

Contributions to the practical surgery of new growths or tumours. Series V. Cartilaginous and bony growths / by John Birkett.

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PRACTICAL SURGERY

OF

NEW GROWTHS OR TUMOURS.

SERIES V.

CARTILAGINOUS AND BONY GROWTHS.

BY

JOHN BIRKETT.

FROM GUY'S HOSPITAL REPORTS.

LONDON :

1866.

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SERIES V.
CARTILAGINOUS AND BONY GROWTHS.

By JOHN BIRKETT.

IN an essay on 'Exostosis'¹ Sir A. Cooper has included under that term all growths springing out of the medullary cavities of bones, or from their investing fibrous tissue, the periosteum. Thus, he writes, "Exostosis has two different seats—it is either periosteal or medullary." In another paragraph he states, "Exostosis is of two kinds, either cartilaginous or fungous." In this passage (read by the light of our present knowledge) it is quite clear that diseases are placed together which, in their elementary structures as well as in their growth and results, are perfectly different. A reader of this Essay, at the present day, will at once see that the author has introduced cases which belong to the class of cancers.

In the first series of these papers ('Guy's Hospital Reports,' 1857) I have published cases in which cancer was developed

¹ 'Surgical Essays.' By Astley Cooper, F.R.S., and Benjamin Travers, F.R.S. Third edition, 8vo, 1818.

in relation with a metacarpal bone (Case 3), with the scapula (Case 4), the femur (Case 5), and a very remarkable case of osteoid cancer of the forearm (Case 14). In all of these the details correspond precisely with those stated by Sir A. Cooper to characterise "Fungous Exostosis."

From the series of cases to follow I have carefully excluded, therefore, every one in which the cancerous element was developed, but I shall have to relate how even a tumour composed entirely of cartilage may destroy life as cancer does, when there happens to be but one growth only of that disease. (Page 407, case 5.)

I have headed this paper "Cartilaginous and Bony Growths" because it is extremely rare to meet with a tumour composed solely of cartilage without bone, or with one consisting of bone without some trace of cartilage. In those enormous masses of new tissue resembling more or less closely foetal cartilage, to be described in this paper, the bony element occurs usually more especially in connection with the bone from which the growth originally sprouted. But this is not always the case, for sometimes, although the cartilage growth is firmly attached to a bone, no osseous tissue is developed.

The best examples of bone growth without cartilage or with but slight traces of it are seen in some of those cases in which outgrowths of bone take place from the apophyses of the flat or long bones, and remain in their original site some time before removal. But probably in all such cases cartilage tissue was associated even with these in the earlier stages of their development (See prep. 1152⁴⁸.) Solid hard growths of compact bone-tissue occur under the name of ivory exostoses, and are generally developed upon the bones of the skull.

The tendinous attachments of muscles are also sometimes changed into bone, but whether a development of cartilage precedes that change I have not yet had an opportunity of investigating. When exostoses grow from long bones, even in youth, cartilage is not always found. Such was not the case with a long bony process extending from the trochanter minor which I found many years since in the dissecting-room during the dissection of the body of a young man. In this instance there was not any cartilage. (See prep. 1152⁵.)

I shall commence with a description of the growths chiefly

composed of cartilage. The cases are arranged according to the usual division of the bones of the skeleton into those of the Head, Trunk, and Extremities.

The bones of the head and face.—I place these together because, although the growth of cartilage may spring in the first instance from those composing the face, it sometimes extends to the base of the skull, and even invades the cranial cavity.

A fine example of a cartilaginous growth involving the right side of the face has already been published in the First Volume of the ‘Guy’s Hospital Reports,’ in 1836. The growth is termed “exostosis,” but it really consists of cartilage containing spiculæ of bone. The completion of the case is related in the Seventh Volume, 1842.

