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4.
OBSERVATIONS

UPON

CHRONIC RHEUMATIC ARTHRITIS

OF

THE SHOULDER.

BY

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ETC. ETC.

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OBSERVATIONS

CHRONIC RHEUMATIC ARTHRITIS

THE SHOULDER

ROBERT W. SMITH, M.D., M.R.I.A.

DUBLIN:

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Fig 1.

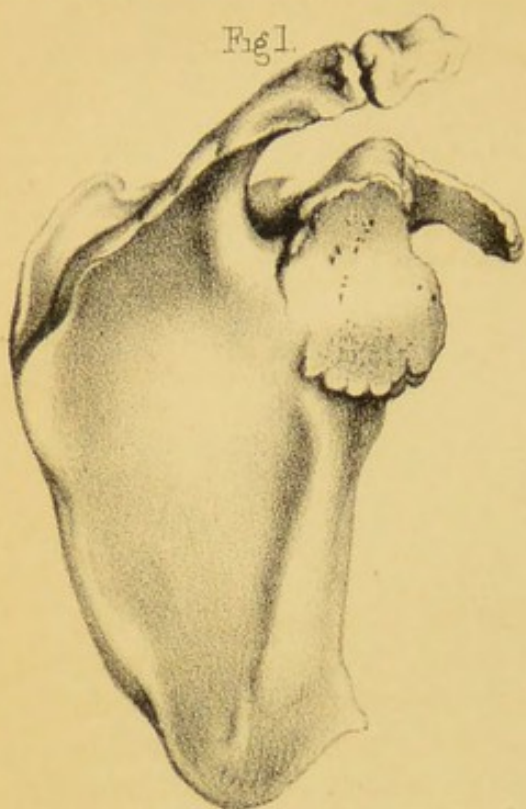


Fig 2.



Fig 5.



Fig 3.

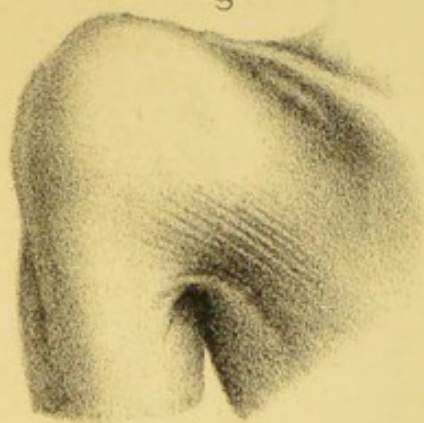


Fig 4.



OBSERVATIONS,

&c. &c.

IN the month of April, 1852, I exhibited, at a meeting of the Pathological Society of Dublin, the shoulder-joints of a man about sixty years of age, each of which presented an example of congenital luxation of the head of the humerus backwards upon the dorsum of the scapula, and in which chronic rheumatic arthritis had been established. In the following pages I purpose, in the first place, to give a description of these very remarkable specimens, and afterwards to analyze the cases which, under various appellations, have been, from time to time, recorded as examples of injuries of the shoulder-joint from external violence, but which, in my opinion, are rather to be looked upon as instances of the effects of chronic rheumatic arthritis.

With respect to the first part of the subject, it will be sufficient to give a detailed account of one of the articulations, so closely did they resemble each other, both in external configuration and in anatomical characters.

Upon the right side, the head of the humerus, placed much farther back than natural, and elevated so as to be in contact with the under surface of the acromion process, formed upon the dorsal region of the scapula a conspicuous tumour, which moved with the shaft of the bone. The acromion and coracoid processes, more especially the latter, were unusually prominent. The shoulder was flattened anteriorly, and the axis of the humerus passed somewhat inwards.

Upon removing the deltoid muscle, and laying open the capsular ligament, it was found that no articular surface existed in the normal situation of the glenoid cavity; but upon the external aspect of the neck of the scapula^a, there had been

^a See Plate I. Fig. 1.

formed a glenoid-shaped, concave surface, for the reception of the head of the humerus. It measured two inches and a quarter in its vertical, and one inch and three-quarters in its transverse, diameter; totally destitute of cartilage, it was covered by a texture as hard and dense as enamel, and as smooth as polished ivory. A glenoid ligament, much broader than natural, surrounded the greater part of its margin; it adhered intimately to the capsular ligament, but had become in several places detached from the circumference of the socket.

The tendon of the biceps muscle arose from the summit of the articular cavity; there was no interruption of continuity in any part of its course, but its intra-articular portion was remarkably short; it passed from its origin almost at once to the bicipital groove. At the point where it arose, however, from the glenoid cavity, its texture was unravelled, and its fibres separated from one another.

The acromion process, about an inch from its anterior extremity, was divided into two portions; the detached fragment rested upon the summit of the great tuberosity, and the solution of continuity corresponded to the sulcus which separates the tubercle from the head of the humerus. There was no deposition of bone along the line of separation, nor displacement of the detached portion, which was closely connected with the remainder of the process by the fibrous tissues derived from the muscles which are here attached.

The head of the humerus had lost completely the globular form which it possesses in the normal state; it was flattened from within outwards, and its axis appeared continuous with that of the shaft of the bone; its inferior border was prolonged downwards, so as to conceal a portion of the anatomical neck of the humerus, between which and the elongated margin of the head there existed a deep sulcus or fissure, which was occupied by vascular productions from the synovial membrane. The articular surface, the outline of which had become quadrilateral, was fully an inch broader than the socket in which it moved, and was smooth and polished to the same extent as the glenoid cavity. The lesser tuberosity was enlarged, and had become articular, and irregular osseous growths surrounded the head of the bone.

The tendons of the capsular muscles were perfect, with the exception of that of the subscapularis, the attachment of which to the rough and scabrous lesser tubercle had, to a certain extent, disappeared. The capsular ligament was somewhat thicker than natural.

Upon the left side the condition of the articulation was si-

milar to that just described as existing upon the right. In the form, situation, extent, and polish of the glenoid cavity^a; in the broad and partially detached glenoid ligament; in the unravelled condition of the tendon of the biceps at its origin; in the enlargement, flattening, and polish of the head of the humerus; its elevation to the acromion process; the nodulated state of its circumference; its prolongation downwards;—in all these respects there existed a perfect similarity between the two articulations. There was also upon both sides an osseous growth from the margins of the bicipital grooves, by which their depth was increased. Upon the left side, however, the acromion process was perfect, but the surface for articulation with the clavicle was enlarged. Upon this side, also, osseous depositions had taken place in the capsular ligament, near its attachment to the inner margin of the glenoid cavity.

It must, I think, be obvious to those acquainted with the external signs and anatomical characters of congenital luxations of the shoulder backwards, and who are also familiar with the morbid appearances which chronic rheumatic arthritis presents when established in this articulation,—that in these remarkable specimens two distinct classes of phenomena existed: the one manifestly indicating original malformation; the other as clearly denoting the super-addition of a disease of a peculiar character. To the former belong the absence of any vestige of a glenoid cavity ever having existed in the situation which it naturally occupies; the accurate resemblance to one another of the abnormal sockets in position, shape, and dimensions; the shortness of the intra-articular portions of the bicipital tendons, and the existence of glenoid ligaments. These phenomena indicate, in my opinion, that the deformities originated neither in disease nor accident; and when I compare them with those observed in the case of double, congenital, sub-acromial luxation, described in my work on *Fractures*^b, I feel more strongly convinced that, in the rare and remarkable case just described, the malformations were also congenital.

Among the appearances which demonstrate that chronic rheumatic arthritis had long existed in each of these malformed joints, are to be placed;—the removal of the articular cartilages; the enamelling of the osseous surfaces thus exposed; the bony growths around the bases of the heads of the humeri; the deposition of bone in the capsule; the unravelling of the fibres of the bicipital tendons; the growth of the numerous vascular

^a See Plate I. Fig. 2.

^b *Treatise on Fractures in the Vicinity of Joints*, p. 206.

bunches of synovial fimbriæ; and the solution of continuity in the acromion process.

In confirmation of this view of the case, it may be mentioned, that in the body of the person in whom these specimens were found, all the fingers and toes were webbed, and that one of the hip-joints presented a well-marked example of chronic rheumatic arthritis, evidenced by the disappearance of the ligamentum teres, the removal of the articular cartilage, the existence of an ivory-like deposit, and, finally, shortening of the neck of the femur, and an alteration in the angle which it naturally forms with the shaft.

The only specimens with which I am acquainted, similar to those above described, are contained in the Museum of St. Bartholomew's Hospital. In his valuable memoir upon the "Abnormal Conditions of the Shoulder-joint"^a, Mr. Adams has thus alluded to these preparations: "Finally, the head of the humerus may be not only displaced partially upwards, as the result of this chronic rheumatic disease, partially inwards, and, as we have just proved, also partially downwards, but the most remarkable abnormal appearances the writer has witnessed from this chronic disease have been, in two specimens, contained in the Museum of St. Bartholomew's Hospital, in which it will be found that the head of the humerus, which had been affected by this chronic disease, was thrown completely backwards on the dorsum of the scapula. In this case the displacement was double, and two new glenoid cavities had been formed for the reception of the enlarged heads of the humeri, beneath the bases of the spines of the scapulæ, just where the head of the humerus has been found to rest in the ordinary dislocation backwards from accident; but in this case, although the history was unknown, that these appearances were not the result of accident is almost certain, as similar abnormal appearances are observable on each side." The notice of this preparation in the Catalogue of the Museum is as follows^b: "The bones of both the shoulder-joints of an adult. In each joint there has been ulceration, or such absorption as occurs in chronic rheumatism of the articular surface of the head of the humerus, and the glenoid cavity. The heads of the humeri are flattened and enlarged by growths of bone around their borders; and the glenoid cavities, enlarged in a corresponding degree, and deepened, extend backwards and inwards to the bases of the spines of the scapulæ. The articular surfaces, thus enlarged, are mutually adapted, and are hardened, perforated, and, in some parts, polished and ivory-

^a Todd's Cyclopædia.

