performed the operation on both sides of the jaw, in a case of bilateral ankylosis of the temporo-maxillary articulation, with very good result, the patient obtaining complete and useful control over the central movable portion of the jaw.

I have recently performed an operation which appears to me to possess equal advantages over other proceedings undertaken for ankylosis of the temporo-maxillary articulation, and which consists in the division of the ramus of the lower jaw beneath the masseter by a saw introduced from the mouth. The patient was a young gentleman aged 16, who came under my care in 1886 with complete closure of the jaws due to ankylosis of the left temporo-maxillary articulation. He had scarlet fever in 1881, and the disease followed upon this. In 1882 and twice in 1883 attempts were made to screw the mouth open, with only partial and very temporary success; and when I saw him, the application of the powerful screw-gag I show produced no effect. In December last I made a small incision within the mouth immediately above the last molar tooth, and having passed a steel director to clear the way, I was able to push an Adams saw beneath the masseter, and to divide the ramus horizontally. No hæmorrhage occurred from the inferior dental artery, though the accompanying nerve was subsequently found to have been damaged.

The patient was able to open his mouth as soon as he recovered from the chloroform, and made a rapid recovery. Unfortunately he caught cold on the railway journey home, and an abscess formed and pointed behind the jaw, but has left only a dimple. The patient can now open his mouth so that there are nine-sixteenths of an inch between the incisor teeth, and his condition is a most satisfactory one.

[To be continued.]

An extraordinary case of poisoning is reported from Pollokshaws, near Glasgow. On Tuesday evening nine children were seized with illness, exhibiting all the symptoms of poisoning, and two of whom have since died. The facts, as stated, are that the children, having gone into a yard where were stowed two barrels containing the remains of poisonous chemicals, picked up and ate portions of what turned out to be bi-arsenate of soda, used in the process of bleaching. The two children who died were aged 3½ and 4 years respectively. The others are said to be recovering.

THE anniversary meeting of the Sanitary Institute of Great Britain will be held on Thursday, July 14th, at 3 P.M., when the chair will be taken by Sir Douglas Galton, K.C.B., who will present the medals and certificates awarded to the exhibitors at the Exhibition held at York. An address will be delivered by Dr. G. V. Poore, entitled, "The Shortcomings of some Modern Methods of Sanitation."

CLINICAL LECTURES ON THE UTERINE NEUROSES.

Delivered at the University College Hospital.

By GRAILY HEWITT, M.D., F.R.C.P.,

Professor of Obstetric Medicine, University College; Obstetric Physician to the Hospital.

LECTURE IV.

Pathology of the Cases of Uterine Vomiting and Cases of Hysterical Attacks.—In attempting an explanation of the phenomena attending uterine vomiting and hysterical attacks, we have to consider the condition of the nerve centres as well as that of the uterus. Assuming it as proved that the vomiting and the hysterical attacks are reflex acts starting in an irritation in the uterus, it seems proper to suppose that in a given case there is (A) abnormal excitability of the nervous centre as well as (B) abnormal irritation of the sensory nerves of the uterus. And it is, of course, conceivable that when the factor A is at its maximum, the factor B being in a minimum state, the reflex phenomena may be present. Or, reversing the respective intensity of the two factors, a minimum degree of central excitability, associated with a maximum degree of peripheral (uterine) irritability, may also give occasion to the vomiting or the hysterical attack. Between these two extremes there may be many degrees of variation. We have to determine, therefore, the nature of the changes which occur in the nervous centre and in the uterus respectively, and which give rise to the reflex phenomena.

Factor A.—For a long period the diseases of the nervous centres in which no obvious physical change could be detected have been spoken of as "functional," including the so-called "hysterical." So far as these latter diseases (the hysterical) are concerned, I have for a considerable time formed the opinion that they occur particularly in individuals who are in a condition of mal-nutrition, and I have gone so far as to conclude that the undue excitability of the nervous-centres in "hysterical" cases, and, whether attended with convulsive attacks or with other reflex symptoms such as vomiting, is really dependent on mal-nutrition of those centres (see quotation from last edition of my work already given). I am much interested to find that Dr. Gowers has quite recently expressed views on this subject which confirm the ideas just alluded to. Dr. Gowers (Gowers on Diagnostic Value of the so-called Tendon Reflexes, *Lancet*, November 7th, 1885) deprecates "the wide use of the term 'functional disease.' We apply it to all cases in which we should not expect to find changes visible with the microscope, and in which recovery is possible. But in a very large number of these cases there must be more than a mere derangement of function; there must be a change, and a considerable change, in the nutrition of the nerve elements..... The change in nutrition that the microscope can detect, even as the most trifling alteration of aspect or behaviour to reagents, is simply colossal considered as an alteration in molecular nutrition. Many so-called functional diseases (most of them, indeed) are far less thought of and spoken of as nutritional diseases."

The great success of the Weir-Mitchell system in the treatment of so-called hysterical cases lends great support to the view that the central nervous system is in a state of decided mal-nutrition in such cases. The treatment is essentially a forced feeding, and Dr. Weir-Mitchell in his work argues for the presence of molecular circulatory or nutritive abnormalities. The clinical history of all the cases I have seen, apart from pathological evidence, is, I believe, amply sufficient to justify such a conclusion.

This accords well with all that is known of the general aspect and history of such cases. The subjects of them are emphatically starved individuals. There is usually a previous history of inappetency, insufficient feeding, gradual weakening of all the vital forces as a result. The general weakening influence may be inadequate dietary, influence of a prostrating disease—for example, scarlet fever—the nature of the cause varying in different cases, but having as an effect great enfeeblement of the general nutrition of the body. The nerve-centres participate, hence the liability to nervous diseases.

Factor B.—The irritation present in the uterus, and effective in giving rise to the reflex phenomena, must be something which operates on the sensory nerves of the organ. This operation may be accompanied with a painful sensation referred to the uterus by the patient,