The man, æt. 24, was fifteen years old when he first noticed something hard in the right nostril. In nine years it had reached the size represented in the drawing 4⁵⁰, and from which the plate in Vol. I was copied, when Mr. Morgan partially removed the growth by cutting off that part which forms the preparation 1666³². The growth increased slowly, the man survived the operation seven years, and the discovery of the disease sixteen. I believe that in this instance the growth did not invade the cranial cavity, but there is a case recorded in which this happened.¹ A young woman died at the age of twenty-eight years, the disease having been first observed when she was seventeen. She therefore survived the discovery of the growth about eleven years.

Mr. Moore, of the Middlesex Hospital, showed a young man whose face was affected with a similar disease, at one of the meetings of the Royal Medical and Chirurgical Society. The sufferer subsequently died, and the disease was found to extend into the cranium.

A cartilaginous growth, removed by Key from a patient twenty-nine years old, together with the right half of the lower jaw from which it had been growing nine years, is seen in preps. 1091^{15, 16}.

The vertebræ.—In the museum of the College of Surgeons there is a preparation (No. 207) of “the section of a tumour,

¹ Mr. T. Holmes, ‘Trans. Path. Soc.,’ vol. x, p. 250, with a plate.

thirteen pounds in weight, which grew in front of the lumbar vertebræ of a soldier thirty-seven years old. It was loosely connected with the vertebræ by its investing fibro-cellular tissue."¹

Ribs.—Also, in the College Museum is a preparation (No. 200) "of a nodulated cartilaginous tumour, seven inches in diameter, which formed on a man's ribs."²

I allude to this preparation as it supplies a parallel case to the one to be described next.

CASE 1.—*Enormous mass of enchondroma developed on the front of the Thorax; about ten years' growth; death.* (Plate II, Drawing 403⁷¹.)

For the opportunity of seeing this remarkable case I am indebted to my former dresser, Mr. Edmund H. Galton, of Brixton. It is, perhaps, one of the most extraordinary examples of enchondroma on record; and it so closely resembled some of the diseases of the breast that I thought that organ had been the original seat of the disease.

In April, 1861, M. B—, between sixty-five and sixty-six years old, stated that a large tumour then occupying the left side and front of her chest began to grow about nine years since. From the manner in which the mammary gland seemed to be involved in the growth, it was assumed that the disease commenced in that organ, but upon closely interrogating the patient there was good reason to believe that the first lump was felt through the breast, and was really developed behind it.

The woman stated that she had always enjoyed very good health; she was the mother of eight children; the catamenia ceased thirteen or fourteen years since; she suckled with the affected breast; and the discovery of the first lump was quite accidental, it having been painless for several years. At this time the general health of the patient seemed as good as ever; the pain arising from the growth was scarcely severe enough to complain of, but its size and weight began to be very inconvenient. The drawing from which the plate has

¹ Descriptive Catalogue, vol. i, p. 90.

² The same, p. 87.

been taken was made by Mr. Hurst at this date, and it gives a very faithful representation of the external appearances then observable. During the year preceding this date the growth had increased very rapidly. In some portions of it there were places so yielding and elastic when pressed that there seemed to be cysts containing fluid; so much so, that I proposed to attempt to diminish the size of the tumour by opening one or more at a time at intervals. In other parts the larger nodulated masses were hard and resisting. The woman would not, however, submit to any interference with the mass, saying that "as it had been growing so long, she would die with it."

During the following twelve months the tumour increased, and, becoming worn out by the changes which took place, as described by Mr. Galton in the following words, she died about ten years after the discovery of the first lump.

"April, 1862.—The patient's general health appeared good, although the tumour had increased rapidly since her attendance at Guy's Hospital. It presented the appearance of a solid mass, with numerous superimposed cysts of various sizes, in which fluctuation was distinct, and which one by one softened down and ulcerated through the skin. Each discharged first a white glairy fluid, and after a few days pus. Fresh cysts constantly and sometimes almost suddenly appeared. In this way the mass increased in size, until it covered the left side of the thorax, extending in front across the sternum to the opposite breast, towards the back to the posterior border of the axilla; above rising over the edge of the clavicle, and below extending to the last true rib. The pain was not very acute at any time, being rather of a dull wearing character. There was not any œdema of the left arm; the radial and ulnar pulses were not perceptibly affected. The superficial vessels of the neck were slightly distended. There was not at any time serious hæmorrhage from the ulcerated openings. The general health of the patient failed very gradually until the middle of September, when the tumour had increased by about one third since the time that it was drawn at Guy's Hospital. At this date very severe rigors commenced, and after a few days an opening in the skin below the breast was formed by the processes of nature, from which a profuse discharge of pus took place. This continued for a fortnight, during which time the

prominence of the tumour rapidly diminished. She continued to decline in strength, and died at last from exhaustion on September 30th, 1862."