^b Page 108-32.

like. The changes of structure are symmetrical, except in that the articular surfaces of the right shoulder-joint are more extensively polished than those of the left."

Although I have never had an opportunity of examining these preparations, I am, nevertheless, convinced, that they are not to be considered simply as examples of displacement of the heads of the humeri backwards, produced by the ravages of chronic rheumatic arthritis, but that they should rather be looked upon as instances of the supervention of this disease in a case of double congenital luxation of the shoulder backwards. It is true that when Mr. Adams, who is so well acquainted with this rheumatic disease, examined the preparations in question, they did not strike him in this point of view; but now that he has seen those which are in my possession, he feels perfectly satisfied, he has assured me, that the two cases are identical in their nature, and that they both present examples of the twofold lesion that I have mentioned. The occurrence, therefore, of displacement of the head of the humerus backwards, as a result of chronic rheumatic arthritis, remains to be demonstrated.

I shall now direct attention to the displacement upwards, which is so frequently seen as a consequence of this disease; and, in doing so, it will be necessary to notice, analytically, the cases which have been from time to time recorded as examples of the effects of injuries upon the component parts of the shoulder-joint; but which, in my opinion, are to be looked upon as resulting from chronic rheumatic arthritis. It is true, that many of them were published at a period when but little was known of this remarkable affection; their authors are, therefore, to a certain extent excusable for having fallen into error respecting the nature of the morbid appearances which they have described; but it is also true that very many have been recently placed upon record, although we now possess full information respecting the symptoms, diagnosis, and pathology of chronic rheumatic arthritis, no matter in what articulation it may be seated. In proof of this statement, it is only necessary to refer to the various memoirs upon the abnormal conditions of the joints published by Mr. Adams in Todd's *Cyclopædia*, and to the numerous communications upon the subject which have been made to the Pathological Society of Dublin, and which are to be found recorded in the volumes of this Journal.

The most remarkable series of specimens, illustrative of the subject under consideration, is that published by Mr. John Gregory Smith in the fourteenth volume of the *London Medi-*

cal Gazette. He has there described the appearances observed in seven shoulder-joints, supposed to have suffered from severe injuries. The previous history of the different cases was unknown,—all the specimens having been found in bodies brought to the Hunterian Theatre of Anatomy. The following abstract from the author's account of this valuable series will suffice for my present purpose:—

No. 1.—The subdeltoid bursa was found to communicate with the general cavity of the shoulder-joint by a large irregular opening in the capsular ligament. The tendinous insertions of the subscapularis, supraspinatus, infraspinatus, and teres minor muscles, were detached from the tubercles of the humerus. The tendon of the long head of the biceps had been *torn* away from the upper part of the glenoid cavity, and entirely withdrawn from the joint; it was found to be firmly attached to the anterior margin of the bicipital groove; the size of the cavity of the joint was much increased. A small portion of the outer margin of the glenoid cavity had been *fractured* off, and with the under surface of the acromion process and the tubercles of the humerus, were partially covered with portions of enamel-like or porcelain secretion, and numerous bands of organized fibro-ligamentous substance extended across the cavity of the joint in different directions.

No. 2.—The subdeltoid bursa communicated, by a large opening in the capsule, with the interior of the joint, and the tendon of the subscapularis was partially *torn* from the lesser tubercle of the humerus. The tendon of the long head of the biceps was *ruptured*, leaving a portion, about half an inch in length, attached to the upper part of the glenoid cavity; the lower portion of the tendon had been drawn from the cavity of the joint, and lay firmly attached to the margin of the bicipital groove. The *ruptured* extremities of the tendon were perfectly smooth and rounded, and the superior portion had become much flattened.

No. 3.—On removing the deltoid muscle, the head of the humerus came into view, presenting a larger surface of bone than usual. On further examination, it was found that the tendon of the subscapularis muscle had been partially *torn* away from the lesser tubercle, and the original insertions of the supraspinatus, infraspinatus, and teres minor muscles, had been completely separated from the greater tubercle. The tendon of the long head of the biceps had also been *torn* from its origin, and become attached to the upper part of the bicipital groove.

The under surface of the acromion process was found har-

dened by the friction of the head of the humerus, and covered by a peculiar enamel-like secretion.

Nos. 4 and 5.—These specimens were found in the body of a female aged 56. In the right shoulder, a jagged, irregular opening, as large as a half-crown, existed in the capsular ligament, so that the subdeltoid bursa communicated with the general cavity of the joint. The tendons of the subscapularis and supraspinatus muscles, *torn* from their respective tubercles, had become united with the capsule; the tendon of the biceps, *torn* from the glenoid cavity and withdrawn from the joint, was fixed firmly to the margin of the bicipital groove. There was a number of small osseous growths connected with the tubercles of the humerus, and an ivory-like deposit covered both them and the under surface of the acromion. A *fracture* of this process had separated about an inch of its expanded extremity; it had not united by bone.

In the left shoulder, similar conditions were observed, viz., the opening in the capsular ligament; the separation of the tendons of the supraspinatus and subscapularis muscles; the deficiency of the intra-articular portion of the tendon of the biceps; the adhesion of the remainder of the tendon to the groove of the humerus; the osseous growths upon the tubercles; the ivory-like deposit; and finally, the solution of continuity in the extremity of the acromion process.

Nos. 6 and 7.—Here, also, both articulations were similarly altered. In that of the right side, an irregular opening existed in the capsular ligament, and the tendons of the supraspinatus and subscapular muscles were separated from their tubercles. That of the long head of the biceps remained connected with the glenoid cavity, but was displaced towards the inner part of the joint; it was expanded, and appeared to have been subjected to pressure and friction; the surface which corresponded to the head of the bone was smooth, but the other presented a bundle of silvery cords, which could be spread out upon the finger three-quarters of an inch in width. The capsule had become so large as to allow of the head of the humerus being placed under the coracoid process. There were small bony deposits about the tubercles, and here and there patches of ivory deposit.

In the left shoulder the capsule was entire, but was greatly increased in size and thickness. The tendon of the subscapularis was *torn* from the lesser tubercle, but the attachments of the other capsular muscles were preserved; the tendons, however, appeared to have been very much stretched. The tendon of the biceps was displaced towards the inner and lower part

of the joint, and played over a smooth part of the lesser tubercle.

It would be difficult to lay before the reader any more striking examples of the anatomical characters of chronic rheumatic arthritis of the shoulder than those furnished by the preceding group of cases, gratuitously described by the author (for their history was unknown) as instances of the effects of accidental violence. The absorption of a portion of the capsule; the detachment of the tendons of the capsular muscles from the tubercles of the humerus; the separation of the acromion into two portions; the ivory-like deposit upon the surfaces of the bones; the loss of the tendon of the biceps; its adhesion to the bicipital groove; its separation into distinct fibres; its displacement inwards from the summit of the humerus; the osseous nodules about the tubercles; the conversion of these processes into articular surfaces; the enlargement of the capsule; the deposition of bone in the capsule, at the margin of the glenoid cavity (described by the author as a fracture); the symmetrical development of the disease—all these well-known results of chronic rheumatic arthritis upon the structures of the shoulder-joint are elucidated in the clearest manner, by the series of specimens (valuable and instructive as far as they speak for themselves) described by Mr. John Gregory Smith.

According to this gentleman, however, the preceding cases furnish examples of every known luxation of the shoulder, as appears from the following extracts from his observations:

“It is likely that the first case was an example of the effects that may be expected to follow the dislocation into the axilla, with the addition of a rupture from its origin, of the round tendon of the biceps muscle.

“The second case is probably one showing the effects of a partial dislocation, in which the head of the humerus is drawn forwards against the coracoid process of the scapula, but quickly slips back again into its natural socket. It is an example of a rupture of the round tendon of the biceps muscle, instead of the tendon being torn away from its origin.

“The third case, I am inclined to think, has been a dislocation *into the axilla or on the dorsum of the scapula.*” It is difficult to imagine what resemblance could exist between the effects of these two opposite luxations, or how, in the case of that on the dorsum of the scapula, the tendons of *all* the capsular muscles, as well as that of the biceps, could have been torn from their attachments. In this rare displacement of the

head of the humerus, the tendons of the infraspinatus and teres minor are relaxed, and in the dissection of this accident recorded by Sir A. Cooper, those of the supraspinatus and of the biceps were on the stretch, but not torn.

"The fourth and fifth cases occurred in the same individual." "I am inclined to think it probable that they are both examples of the dislocation upwards." "They would seem to have been produced at the same time."

"The sixth and seventh cases likewise occurred in the same subject. The appearances in the right shoulder, I think, clearly indicate that it is an example of the effects of a dislocation under the pectoral muscle. The appearances of the left shoulder result, perhaps, from a dislocation under the pectoral muscle or into the axilla."

When we consider the fertility of imagination displayed in the preceding extracts, it certainly appears strange, that with regard to the fourth and fifth specimens, as well as the sixth and seventh, the mere circumstance of the morbid appearances in one shoulder-joint being "nearly a counterpart" of those in the other, did not strike the author as constituting strong presumptive evidence of their having originated in disease, for symmetry is as frequent in diseases and original malformations as it is rare in injuries from external violence; and this observation holds good in an especial manner, as regards chronic rheumatic arthritis, wherever situated. It is difficult, indeed, to conceive how external violence could either rupture or dislocate the tendon of the biceps in both shoulders at the same time.