"*Necropsy*, twenty-four hours after death.—The body was emaciated, but otherwise generally healthy. The left side of the thorax presented an enormous mass of disease, greatly decomposed, which in parts had evidently been gangrenous before death. The tumour occupied the entire left side of the parietes of the chest, extending from the clavicle above to the margin of the last true rib below, and from the posterior border of the axilla behind to the right edge of the sternum in front, beyond which small cysts encroached upon the right mamma, and some extended below the lower angle of the axilla, and even as far as the middle third of the upper arm. In the principal mass three openings were visible, one about three inches below and in a vertical line with the site of the nipple, another just below the lower angle of the axilla, and the third near the mesian line of the chest opposite the sternal end of the sixth rib. All these openings communicated with each other and opened into a central cloaca, formed by the walls of an enormous cavity, which measured about eight inches in diameter, and contained a large quantity of decomposed pus, blood, and débris of the tumour. On cutting through the entire tumour this largest cavity was exposed, and in endeavouring to dissect it from the walls of the chest a cartilaginous mass was noticed, continuous with and inseparable from the cartilage of the fourth rib, forming what had evidently originally been the pedicle of the tumour. The fibres of the pectoral muscle could not be clearly made out, and no bands or septa of fibrous tissue could be distinguished throughout the growth, which consisted of innumerable smaller cysts extending in all directions from the larger one. Some of these were entirely broken down; some contained a puriform fluid, and others a white glairy fluid. The nipple was healthy, but the ducts were dilated and appeared to open into the largest cyst. Immediately around the nipple a layer of healthy skin and adipose tissue covered the gland. There was no opening into the thoracic cavity, but the intercostal muscles between the fourth and fifth ribs were attenuated, and the sternal end of the fifth rib partially necrosed."

"I am indebted to Mr. Brennan for the report of the patient's state before death, as she was under his care from April last. He kindly allowed me to be present at the necropsy."

Bones of the pelvis.—Passing on to these bones, we have a fine example of a growth of cartilage arising from the os innominatum, and invading the cavity of the abdomen.

CASE 2.—The man, æt. 26, was under the care of Mr. Morgan in 1845. The tumour was of about three years growth, and weighed twenty-two pounds. (Prep. 1132⁵² and 1132⁵³.)

Necropsy.—The right leg was distended with serum. The tumours occupied the right half of the abdomen, extended beyond the mesial line, especially below the groin, and pressed up the liver, &c. The caput coli was adherent to it anteriorly and above. It was made up of nodules of cartilage, with cavities containing two or three pints of ropy brownish mucus and coarse grains of softened cartilage. A long cut downwards removed the inner and anterior third of the mass; another removed the upper right and back third, with but traces of bone. The base (third) was then left and brought away with the chief part of the ilium; it contained more bone, and a thin whitish body, coarsely, feebly, and darkly cancellated and buried in an excess of soft varying cartilage.

The pelvis of the right kidney was dilated and distended with water.

The preparation (1132⁵²), having been macerated, shows the bony elements composing that portion of the growth more immediately in connection with the ilium. A large coral-like bony projection is growing from the crest of the bone, and another circular growth is springing from the dorsum, and having traversed the bone is visible on the venter also. These now appear to have been osteophytic outgrowths of bone into the cartilaginous growth. They are beautifully delicate, without, however, the common appearance of ordinary bone.