In the last edition of his valuable work on Surgery, Professor Fergusson, of London, has made some observations upon partial luxations of the shoulder upwards from external violence, which I deem it right, upon the present occasion, to give in full; and as I am of opinion that he has not given the true explanation of the phenomena which he has described, I shall devote some space to their consideration; for it is obvious that the promulgation of an erroneous doctrine is the more calculated to mislead, and therefore the more dangerous, the higher the authority from which it emanates. It need scarcely be said that I have no desire to undervalue the labours of one who has worked so efficiently to advance our knowledge of surgery as the distinguished Professor of King's College, but truth compels me to say that, *as far as his published writings can guide us* in forming an opinion, he does not appear to be familiar with the symptoms and anatomical characters of that remarkable disease of the shoulder, which is so well known here by the

name of "Chronic Rheumatic Arthritis," and which, in other countries, has proved itself so fruitful a source of errors in diagnosis.

"It is customary," says Professor Fergusson, "to suppose that the head of the humerus cannot be luxated directly upwards; but I have long been of opinion that such an event, to a partial extent, may, and indeed does, occur pretty frequently. I have met with various examples in the dissecting-rooms, in which the end of the bone has been in close contact with the acromion process and spine of the scapula, or with the coraco-acromial ligament; lying, in the one instance, a little above and behind the upper part of the glenoid cavity; in the other, somewhat above and in front, between the natural articular surface and the coracoid process; both, however, coming strictly under the title of partial luxation upwards. Whether these effects were the result of immediate violence, or of gradual change, I cannot decide. The capsular ligament seemed entire, but elongated, in some of the examples, whilst in others the articular surface of the humerus was in contact with the parts above, the capsular ligament being attached to the surrounding textures, which, thickened and infiltrated with lymph, bore all the marks of former inflammation. Within these few years, the occurrence of rupture of the long head of the biceps has been noticed by Mr. Stanley, Dr. Knox, and others; and Mr. John Soden, Jun., of Bath, has related^a the particulars of a case of supposed sprain in the shoulder, which dissection afterwards proved to be a partial displacement of the humerus upwards, and luxation of this tendon forwards on the lesser tuberosity. That this tendon is displaced in the luxation forwards or backwards (or perhaps, to speak more correctly, that the head of the bone in such instances is displaced from the tendon), there can be little doubt; I have seen the change more than once in the dissecting-room. In some shoulders, I have found the tendon partially torn and elongated, lying either in the natural groove, or in a new one formed by friction; in others, I have observed the tendon torn across about an inch from its upper extremity, which floated free within the capsule, whilst the other end was adherent to the groove between the tuberosities. In some of them, old unreduced luxations existed; in others, every mark bore evidence that this injury had at one time occurred. There is now in my collection, in the Museum of King's College, a preparation strongly corroborative of the above observations. On a subject, I no-

^a Transactions of the Medical and Chirurgical Society, 1841.

ticed that one shoulder was more prominent than the other, and, in the progress of the dissection, the head of the humerus was found lying immediately under the deltoid muscle, in contact with the acromion, and surrounded by a very thin capsule of cellular texture. On raising the head of the bone, it was ascertained that the long tendon of the biceps was torn, the under end being adherent in its natural groove, and that, in addition, a dislocation of the head of the humerus (forwards, in all probability) had been in a manner reduced; but, instead of passing again into the capsule, had been thrust between this texture and the deltoid muscle. Only a small portion of the glenoid cavity was visible at its lowermost point, the greater part being covered by the flattened capsule. Doubtless, in this case, the original opening in the ligament had been only sufficient to let the head of the bone escape, and not free enough to permit of proper reduction^a.

It must be manifest to every person who reads, even in a cursory manner, the preceding extract from the recently published work of this justly distinguished surgeon, that no evidence whatever of any description has been adduced to prove the occurrence of partial luxation of the head of the humerus as the result of accident or external violence. The opinion which the author has advanced, viz., that this is an event of pretty frequent occurrence, is evidently grounded upon the phenomena which he has observed in shoulder-joints found in the dissecting-room, and with the previous history of which he was unacquainted. In the remarks which he has made upon the subject, he has, unknowingly, described many of the leading features of chronic rheumatic arthritis of the shoulder, although he looks upon them as resulting from accident: indeed this generally happens whenever a specimen, such as that to which he alludes as being preserved in the Museum of King's College, is found in the dissecting-room by those unacquainted with the pathological characters of this disease.

In the instance mentioned by Professor Fergusson, as one of partial luxation upwards from accident, there existed the following evidences, showing that chronic rheumatic arthritis had long been established in the articulation, viz.: the aperture in the capsular ligament; the contact of the head of the humerus with the deltoid muscle, and with the acromion process; the disappearance of the intra-articular portion of the tendon of the biceps, and the adhesion of the remainder of it to the bicipital groove. In endeavouring to explain these phe-

^a Practice of Surgery, p. 252, 1852.

nomena, as well as the concealment of the glenoid cavity by the capsule, the author has evidently experienced some difficulty: for he has been obliged to have recourse to the hypothesis, that a dislocation of the head of the humerus forwards had occurred, and had been imperfectly reduced; and that, owing to the original aperture in the capsular ligament not having been free enough to permit the return of the head of the bone (although sufficient to allow it to escape), this latter had, in the efforts made to accomplish the reduction, been pushed up between the capsule and the deltoid muscle.

Upon the insufficiency of this explanation, it is scarcely necessary to make any remark, as the author himself seems to be aware of it, for he adds, "such an occurrence I believe to be exceedingly rare, almost all evidence going to prove that the capsular ligament is in general so extensively torn open, that the head of the bone cannot possibly be obstructed by it in its backward course; yet the preparation confirms the opinion of Delpech, who, though he suspected such an occurrence, had himself met with no anatomical proof of the fact." It might, I imagine, be safely added, neither has any one else.

The following account of a specimen of chronic rheumatic arthritis of the shoulder-joint, which is in my own collection, will, I think, illustrate the true nature of that described by Professor Fergusson. It was taken from the body of a woman of advanced age, who for many years before her death suffered from the usual symptoms of this disease, and who, it was known, had never sustained any injury of the shoulder.

Upon removing the deltoid muscle, the naked head of the humerus, elevated to the acromion process, came into view; the centre of its summit was devoid of cartilage over a space as large as a shilling, and covered with ivory-like deposit. An aperture of a circular form, with a fringed margin, and so large as to have permitted of the exit of the entire of the head of the humerus, existed in the upper and anterior part of the capsular ligament, the attachment of which to that portion of the anatomical neck of the bone, which lies above the greater tubercle, had disappeared; the tuberosity thus became articular; it was covered with ivory-like deposit, and in certain motions of the joint played against the under surface of the acromion; the sulcus which in the normal state separates it from the articular surface of the head of the bone was obliterated. The remains of the upper portion of the capsule, or that part of it which is related to the tendon of the supraspinatus muscle, was compressed, and, as it were, folded on itself between the upper portion of the glenoid cavity and the

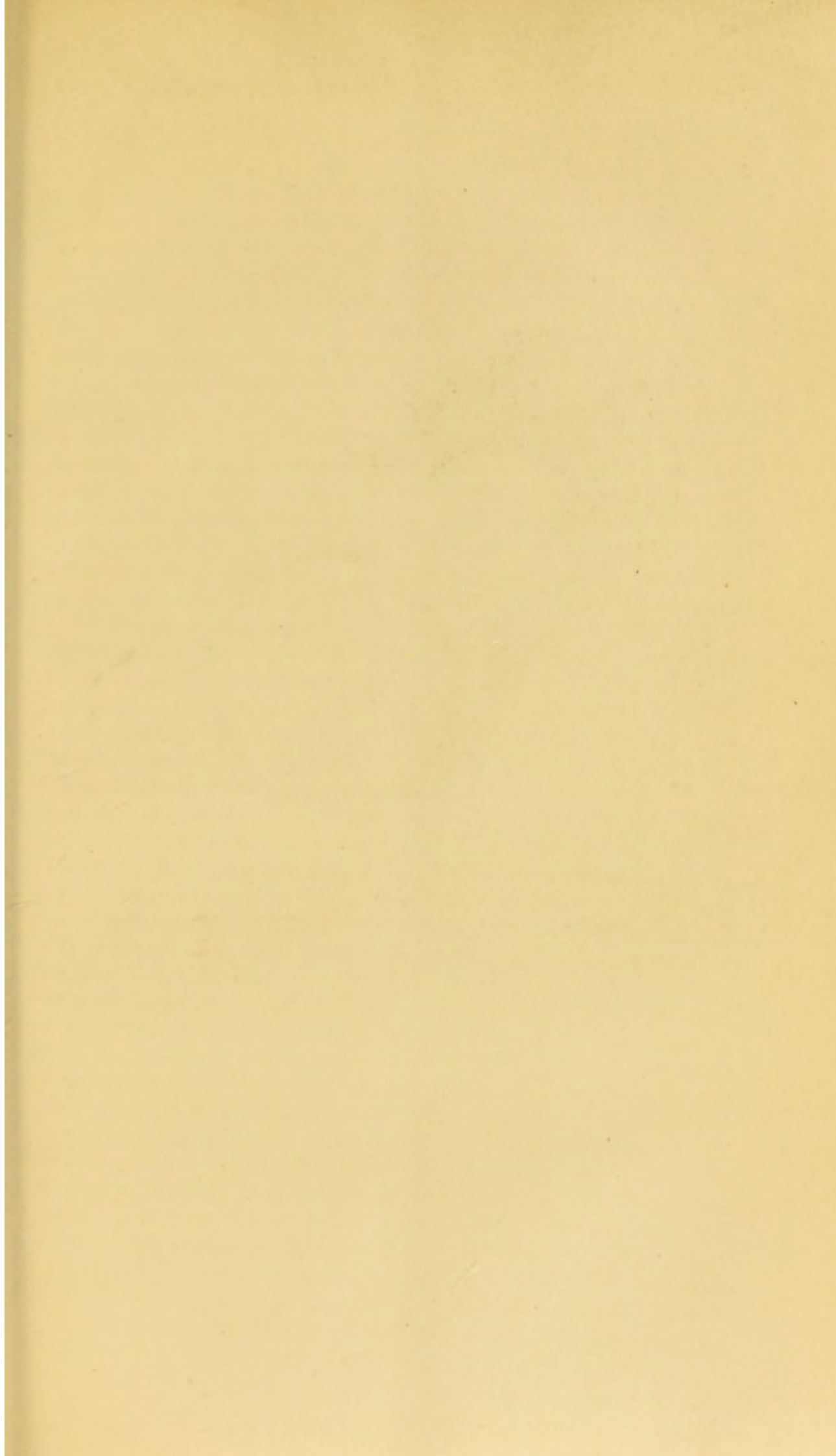
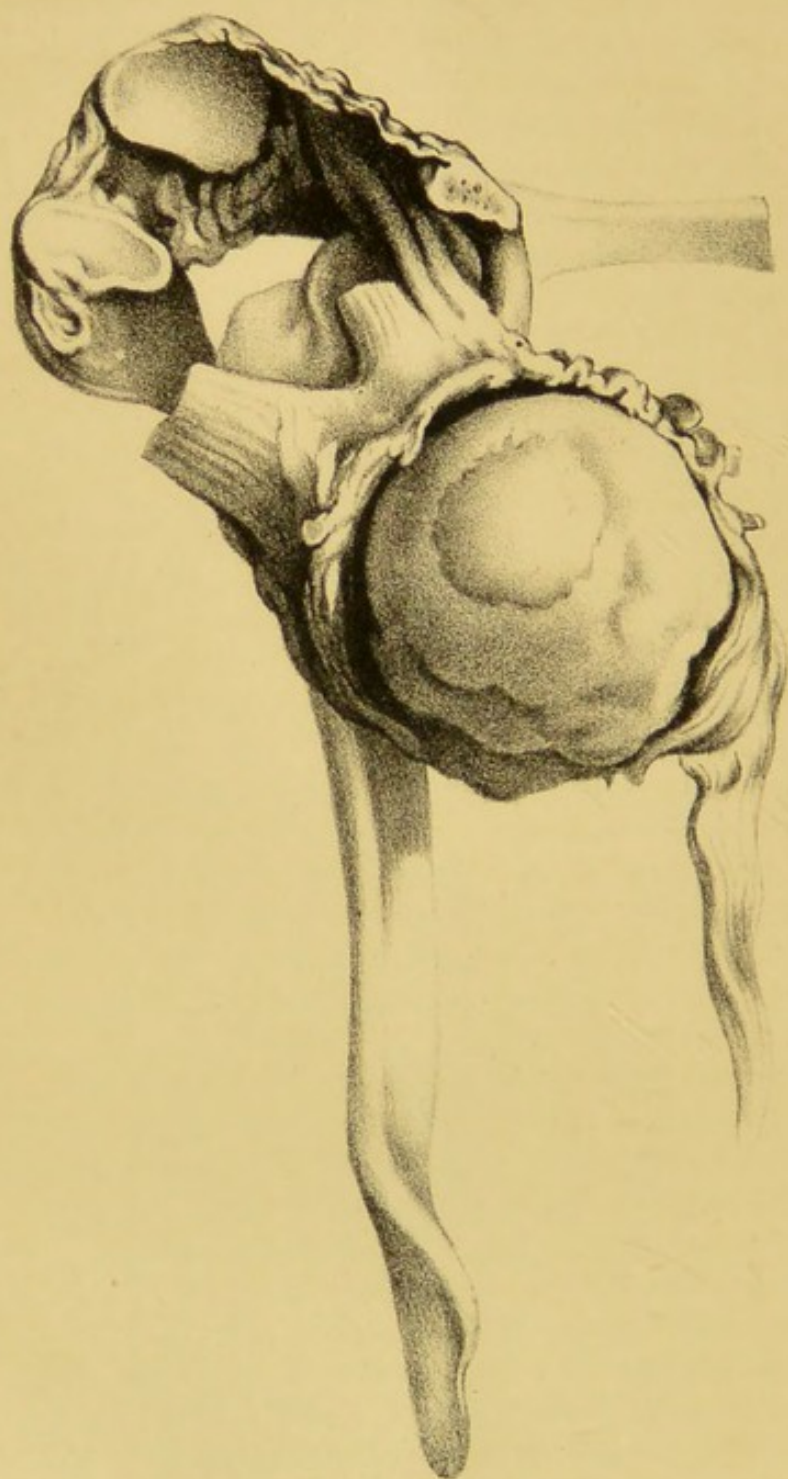


Plate 2.



posterior inferior region of the elevated head of the humerus. The tendons of the four capsular muscles had lost their attachments to the tubercles, the lesser of which processes had become nodulated, and so much enlarged as to have obliterated that portion of the bicipital groove, of which, in the normal state, it forms the internal boundary. The intra-articular portion of the tendon of the biceps had nearly altogether disappeared; about a quarter of an inch of it, however, still remained connected to the glenoid ligament; its extremity was smooth and rounded off, like that of the bone of a stump; it was larger than natural, and, along with the corresponding portion of the glenoid ligament (which was loosened from its attachment), was laid down, as it were, upon the upper part of the glenoid cavity, between which and the head of the humerus (with the intervention of the capsule), it was compressed. The lower portion of the tendon was adherent to the inferior part of the bicipital groove, and to the remains of the neighbouring portion of the capsular ligament.

The acromion, about three-quarters of an inch from its extremity, was divided into two portions, which were held together solely by the fibrous structure which invests the upper surface of the process; but this tissue was so much stretched, that the detached portion was separated from the remainder of the acromion by an interval of three-quarters of an inch. The under surface of the entire process was denuded of periosteum and covered with an ivory-like structure, which was also found investing the articular surfaces of the acromio-clavicular joint. The lower part of the glenoid cavity (which was still covered with cartilage) was completely abandoned by the head of the humerus. The remainder of the socket presented the appearance of ivory, which manifestly must have been established before the head of the bone had perforated the capsule^a.

The resemblance which this case bears to that detailed by Professor Fergusson cannot fail to strike the reader. In each he will remark the elevation of the head of the humerus; its contact with the inferior surface of the acromion process; the deficiency in the capsular ligament, in consequence of which the head of the bone was found lying immediately under the deltoid muscle; the adhesion of the tendon of the biceps to the bicipital groove; the disappearance of its intracapsular portion, and the interposition of the capsule between the upper part of the glenoid cavity and the head of the humerus. We must, therefore, refer them to the same category, and as the

^a See Plate II.

one was known to have been a case of chronic rheumatic arthritis, uncomplicated with injury, and as the history of the other was totally unknown, it appears to me that we cannot avoid looking upon Professor Fergusson's specimen as a well-marked example of that disease.

In the fifth volume of Guy's Hospital Reports Mr. Hilton has published a case of dislocation of the right humerus into the axilla, with an account of the dissection of the parts, thirteen weeks after the accident. The injury was caused by the falling of a load of gravel upon the man while at work in a stooping position. When he had been extricated, his left femur, and some of his ribs, were found to be broken, and his right humerus dislocated into the axilla. The luxation was easily reduced, but great difficulty was subsequently experienced in maintaining the head of the bone in its proper position. The patient died of disease of the chest thirteen weeks after the accident.

The external form of the joint resembled very much the configuration of a shoulder which had been the subject of ulceration, or rupture of the tendon of the long head of the biceps, or what is termed the partial dislocation inwards of the humerus. The rotundity of the shoulder was diminished, as compared with that of the opposite side; the acromion and coracoid processes were very distinct; the head of the humerus was elevated to the acromion; the posterior surface of the joint flattened, and the deltoid muscle atrophied.

On dividing the attenuated deltoid transversely, and retroverting it, the head of the humerus was immediately brought into view, uncovered by its capsule, and without its greater tubercle, which had been broken off. A portion of the capsule, with the greater tubercle of the humerus attached to it, was found interposed between the articular surfaces of the humerus and the scapula. Two considerable openings existed in the capsule. The upper, somewhat circular in outline, was nearly an inch in diameter, and its edges were much thinned and well-defined; this opening corresponded with the surface of extreme pressure between the humerus and scapula. The lower opening was opposite the inferior edge of the glenoid cavity; it was angular in outline, and its edges were thick and irregular. Through this opening the head of the humerus escaped at the time of the accident.

The greater tubercle of the humerus had become retracted by its muscles with the capsular ligament, towards the outer part of the glenoid cavity. The tendon of the long head of the biceps had been separated from its origin at the scapula,

and divided vertically into two portions; one of them had become fixed to the inner edge of the bicipital groove; the other had acquired an adhesion to the tubercle of the humerus in its new position, and encircled the outer half of the neck of the humerus.