In the College Museum (prep. 206) is a very interesting cartilaginous growth removed from a woman 34 years old. "After death the tumour was found closely connected with

the sacro-iliac symphysis and the adjacent bones. It projected also at the back of the pelvis.”¹ This woman had had several children, each labour being more difficult than the preceding one. The last labour, thirteen months before death, was very severe and protracted. A large immovable tumour was felt in the left side of the pelvis.

A case similar to this one was for some weeks in the Obstetric Ward in Guy’s Hospital during 1865. The patient, a well-formed, healthy looking woman, about thirty years of age, had a hard nodulated mass occupying the venter of the left ilium. As the growth enlarged she experienced increasing pain from compression or stretching of the anterior crural nerves. As it was not considered practicable to remove the tumour, she left the hospital.

Mr. Holthouse has described a cartilaginous tumour originating in the left os innominatum of a male, æt. 35.² It seems to have been of about three years’ growth when he died, worn out with pain and suffering. “The tumour occupied nearly the whole of the abdominal cavity, but its outline could be felt on the right side, and it had pushed the intestines over into the right hypochondriac region, where they could be recognised on percussion. The weight of the tumour was thirty pounds.” The details of this case are most interesting, but I must refer the reader to the book in which they are published.

Bones of the upper extremity.

The scapula.—In the essay before quoted Sir A. Cooper states that he does not “recollect to have met with any instance of this affection of the scapula.” By reference to our museum we are now enabled to supply three cases. One of these, sent some years since by Mr. R. Nunn, of Colchester, affords a fine example of an enormous growth, which commenced rather late in life, was not observed until some weeks after the receipt of a blow upon the shoulder, and seems to have been developed in relation with the neck of the bone. The second case forms the subject for one of the illustrations of this paper; and the third I had entirely under my observation from very soon

¹ ‘Descriptive Catalogue,’ vol. i, p. 89.

² ‘Trans. of Pathol. Society,’ vol. viii, p. 367.

after the commencement of the growth to the death of the patient.

CASE 3.—*Enchondroma of scapula of about seven years' growth ; death.* (Drawing 5²⁵, prep. 1098²⁰.)

(The following report of this case was sent to the museum by Mr. ROGER NUNN. Note-Book 2, p. 48.)

In April last I was requested to visit James Goody, who was residing about six miles from this place, and who had been suffering for some years from a tumour on the shoulder. Having seen this man about three years previously, I was much surprised to see the immense increase which had taken place in the size of the tumour, and upon making very particular inquiries of his wife and neighbours I heard the following particulars :

He was a carpenter and bricklayer, æt. 57, and had, until within seven years, enjoyed in every way good health. About that time, whilst assisting to move a piece of timber over a saw-pit, he was struck by it on the shoulder ; this accident gave him considerable pain at the time (which he termed a wrench), and prevented him from following his employment for a fortnight, at which time he had apparently recovered from the effects of it. He continued perfectly free from pain and inconvenience for about two months, when he was seized with an acute gnawing pain at the top and back part of the shoulder, which gradually increased during three months, when a small swelling was perceived situated about the neck of the scapula. For this he applied to a medical man, who gave him liniments, &c. &c., which he applied, but without avail, and both the swelling and the pain increased for about three years, at the end of which time he visited the Essex County Hospital as an out-patient. The tumour had then gained a considerable size. He was leeches, and other remedies were taken to reduce it, none of which, however, had any effect, and it still continued to increase. The pain, which until now had simply been of a gnawing kind, had of late become lancinating, accompanied with a feeling of intense heat. He continued his work until the Christmas of 1834 (being four years after the swelling commenced), and was even able to follow his occupa-