To any one who reflects for a moment upon the description given by the author of this interesting case, it must be apparent that two classes of phenomena existed, distinct in their nature, and originating in causes essentially different; one, produced by the injury which occurred thirteen weeks before the death of the patient; the other, resulting from the pre-existence of chronic rheumatic arthritis.

The results of the recent injury were, the angular rent in the lower part of the capsule, through which the head of the bone had passed into the axilla; the fracture of the greater tubercle of the humerus, and the interposition of the capsule between the articular surfaces of the humerus and scapula; while to the effects of pre-existing disease are to be ascribed—the circular aperture in the upper part of the capsule; the detachment of the tendon of the biceps from the glenoid cavity; its adhesion to the bicipital groove and adjoining portion of the tuberosity; the disappearance of its intra-articular portion; and the contact of the head of the bone with the deltoid muscle, and with the acromion and coracoid processes and coraco-acromial ligament.

The splitting of the remains of the tendon of the biceps was, I conceive, an effect of the injury; the broken tubercle, retracted by the muscles attached to it, drawing forcibly with it that portion of the tendon which previous disease had rendered adherent to it, where it forms the outer margin of the bicipital groove. It is obvious that the circular aperture in the upper part of the capsule could not have been the result of absorption from pressure exercised upon it *after* the receipt of the injury; for it is distinctly mentioned that great difficulty was experienced in maintaining the head of the bone in its natural position; that it had a constant disposition to fall again into the axilla, almost by its own weight; and that the action of three of the capsular muscles was annulled by the fracture of the greater tubercle. Under these circumstances, it is impossible to believe, with the author, that “the pressure of the humerus upon the capsular ligament had induced its progressive attenuation and absorption,” *after* the receipt of the injury. The case must, therefore, in my opinion, be considered as an example of dislocation and fracture occurring in a joint previously the seat of chronic rheumatic arthritis.

In the first volume of the *Lancet* for the year 1845, Mr. Alfred Smee has given the particulars of the dissection of a case of partial dislocation of the shoulder upwards; the specimen was found in a body brought to the Aldersgate School of Medicine. He describes the upper part of the greater tubercle of the humerus as having been converted into an articular surface, which corresponded to another smooth surface, formed, partly on the inferior aspect of the acromion, and partly by new bony matter, extending about half an inch into what he terms the *tendon* of the deltoid muscle. The tendons of the supraspinatus and infraspinatus, together with the adjoining portions of the capsule, were *torn* from the tuberosity. The tendon of the biceps was *ruptured*, and the lower portion adhered firmly to the bicipital groove. He also alludes to the presence of several tendinous bands, which he considers to be a new formation, and destined to strengthen the capsule.

"From the above dissection," the author observes, "we are in a condition to infer the nature of the *accident* at the time of its occurrence, and it is apparent that the tendons of the spinati and capsular ligament were *torn* from the tuberosity, and the tendon of the *biceps* ruptured." This mode of dealing with the question will scarcely be deemed satisfactory by those who have carefully studied the diseases of the shoulder-joint; for, in the deficiency of the capsule, the detachment of the capsular tendons, the adhesion of the remains of that of the biceps to the groove of the humerus, the conversion of the greater tubercle into an articular surface continuous with that of the head of the bone and in contact with the acromion, they will not fail to recognise the familiar features of chronic rheumatic arthritis of the shoulder. Nor can I avoid expressing my conviction, that the bony matter, which the author has spoken of as extending from the acromion into the *tendon* of the deltoid, and as forming part of the surface which articulated with the greater tubercle, was not in reality a new formation, but the detached extremity of the acromion, that process being traversed by the usual solution of continuity, with which we are now so well acquainted as one of the anatomical characters of the disease under consideration, but which we may conclude Mr. Alfred Smee to have been totally ignorant of, when he published the preceding case.

As to the tendinous bands observed in the capsule, had the author been acquainted with the morbid appearances noticed in the advanced stages of chronic rheumatic arthritis of the shoulder, he would have known that they were, in reality, the unravelled fibres of the capsular tendons.

In the Museum of St. Bartholomew's Hospital there are preserved two shoulder-joints, which present, in my opinion, well-marked examples of the effects of chronic rheumatic arthritis. They are the shoulders of the same person, and are thus described in the Catalogue^a:—No. 59.—“A shoulder-joint. The capsule is thickened; in its upper part there is an irregular opening, and the tendon of the supraspinatus seems to have been torn away from the tuberosity of the humerus. The tendon of the biceps appears to have been torn near its attachment to the glenoid cavity, and has become adherent to the head of the humerus; a portion of it in shreds remains attached to the glenoid cavity.

“No. 60.—The other shoulder-joint of the person from whom the preceding specimen was taken. The capsule is thickened; the tendon of the biceps, separated from the glenoid cavity, has become firmly adherent to the head of the humerus, and an irregular, nodulated deposit of bone has taken place around the part to which it is now attached. It is presumed that the alterations in these joints were the effects of external injury, probably of dislocation of the humerus.”

It is unnecessary to make any observation upon these specimens, the appearances described being so strikingly characteristic of the peculiar disease which I have been considering; a confirmation of this opinion is derived from the circumstance of the alterations in question existing in both shoulder-joints.

Mr. Barron has described three specimens of chronic rheumatic arthritis of the shoulder in the *London Medical Gazette*, but has assigned external injury as the cause of the alterations which were observed. In each of the three, he found that the tendon of the long head of the biceps was detached from the glenoid cavity, and adherent to the summit of the bicipital groove. In every instance there was some irregularity on the upper part of the glenoid cavity, where the tendon should have been attached; in one case, a part of the adjoining cartilage had been absorbed, while in the other two, the cartilage was removed from the head of the humerus. The absence of any other diseased appearance, he considers as evidence that the detachment of the tendon was the result of accident, and not of any morbid process. He has described the specimens under the name of “a peculiar formation of the biceps muscle,” rather a singular title by which to designate a disease of the scapulo-humeral articulation^b.

^a Page 128, No. 59; and page 129, No. 60.

^b Vol. xx.

Dr. Knox of Edinburgh was one of the first to notice the abnormal states of the intra-articular portion of the tendon of the biceps muscle. In one case, he found that the tendon ceased at the top of the bicipital groove, to the margins of which it adhered; a few fibres, looking like cellular threads, could be with difficulty traced, adhering to, and almost identified with, the internal surface of the capsular ligament. In three other cases the tendon had more or less disappeared; in one, altogether; and in another, the altered state of the tendon existed in both joints. From Dr. Knox's remarks, however, it does not very clearly appear, whether he considered these abnormal conditions of the tendon as the results of disease or injury; he merely observes, that injuries done to the intra-capsular portion of the tendon are exceedingly rare^a.

Mr. Stanley, also, many years ago, published an account of three specimens, in two of which he found the tendon of the biceps separated from the glenoid cavity, and adherent to the bicipital groove, while in the third it was displaced, and lay upon the great tuberosity of the humerus. "It may be a question," Mr. Stanley observes, "whether in these instances of rupture and displacement of the tendon of the biceps, there had been a dislocation of the head of the humerus"^b.

When, however, I reflect upon the extreme rarity of rupture of the tendon in question, in any variety of luxation of the shoulder, and also upon the important fact, that the previous history connected with the specimens described both by Dr. Knox and Mr. Stanley, was totally unknown,—I cannot avoid adding these to the already extended series of cases of chronic rheumatic arthritis of the shoulder, in which the abnormal conditions of the joint were supposed to have resulted from accidental luxation, or other external injury. "The statement," as Mr. Adams has observed, "made in the report of various cases in surgical works, and in the catalogues of museums, in which we find it briefly noted, that the tendon of the biceps was found ruptured, has been made by the writers confessedly without any knowledge of the previous history of the case, the anatomical characters of which they are describing. On this account, we feel the less delicacy, after long and patient consideration of the subject, in expressing our conviction that the tendon of the biceps, in the numerous cases published, was not (as supposed to be) ruptured by accident, but absorbed as the result of disease."

To the preceding catalogue of examples of chronic rheu-

^a London Medical Gazette, vol. i.

^b Ibid. vol. iii.

matic arthritis of the shoulder-joint, which, as it appears to me, have been described under the various erroneous appellations of:—Partial luxation of the head of the humerus; rupture of the tendon of the biceps; dislocation of the tendon from its groove; peculiar formation of the biceps muscle, &c.;—must be added those which have been recorded by Sandifort, Cooper, Hargrave, Soden, and Callaway. It is unnecessary, however, to enter into a full consideration of these cases, as this has already been done to a great extent by Mr. Adams in the valuable memoir to which I have repeatedly had occasion to allude. It will be sufficient to mention here the principal circumstances which demonstrate, that in every one of the instances to which I have just alluded, the various conditions described are to be referred, to the effects of disease, and that accident (whenever such was known to have occurred) is only to be looked upon, as Mr. Adams has observed, when commenting upon Mr. Soden's case, as the immediate exciting cause of the development of a local disease, a predisposition to which had already existed in the constitution.

In the case recorded by Sandifort, as an example of partial luxation of the head of the humerus from external injury, there existed a new articulating surface, formed partly upon the upper portion of the glenoid cavity, and partly upon the root of the coracoid process of the scapula. It was here and there porous, but for the most part covered with a dense, polished, ivory-like substance. The head of the humerus was enlarged, and its summit was in contact with the under surface of the acromion, coraco-acromial arch, and acromial end of the clavicle. The upper part of the greater tubercle had also suffered from attrition. No mention has been made of the state of the capsular ligament, or of the tendon of the biceps muscle^a.