tion of sawyer up to the summer of the same year. In the following April, 1835, he was advised to go to London, where he applied to Mr. Liston, at the University College Hospital, who, after some little time, determined upon removing it, which he then proposed to the man. I believe Mr. Liston thought it to be an exostosis. It then extended from the scapula downwards to the ninth rib, and upwards over the shoulder to the clavicle; backwards towards the median line nearly to the spinal column, and down the humerus, so as entirely to encircle the head of that bone and the scapula. The man, however, would not give his consent to have the whole removed, but would allow only three quarters being taken away. The operation was then, of course, given up, and he returned home to his family. From that time until November last it rapidly increased in size, when it had reached to that extent that when sitting he was obliged to have it supported upon a table, and, although with sufficient general strength, he was only able to walk with assistance, as the weight was so great it quite overbalanced him. After this he was obliged to keep entirely to his bed, not being able to support it in any but the recumbent posture. During this time his general health and appetite had been good, his spirits high; at the time I saw him he was evidently fast sinking; his appetite had failed him for several days. He had suffered much from alternations of chill and fever; had had no sleep; constant severe pain, with great restlessness; hands and feet constantly cold, and the back part of the tumour about to slough. As it was now so painful to him to be moved, I deferred making any minute examination of the swelling until after his death, which took place on the following morning.

Necropsy.—The anterior part of the tumour presented a very irregular surface, in some parts soft and yielding to the touch, as of fluid, in others firm and almost bony; some much distended and injected, others depressed and livid; on the whole much resembling a fungous growth. The posterior surface was regular, and in parts in some stages of disorganization. It extended anteriorly to the centre of the sternum, and posteriorly to the spine; superiorly above the shoulder and inferiorly to the right ilium, presenting somewhat the form of an irregular cone, the basis of which enveloped the whole side

and three fourths of the humerus, the *apex resting on the crest of the ilium*. On dissecting off the skin I found it in many parts to consist of numerous cysts filled with a serous kind of fluid, intermixed with numerous portions of lymph, in others cartilaginous, and in others even osseous. Removed with it the scapula and greater part of the humerus, with a small portion of clavicle, to which it was attached; it had no strong attachment either to the ribs or crest of ilium."

The drawing and preparation in the museum merely show the texture of the growth, which is, in the piece of it preserved, rather more broken up into distinct lobules than we commonly see in these growths. This condition may, however, be explained by changes taking place in so large a mass as was somewhat rapidly developed in this particular instance.

CASE 4.—*Very large enchondroma of scapula, about two and a half years' growth.* (Pl. I, drawing 5¹⁸, prep. 1098²⁵.)

E. G—, æt. 36, was admitted into Lazarus Ward on the 10th February, 1866, under my care. The following history of the case and description of the man's condition were given to me by my dresser Mr. Gill, and Mr. S. S. Brown, the reporter.

About the end of the summer of 1863 the man discovered a small "lump" on the infra-spinous fossa of the left scapula. This seems to have been the point of commencement of the growth, as accurately as could be ascertained from the patient and his wife at this date. His wife said when it was first noticed it was "about the size and shape of a native oyster," but harder. He did not suffer from any pain in the swelling then nor until some months afterwards. The surface of the lump was quite smooth. During the first eighteen months of its growth the increase was gradual and slow, although at this time it had reached nearly the size of his head. Even now it was painless. About this period the tumour began to increase much more rapidly. The pain he now suffers from began about eight months since, is dull and dragging, and it was more severe than it is at the present moment. He has had less pain since the skin ulcerated. He never felt any

difficulty in breathing whilst the tumour was growing, and the cough with which he is now suffering so severely commenced but a few weeks since. He complains besides of a very severe pain in his head, which causes more distress than the tumour. The pain arising from the growth has never interfered with sleep, and it has been so trifling that he continued to follow the occupation of a maker of the leathern parts of army accoutrements until within a few days of admission into the hospital.

It is somewhat remarkable that he never asked medical advice until the last week. He accounts for this strange and fatal neglect of himself by stating that his great anxiety had been to work for his family as long as he could possibly do so.

The man was short in stature and extremely emaciated; his skin was of sallow complexion, containing a considerable amount of dark brown pigment. There were several cicatrices of old ulcers on his back, which were probably connected with the syphilitic poison, as he confesses to having had the venereal disease. With this exception he states that his health has been always good, and that he has never been stinted of food. His mother died of consumption, but his father is at present alive and very healthy. He was brought up to and followed the trade of a painter, but he never suffered with any symptoms of lead poisoning. He cannot remember any injury of the bone affected.