In another case, described by the same author, the acromioclavicular articulation was enlarged, and the acromion process divided into two portions.

The specimen described in Sir Astley Cooper's work is so familiar to the profession, and so generally quoted by surgical writers, that it is quite unnecessary to reprint it upon the present occasion. I may, however, remark, that it is much more extensively known as an instance of what it is not, than as an example of what it really is. It is this case which is always adduced in support of their doctrine, by those who maintain the possibility of the occurrence of such an accident, as partial

^a Museum Anatomicum, vol. iv. tab. cli.

luxation of the head of the humerus upon the outer side of the coracoid process.

Many years have elapsed since the publication of the great work of Sir Astley Cooper, and numerous and valuable are the memoirs and essays that have, since that time, appeared upon the injuries of the shoulder-joint; but in almost every one of these treatises, whenever mention has been made of this specimen (found accidentally in the dissecting room, and of the previous history of which all are ignorant), it has been referred to as an undoubted example of the effects of external injury, and as affording satisfactory confirmation of an opinion, the correctness of which is highly improbable, namely, that it is possible for the smooth and lubricated surface of the globular head of the humerus to rest permanently upon the margin of the glenoid cavity. And yet the real nature of the case recorded by Sir Astley Cooper, and its true pathology, have been, upon several occasions, clearly demonstrated, and brought prominently before the profession by Mr. Adams, as, for instance, in his observations upon the subject made to the British Association in 1836^a, in his memoir upon the "Abnormal Condition of the Shoulder-Joint," published in 1849^b, and in his numerous communications made to the Pathological Society of Dublin, and recorded in the volumes of both Series of this Journal. But when an erroneous opinion, pronounced by an eminent and justly distinguished author, once becomes generally diffused, it frequently happens that years must elapse before it is overthrown, and truth established in its place.

I cannot better express my own opinions upon the case in question, than by quoting the observations made upon it by Mr. Adams. This eminent surgeon, in the article already so often referred to, remarks:—"The foregoing dissection, which is illustrated by an engraving in Sir A. Cooper's work on Fractures and Dislocations, should not, in our opinion, be considered in any other light than as an excellent specimen of the anatomical appearances to be found in those who have had chronic rheumatic arthritis of the shoulder-joint, for we consider that these appearances were not the result of an accidental luxation, but the true effects of this slow chronic disease. If Sir A. Cooper had known anything of the history of the case during life, we might hesitate to call in question the opinion of so eminent an authority on such a subject; but as the only grounds he possessed for forming any opinion were derived from the mere

^a See *Athenæum*, September 10th, 1836.

^b *Todd's Cyclopædia*, vol. iv.

anatomical appearances observed in the shoulder-joint of the subject in the dissecting-room, we conceive that every one who studies the report of this dissection, accompanied as it is by an engraving, is at liberty to draw his own conclusion as to what was the real nature of the case; and to us it seems quite clear that the appearances observed in the examination of the case referred to by Sir A. Cooper were exactly those most frequently found to be the result of chronic rheumatic arthritis as it affects the shoulder-joint. The new form assumed by the head of the humerus; the fact of the cartilage having been removed, and its place supplied by an ivory enamel—the piece of cartilage which hung loosely into the cavity being connected with the synovial membrane, at the upper part only, by two or three small membranous bands; the attachment of the capsular ligament to the coracoid process; all these circumstances, related in the above-mentioned case, strongly remind us of what we now know to be characteristic marks of the disease we have denominated chronic rheumatic arthritis, as we have so often met with them.” “On the other hand, such appearances afford no evidence whatever that an accidental luxation was the cause of them: certain it is that appearances, exactly similar to those described in Sir A. Cooper’s case, have been met with in cases in which their causes could not be attributed to accident, because no injury had been received; while in others, it was useless to refer to accident, inasmuch as the morbid action had similarly affected *both shoulder-joints*, so that, by the dissection of such cases, we have convinced ourselves that *disease, not accident*, was the source of the morbid appearances.” “Sir A. Cooper, in our opinion, somewhat *gratuitously* supposes that his specimen was the much sought-for example of the anatomy of the accident called partial luxation. We say *gratuitously*, because the previous history of the case he alludes to was unknown, and the accident *supposed* to have occurred.”

With respect to the long head of the biceps, it is stated that it seemed to have been ruptured near its origin, for at this part the tendon was very small, and had the appearance of being a new formation. Those who have studied the pathology of the disease in question will, I imagine, infer from this statement, not that the tendon had been ruptured and became re-united, but that it was in that atrophied condition which is so frequently observed preceding its complete disintegration and removal.

Before leaving the consideration of this case, it should be stated, that even Mr. Bransby Cooper, so devoted a follower of the doctrine taught by his distinguished relative, has expressed

his belief that partial dislocations of the shoulder are, in general, the results of disease of the articulation^a.

In Mr. Hargrave's case^b, recorded as one of partial luxation of the head of the humerus inwards, the result of accident (but the history of which is unknown), I may refer to the following circumstances, as constituting sufficient evidence that the appearances which he has described originated in chronic rheumatic arthritis, viz., the loss of the intra-articular portion of the tendon of the biceps muscle; the adhesion of the remainder of it to the bicipital groove of the humerus; the disappearance of the glenoid ligament; the existence of foreign bodies and osseous vegetations; the removal of the articular cartilages; the formation of the ivory deposit; the enlargement of the head of the humerus; the coracoid process having become articular; and the existence of chronic rheumatic arthritis in the corresponding acromio-clavicular articulation, a circumstance to which Mr. Hargrave has not alluded.

It is unnecessary, upon the present occasion, to give even an abstract of Mr. Soden's case^c, as it has appeared in the pages of the former Series of this Journal, among the Proceedings of the Pathological Society of Dublin, where it has been made the subject of close investigation, and where it has been clearly demonstrated, that the fall alluded to in the history of the case had only this much to do with the partial displacement upwards of the head of the humerus which succeeded to it, that this accident became the starting-point of an inflammatory action of a rheumatic character, under the influence of which the head of the humerus became elevated to the acromion process, and the tendon of the biceps displaced; just as in the case of the comedian, Mathews (detailed by Mr. Snow Harris, at the meeting of the British Association in Dublin, in 1836), where a fall became the exciting cause of the development of chronic rheumatic arthritis of the hip-joint, giving rise to appearances which were supposed to indicate that an intra-capsular fracture of the neck of the femur had been produced, and had become united by bone.

I cannot, however, pass on without expressing my regret that, in several of the systematic treatises upon surgery that have recently appeared, in which Mr. Soden's case has been mentioned, no allusion whatever has been made to the elaborate analysis of it published in the *Cyclopædia of Anatomy and Physiology*^d,—I allude more especially to the works of Pro-

^a Lectures on Surgery.

^b Edinburgh Medical and Surgical Journal, 1837.

^c Medico-Chirurgical Transactions, 1841.

^d *Loc. cit.*

fessors Ferguson and Pirrie, both of whom have noticed the case in question as an example of what Mr. Soden termed it, without appearing to be at all aware that any doubt has ever been thrown upon it. Referring the reader, then, to the analysis above mentioned for a complete refutation of Mr. Soden's view of his own case, I shall briefly detail the particulars of an analogous instance, of which I gave a full account at a meeting of the Surgical Society of Ireland in the year 1840.

The patient, an elderly female, had for many years suffered from chronic rheumatic arthritis of the right shoulder-joint, in consequence of which the head of the humerus became gradually displaced upwards, until at length it passed the level of the coracoid and acromion processes: it was also drawn forwards, so that the coracoid process was obscured, the infra-clavicular space increased in depth, and the posterior region of the joint much flattened. In Plate I., Figures 3 and 4 represent the right and left shoulders of this patient, and show a remarkable contrast in the external appearance of the two joints.

Upon examining the affected articulation after death, the capsular ligament was found enlarged, and almost as thin as synovial membrane; superiorly it was altogether deficient. The tendon of the biceps was perfect as to structure, but crossed the inner instead of the upper surface of the head of the humerus, the cartilage of which was abraded, and osseous deposits had taken place near the bicipital groove, and around the margin of the head of the bone. The acromion was thinner than natural, excavated upon its inferior surface, and at a distance of half an inch from its anterior extremity, divided into two portions, which were only connected to each other by the fibrous structure which invests the upper surface of the process.

In the case of Charles Mailly, recorded by Mr. Adams, the partial displacement of the head of the humerus upwards, with dislocation of the tendon of the biceps inwards, was found in *both* shoulder-joints.

Sir Philip Crampton has lately informed me that he has had under his care, for a considerable period, a patient labouring under this chronic rheumatic disease of the shoulder: he has watched the case from its commencement, before there was any deformity of the articulation, and has been able to observe the gradual elevation of the head of the humerus, the summit of which is now placed above the level of the acromion.

In 1849 a dissertation was published by Mr. Callaway upon "Dislocations and Fractures of the Clavicle and Shoulder-joint," being the Jacksonian Prize Essay for the year 1846.

In this work, a separate chapter is devoted to the consideration of injuries of the long tendon of the biceps muscle, in which the author notices the different cases to which I have referred, but looks upon them as examples either of rupture or dislocation of the tendon, produced by external injury. As I have already expressed my opinion respecting these cases, it is unnecessary to allude particularly to Mr. Callaway's observations; it is, however, to be regretted, that in a treatise otherwise meritorious, so erroneous a view should have been adopted with regard to the nature of the morbid appearances in the instances in question.

The remarkable elevation of the head of the humerus, to which the name of "partial luxation upwards" has been given, has invariably been ascribed to the destruction or displacement of the tendon of the biceps, not only by those who look upon it as the result of external injury, but also by those who, in my opinion correctly, refer it to the effects of chronic rheumatic arthritis. Mr. Adams, for instance, observes that "the effects of the loss of the tendon of the biceps are such, that the head of the humerus is at once elevated by the deltoid, and kept habitually pressed up against the under surface of the acromion." Mr. Canton, also, in his description of a case of this disease, which he brought under the notice of the Westminster Medical Society, and in which the tendon was divided into four or five slips, remarks, that "this condition of the tendon had permitted the head of the humerus to shift upwards, and thereby to articulate with the under part of the acromion process"^a.

The correctness of this opinion certainly admits of being questioned, and I am inclined to believe that in the cases under consideration, the cause has been mistaken for the effect. I do not mean to say that the accidental rupture or displacement of the tendon of the biceps in a healthy shoulder-joint would not be followed by the elevation of the head of the humerus, but I suspect that in cases of partial luxation upwards, resulting from the rheumatic disease in question, the sequence of events is different from that described by authors.

I believe that in these cases, the elevation of the head of the humerus occurs at a comparatively early period of the disease, and is a gradual process, and that the displacement is not in any instance sudden, as might be expected to happen were it consequent upon the rupture or dislocation of the tendon. It is difficult to say in what it originates, but it is probably to be ascribed to the spastic contraction of the muscles,

^a London Medical Gazette, 1849, vol. viii. p. 958.

and their increased irritability under the influence of the rheumatic inflammation.

From the moment when the shoulders (from the cause which I have suggested) begin to be elevated, the tendon of the biceps is put upon the stretch, and pressed against by the head of the humerus, which unceasingly tends to pass still further upwards. When the latter has come into contact with the under surfaces of the acromion, and coraco-acromial arch, the effects of compression, as far as the tendon is concerned, have then reached their utmost limits. In the earlier periods of such cases, the tendon will be found in one or other of two conditions, either displaced from its natural situation, and running over the inner instead of the upper surface of the head of the humerus, or else maintaining its normal position, but presenting alterations of form and structure, which will be found to vary, according to the length of time during which it has been subjected to pressure. At first it becomes flattened and increased in breadth, but at a later period its fibres are separated from one another, and its under surface acquires a corroded appearance^a. The process of absorption goes on throughout the whole extent of the compressed portion, until at length a complete solution of continuity takes place; and should an opportunity of examining the interior of the joint be afforded at this period, the lower extremity of the tendon will be found to have become adherent either to the capsular ligament or to the bicipital groove, or perhaps to both, while the upper will be seen hanging loose in the articulation. At a still later period, the whole of this superior fragment, in almost every instance, totally disappears.

The displacement of the intra-articular portion of the tendon from its normal course, I believe to be simply owing to its having glided downwards over the globular head of the humerus, to escape, as it were, from the gradually increasing pressure exercised upon it by that process; and I am further of opinion, that when it occurs at all, it happens at a comparatively early period of the disease, and while the head of the humerus still presents a smooth, cartilaginous surface. There is nothing more easy to comprehend than that the undue elevation of this polished ball should cause the equally smooth tendon to glide from its summit. When it has once attained its new position upon the inner surface of the head of the bone, it to a certain extent ceases to be overstretched, and the effects of pressure are but slightly experienced; hence it is that the tendon, thus

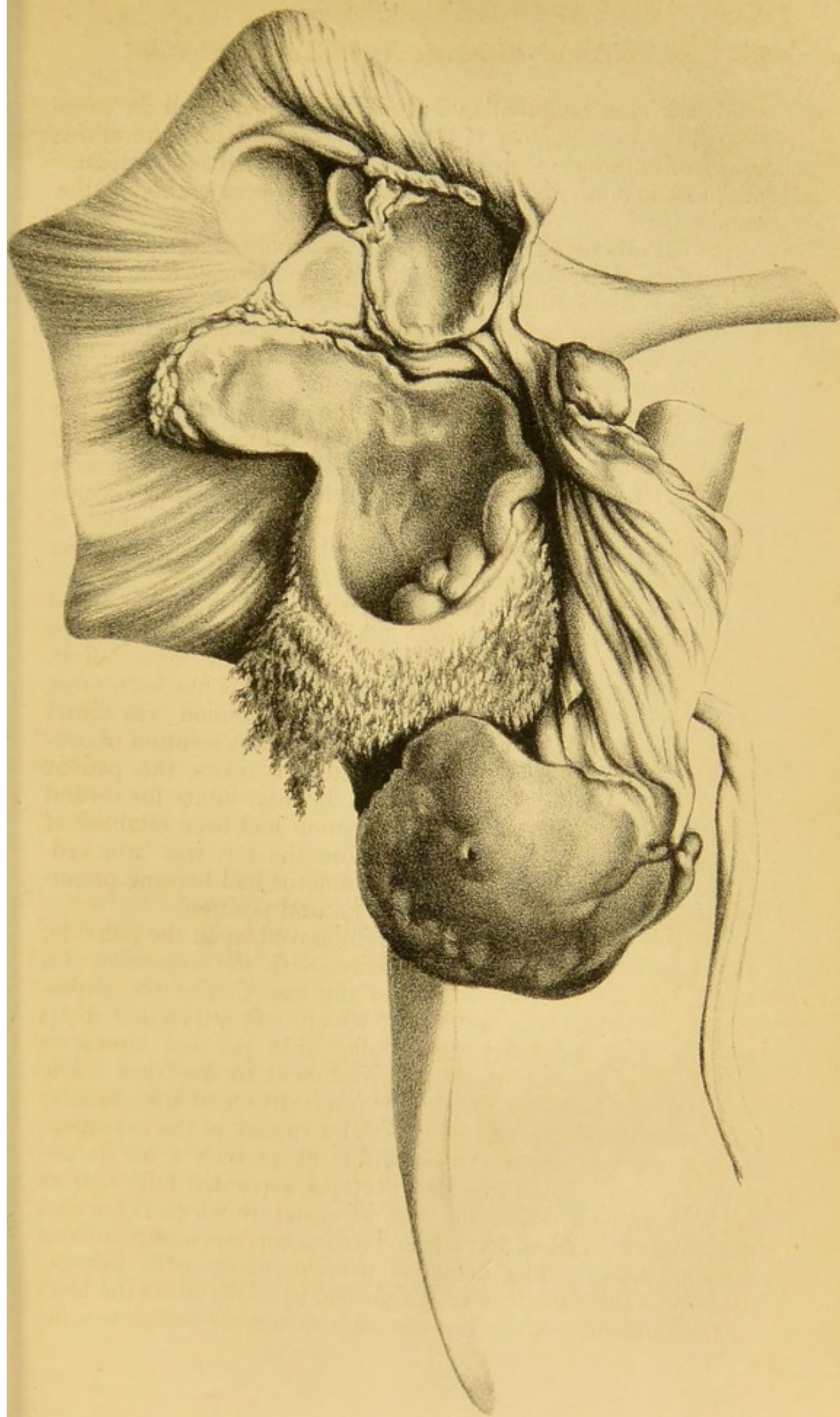
^a See Plate I. Fig. 5.

displaced, may be found in a state of integrity even in cases where the consequences of the long-continued pressure of the head of the humerus upon the other structures of the articulation, and upon the contiguous textures, are seen carried to the utmost.

In the advanced stages of this remarkable affection, should the tendon still continue perfect, the displacement may implicate that portion which, in the normal state, is extra-capsular, but which, in consequence of the singular changes induced by the disease, has now become intra-articular. In such cases the tubercles will be found amalgamated with the head of the bone; the sulcus which here marks the anatomical neck of the humerus being obliterated; the corresponding attachments of the capsule destroyed; and the summit of the bicipital groove filled up. The tubercles and head of the humerus thus become one large articular surface, and the displaced tendon, unless it has become disintegrated, will generally be found crossing that portion of it which corresponds to the lesser tubercle.

That the doctrine which ascribes the elevation of the head of the humerus to the previous loss of the tendon of the biceps is erroneous, or at all events not universally true, appears from the fact, that this partial displacement upwards has been often observed in cases where, after death, the tendon was found occupying its natural position, and without any solution of continuity. In the case to which Plate III. refers, the patient laboured under the disease in both shoulder-joints for several years before her death, but the affection had been established in the right articulation long before the left was attacked. Upon each side, the head of the humerus had become prominent and elevated much above its natural position.

When the deltoid muscle was removed upon the left side, the capsule was found to be entire, with the exception of a small aperture, corresponding to the insertion of the supraspinatus muscle, the tendon of which was unravelled in its texture, and evidently undergoing that peculiar alteration which precedes the loss of its attachment to the bone. The head of the humerus (with the intervention of the capsule) was pressed closely against the under surface of the acromion, which process, about three-quarters of an inch from its extremity, was divided into two portions, separated fully half an inch from each other, the fibrous structure which connected their upper surfaces having suffered a corresponding amount of elongation. The detached portion, along with the extremity of the clavicle, was also pushed upwards above the level of the remainder of the process. There was no complete solu-



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tion of continuity in the tendon of the biceps; it still adhered above to the glenoid ligament, but it was greatly on the stretch, and its inferior surface^a, throughout the greater part of the intra-articular division of its course, presented a corroded appearance, and its fibres were unravelled and separated from one another. It was not displaced: it crossed the summit of the humerus in the usual situation and direction.