Description of the tumour.—The whole of the posterior thoracic region and left side were involved in an immense growth, which measured 38 inches around its largest circumference, $23\frac{1}{2}$ inches in its vertical axis, and 24 horizontally. This growth extended backwards to within three inches of the spinal column, forwards in front of the axilla nearly to the left nipple, and the inferior border extended downwards to within an inch of the crest of the ilium when the patient was sitting upright. The pedicle of the growth was not attached further downwards than for about an inch below the nipple, and by moving the upper extremity it was clearly ascertained that the growth involved the whole scapula, without in any way implicating the humerus. Neither was the integrity of the clavicle in any way affected. The acromion of the scapula was distinguishable,

and the contiguous portion of the spine of that bone was traceable for a short distance. The movements of the shoulder-joint were free, although limited. The tumour was not anywhere attached to the ribs. The axillary and cervical lymphatic glands were not diseased. The axillary artery traversed the anterior surface and upper border of the tumour in a groove or furrow formed between two masses of the growth. It was easily felt, being pushed close beneath the integuments, and the pectoral muscles were much wasted. The pulse in both radial arteries were of equal strength. There was not any numbness of the left arm. The new growth was an irregularly oval mass, the skin covering it being congested and having numerous dilated veins traversing it; but it was not adherent to it, nor in any way infiltrated except the lower part, and there with serum only. At two spots the skin had ulcerated, and through these openings a passage led into the substance of the mass. From these sinuses a very offensive sanious fluid continually flowed. The surface of the mass was remarkably irregular, and the whole of it seemed to be composed of separate lobes of harder or softer consistence, some of the lobes from their hardness feeling like masses of bone, others from their more yielding texture resembling cartilage, whilst others felt elastic like a cyst containing fluid. From the external indications and the history of the case, the conclusion was that the growth consisted of cartilage, and was growing from the scapula, having originally commenced in that bone.

The idea of removing the tumour was, of course, entertained, but the state of the patient's general health at the moment of his admission into the hospital precluded all hope of his recovering from an operation of a nature so formidable as would be required in a case like this.

The state of his general health was as follows:—He was emaciated to an extreme degree; he had passed sleepless nights, the tumour preventing him lying in any position of comfort or repose; he had total loss of appetite; his pulse was very feeble and very rapid, although the sounds of the heart's action were fairly normal. His respiration was short and hurried, he had constant but slight cough, his voice was feeble and interrupted, and he complained of pain at the epigastrium and on the left

side. The blood-vessels of his face were congested, and the facial expression was distressed and anxious. Still, there were no marked indications of active disease in the lungs.

Food of every kind he could take was freely given to him, with stimulants, tonics, and sedatives, but in spite of all treatment he gradually declined, and died February 16th, the sixth day after admission.

After death I attempted to remove the tumour with as much caution in dividing important structures as I should have employed had the patient been living, and I believe I might have effected the removal of the growth together with the scapula without cutting the brachial plexus or axillary artery. An enormous wound was, of course, made, nearly the whole of the side and back of the thorax having the integuments detached, but the operation was practicable; so far as concerned the removal of the tumour, sufficient integument was saved to form flaps.

The weight of the tumour was about twenty pounds. It constituted a well-defined mass, over which the muscular fibres of the region were in some places stretched out. With the exception of the posterior surface, where there was a great hole leading into the centre of the growth, its surfaces were perfect. To a certain extent the surface in relation with the thorax was moulded to the shape of the parietes of that cavity, the extremely nodulated surface being the superficial one, which had not encountered much resistance to the development of the new tissue. The general outline of the scapula was entirely lost, although the glenoid cavity was visible and quite unaltered. Also, the acromion formed its normal prominence, and the supra-spinous fossa was well marked. A vertical section of the tumour was made at right angles with the spine of the scapula. Near to the superior extremity of the mass traces of the original spine of the scapula are visible in the preparation. With these a large osseous centre was somewhat indefinitely continuous. Ramifications of bony tissue spread outwards from this towards the surface of the growth, without, however, reaching it in any place, for the whole of the more superficial parts consisted of beautifully bright clear cartilage, of firm consistence and lobulated structure. The lobes were made up of lobules very even in size, which were about

half an inch in diameter. Parts of the tumour were very soft, others entirely broken down and almost fluid, forming a jelly-like substance. Some of the tissues had died, and formed a very offensive semi-fluid grayish slough.