It is manifest that here, at all events, the displacement of the head of the humerus upwards upon the left side was not due to any cause having reference to external violence, for there was neither rupture nor luxation of the tendon, nor laceration of the capsular ligament.

In the opposite shoulder^b the disease was further advanced, and the elevation of the head of the bone more remarkable. When the capsule was exposed, it was found to have acquired several abnormal adhesions. Its normal attachment to the superior part of the glenoid cavity seemed to have been transferred, as it were, to the acromion, clavicle, and coracoid process, and to have become identified with the coraco-acromial ligament, which could no longer be distinguished as such. The capsule was thin and atrophied, and in many places as translucent as if it had been composed merely of synovial membrane. It was distended by a viscid synovial fluid, and its interior presented some very remarkable appearances. Besides numerous clusters of exceedingly vascular fimbriæ, suspended by delicate pedicles from its inferior portion, vast numbers of tendinous-looking fibres were seen converging towards the tubercles of the humerus; upon close examination they were found to be those of the tendons of the capsular muscles, separated from one another, flattened and expanded. They terminated at different distances from the tubercles, and there existed no vestige of the insertion of any of the capsular muscles into these processes, which had become articular. In the upper part of this abnormal capsule there were several thin, concave plates of bone, the under surfaces of which were in contact with the head of the humerus, and resembled polished ivory. The tendon of the biceps was adherent to the lower part of the bicipital groove, and to the adjoining portions of the capsular ligament, the entire of its intra-articular portion having disappeared.

It was, however, in the osseous fabric of the joint that the most singular deviations from the normal state were observed. About three-quarters of an inch of the extremity of the acro-

^a See Plate I. Fig. 5.

^b See Plate III.

mion had altogether disappeared, and a broad, thick, concave plate of bone passed downwards from the shortened process, and became perfectly continuous with the upper and outer part of the margin of the glenoid cavity, which thus appeared as if a coracoid process had sprung from its external side. The acromial extremity of the clavicle was enlarged, excavated upon its under surface, and polished by the attrition of the head of the humerus; it was distant from the acromion fully three-quarters of an inch, but connected to it by an exceedingly dense fibrous tissue, which constituted the highest part of the capsule. The superior part of the enlarged glenoid cavity presented an enamelled surface, but its inferior portion was still covered by the cartilage of incrustation. There was no trace of the glenoid ligament. The head of the humerus was enlarged, irregular in form, destitute of cartilage, and polished, and the tubercles, which were studded with osseous granules, had become continuous with its articular surface, and also with each other, the commencement of the bicipital groove having been obliterated. This specimen furnishes the only example I have ever seen of the formation of an osseous plate connecting the glenoid cavity with the acromion, but there is a preparation, somewhat similar in other respects, contained in the Museum of the Royal College of Surgeons in Ireland^a. Although the circumstance has not been alluded to by the author of the Catalogue, yet we have the authority of Mr. Adams for stating that in this instance, "the acromial end of the clavicle is unsupported, and that the acromion process has been removed for the amount of an inch in extent"^b.

In the case which I have described above, I think it highly probable that the removal by absorption of the extremity of the acromion upon the right side had been preceded by the solution of continuity of that process, so often seen in this rheumatic disease, and which actually existed in the opposite shoulder; and I have been influenced in forming this opinion, not so much by the fact of this lesion of the bone being so often symmetrical, as by the circumstance, that the length of the spine of the right scapula, measured to the end of the shortened acromion, was precisely equal to that of the left, measured to the situation of that remarkable lesion which has been in so many instances mistaken for fracture caused by external violence.

I may here observe, that in cases of displacement of the

^a Catalogue, vol. ii. p. 397, E. b. 901.

^b *Loc. cit.* p. 588. See also Cruveilhier, liv. ix.

head of the humerus upwards resulting from the disease under consideration, the lower portion of the glenoid cavity is frequently found covered by its cartilage, the ivory deposit existing above; and that the vertical extent of surface thus invested by cartilage may be taken as a measure of the amount of displacement.

Among all the numerous and varied phenomena which occur during the progress of chronic rheumatic arthritis of the shoulder, there is none more remarkable, nor one for which it is more difficult to offer any satisfactory explanation, than the detachment of the extremity of the acromion process. It is most frequently to be noticed in the advanced stages of the disease, but I have more than once seen it at a period prior to the destruction of the tendon of the biceps; it is in many instances symmetrical, and in general occurs where in early life the epiphysis joined the remainder of the process. I have, however, in one instance found the entire of the acromion thus separated from the spine of the scapula. It may co-exist either with hypertrophy or atrophy of the acromion; it may occur with or without perforation of the capsular ligament; or with absorption in some instances, and displacement in others, of the tendon of the biceps, or finally in cases where the tendon is perfect as to structure and normal as to position.

"In many cases," says Mr. Adams, "in which the shoulder-joint has long been the seat of this chronic disease, the acromion process has been found traversed in the line of junction of its epiphysis, by a complete interruption of its continuity, as if fractured; we say, as if fractured, for we are convinced that this solution of continuity of the acromion process is not really a fracture produced by external violence, but a lesion, which so frequently exists in combination with chronic rheumatic arthritis of the shoulder, that we are compelled to look upon it, in these cases, as a peculiar organic change, the result of chronic rheumatic disease. We do not pretend to account for the separation of the acromion process into two portions, nor can we say why it is that the division usually occurs in the original line of the epiphysis, particularly at the late period of life at which we generally witness this phenomenon. In some of these cases we have found the acromion in a state of hypertrophy; in others in a state of atrophy; but in no case did there seem to be any attempt at ossific deposition on the contiguous surfaces of the separated portions of the acromion, a circumstance which might be expected if a fracture had occurred"^a.

^a *Loc. cit.* p. 587.

By those who have not made the subject of chronic rheumatic arthritis a special object of their study, it might be supposed that the singular solution of continuity of the osseous tissue, such as that to which I have been alluding, was only to be met with in the acromion process. This, however, is far from being the case, for I have seen half of an hypertrophied olecranon thus separated from the shaft of the ulna, in an aggravated case of this disease affecting the elbow-joint, and in several instances of chronic rheumatic arthritis engaging the articulation of the knee, which are preserved in the Museum of the Richmond Hospital, large portions of the condyles and head of the tibia may be seen separated from the remainder of the bone. In one of these examples the detached mass is of such a size as to embrace the insertion of the ligament of the patella.

Independently of the absence of ossific deposit, or of any attempt at reparation, there are two remarkable circumstances to be observed in these cases, namely, that the detached portion is never at once separated from the rest of the process, whatever may be the particular bone concerned; nor is the fibrous tissue investing the external or subcutaneous surface of the process ever torn: conditions which might be expected to be present (in the case of the olecranon at all events), if the phenomenon in question was the result of external violence. On the contrary, the two portions remain in contact, frequently so close and perfect that a careful examination may be required before the exact seat of the interruption of continuity can be discovered; and hence it has several times occurred to me to find this *apparent* fracture of the acromion, in specimens of this rheumatic affection of the shoulder, preserved in different museums: although in the printed description of such no mention had been made of anything abnormal in the condition of that process.

It should also be recollected, that when the acromion is broken by external violence, the shoulder droops, and the detached portion of the process sinks along with it, but when the solution of continuity is the result of the disease in question, a precisely opposite condition is frequently observed, the separated portion being pushed by the elevated head of the humerus above the level of the rest of the process.

It is true that, at a period more or less remote, the detached portion may become widely separated from the rest of the acromion^a, but this has been gradually accomplished by the continued pressure of the head of the humerus, stretching and

^a See Plate II.

elongating the fibrous structure, which naturally invests the superior surface of the process.

It would appear from the analytical investigations conducted by Mr. Harper, and recorded by Mr. Canton, that in this rheumatic disease of the shoulder a large proportion of the earthy matter naturally existing in the bone is removed; but I scarcely deem the knowledge of this fact adequate, of itself, to account for the solution of continuity in the acromion; and it appears to me that, in our endeavours to explain this remarkable phenomenon, we can at present only go so far as to suppose that, under the influence of this specific arthritic inflammation, the intimate structure of the bones undergoes some peculiar molecular alteration, the exact nature of which is as yet hidden from us, but the effects of which are to diminish its cohesive power, and to render it liable to yield to a pressure, which, though perhaps not powerful, is unceasingly exerted upon it. In many of these cases I have found the affected bones soft, porous, and spongy: these conditions in some instances co-existing with increase of volume, constituting that state of the osseous tissue which Lobstein has described under the title of "Osteoporosis"^a.

A long and careful consideration of the subjects discussed in the preceding pages leads me to believe, that the occurrence of partial dislocation of the head of the humerus upwards, as an immediate result of rupture or displacement of the tendon of the biceps muscle from accidental violence, has not been anatomically demonstrated; that all the cases accompanied by dissections, that have hitherto been published, as examples of the luxation in question, resulting from injuries to the tendon, have, in reality, been instances of the effects of chronic rheumatic arthritis; and that the morbid conditions, which in them have been regarded as affording the clearest evidence of the joint, having at some former period suffered from external violence, are among the most constant effects of this disease. "Notwithstanding all these lesions, namely, the total disappearance of the articular part of the tendon of the biceps; the perforation of the superior part of the capsular ligament by the head of humerus and the separation into two portions of the acromion process,—we feel convinced that all these phenomena combined should by no means be considered as proof of any accident having occurred to produce them; but, on the contrary, should be looked upon as the usual results of chronic rheumatic arthritis of the shoulder"^b.

^a *Traité d'Anatomie Pathologique*, tom. ii.

^b *Cyclopædia of Anatomy*, *loc. cit.*