Necropsy.—Dr. Moxon recorded the following account of the after-death examination :—The body was spare, almost to wasting. The membranes of the brain were slightly thickened. The left pleuræ were adherent uniformly and universally by old adhesions. The right lung had a thin coating of recent lymph over its lower lobe. There were not any lobular abscesses discoverable. The lungs generally were emphysematous, all parts of their surface having elevations the size of small shot to split peas scattered about, each having a black zone about it, and each seeming to consist of distinct air-vesicles. At the edge was a fringe of vesicles of the size of shot to peas. The lower right lobe was tougher and firmer than the rest, like the indurated chronic pneumonia in low degree.

The right side of the heart was somewhat, but distinctly, larger in proportion than is proper ; its texture was also increased and its substance hardened. There was a large, fleshy, pale clot in the right side ; very little indeed in the left, which was contracted firmly.

The liver weighed sixty-six ounces. Its section was coarse, from the sharply defined distinction between the portal and the hepatic fields.

The spleen weighed seventeen ounces ; it was very soft and grumous.

The kidneys appeared healthy, but they were of large size and weighed fourteen ounces.

CASE 5.—Enchondroma developed on the scapula, but extending into the surrounding textures ; removal of growth ; recurrence, and death about two years after its discovery. (Drawing 197⁹⁵, prep. 1098³⁰.)

I was requested by Mr. Kellock, of Stamford Hill, to see a patient of his, in March, 1861. I was introduced to a very healthy looking lady, forty-five years old, who had enjoyed uninterrupted good health ; had had several children,

the last some years since. The catamenia were persistent. I was told that, six months since, she accidentally felt a little above the inferior angle of the right scapula, and on the surface of the infra-spinous fossa, a firm circumscribed swelling. It was then about one inch in diameter. The swelling had never been very painful. There was not any difficulty in being certain that the tumour, whatever might be its nature, was intimately associated with the scapula, for it was immediately influenced by the slightest movement of that bone. When I saw it the shape was rather oval, the longest axis being vertical and measuring about two inches. It was remarkably circumscribed, projected about half an inch above the surface of the bone, was firm, resisted all pressure, and no complaint of pain was made under manipulation. At this time I suspected that the swelling arose from some chronic inflammatory effusion, and measures were adopted upon this assumption in relation to treatment.

I did not see the patient again until the next year, in February, 1862, an interval of one year. The growth had now reached a considerable size. It gave her great pain and trouble, but the integuments were unaffected, although it had advanced towards the axilla and occupied the whole of the infra-spinous fossa of the scapula, and was even identified with its spine. It felt very firm and resisting in some parts when pressed hard, in others softer, and even here and there disposed to fluctuation, or, rather, as if consisting of cysts tightly circumscribing some soft solid. The axillary lymphatic glands were healthy. Movements of the growth and scapula were perfectly coincident. Now, from the healthy aspect of the patient, the manipular indications of the tumour, its steady increase and intimate connection with the scapula, I diagnosed the growth to consist of cartilage.

During the preceding twelve months she had been under the treatment of another surgeon, who had employed various means in the hope of dispersing the swelling.

It seemed to me that there was no alternative but to attempt the removal of the tumour, together with as much of the scapula as was implicated in the disease. To this proposal the patient consented. Accordingly, Mr. Kellock and myself undertook the operation on February 12th.

The patient was placed fully under the influence of chloroform, and a vertical incision through the integuments enabled us to expose completely the surface and borders of the tumour, and to detach it together with the body of the scapula from the surrounding tissues. Then with bone-cutting forceps we detached the whole of the infra-spinous fossa of the scapula, or rather that part of the tumour occupying its site, for we were unable to find any vestige of that division of the bone. Upon examination we found that the disease was extending under the root of the acromion process into the supra-spinous fossa, and all that we could find we removed. There was not much hæmorrhage, and each divided artery was secured as soon as possible. The parts of the scapula we did not remove were the glenoid cavity, supra-spinous fossa, part of the spine, and acromion process.

That part of the growth below the spine of the scapula was contained in a well-defined fibrous envelope. The mass consisted entirely of cartilage, firm and solid in some parts, granular and easily breaking up on pressure in others. The section was beautifully hyaline. There was a capsule at one border, containing a material of semi-solid consistence, and, indeed, almost fluid, tenacious like very thick mucus. Not a vestige of the shape of the infra-spinous fossa was traceable in the section of the growth removed, although here and there the finger detected the roughness of osseous tissue when it was gently moved over the section. The cartilage-tissue was granular where it invaded the supra-spinous fossa and its muscle, and, indeed, we entertained a suspicion that these minute granules of cartilage extended into the surrounding muscular textures even to the subclavius muscle.

The wound healed favorably, and the patient recovered its effects very fairly, but about the end of May there were signs that the disease was again growing. These were swelling, or rather fulness, and pain at the upper part of the cicatrix. At the end of June there was a large tumour occupying the whole scapular region, and extending towards the spine, beneath the clavicle and into the axilla.

In July the cicatrix ulcerated at the upper two thirds, and the growth projected through the opening; its surface was curiously mottled, and small patches of cartilage were clearly

seen on it. The edges of the ulcer were quite independent of the growth, and not attached to it, but were merely lying upon it.

The general health of the patient was tolerably good, and, although she complained of shortness of breath and weakness, there were not any signs of either thoracic or abdominal visceral complications.

At this date the repetition of the operation was considered. From the wide-spread ramifications of the growth, it seemed useless to attempt any further operation unless the whole of the upper extremity was sacrificed, a proceeding, of course, of considerable risk. Neither the patient nor her advisers felt disposed to urge another operation, and, as she did not suffer acute pain, she made up her mind to rest content with palliative measures.

After the skin had ulcerated there was a continued discharge of serous, sanious fluid, the patient lost her appetite, passed restless nights, and at last sunk from exhaustion in December, 1862.

An after-death examination showed a large development of fat beneath the skin. The muscular tissue of the heart was weak and pale; the lungs were collapsed, but their texture was normal, and not a trace of any new growth was found. The liver was large, pale, soft, and loaded with fat; the kidneys were soft and flaccid; there was no serous effusion in any of the cavities.

The cartilaginous growth was confined to the scapular region, and had not invaded either the ribs, the clavicle, or the humerus. The shoulder-joint was quite healthy; but the important soft parts, the brachial plexus and axillary vessels, were closely associated with the growth, which extended beneath the clavicle. This after-death examination therefore showed that considerable difficulties must have been encountered in any attempt to eradicate the growth. The arm might certainly have been allowed to remain, but, unless the glenoid cavity of the scapula had been taken away together with the tumour, a second operation would, I believe, have been futile.

The result of this case teaches the following lesson. It is clear that the patient died from the effects of the local growth as

a primary cause, for there was not found a trace of any specific kind of growth in mass interfering with the function of any important organ. In a most decided manner it indicates the importance of performing an operation for the eradication of the local complaint at the earliest moment after the employment of all means which have failed to reduce the size of the swelling or arrest of its growth. Had an operation been performed in this case when the tumour was entirely circumscribed and perfectly confined to the infra-spinous fossa of the scapula, that part of the bone might have been easily cut away together with the growth, and a perfectly healthy wound left; as it was, when the operation of removing the tumour was accomplished, although a very large quantity was cut away, yet there seemed to be, in the space above the glenoid fossa and about the neck of the scapula, minute granular bodies, which, on examination, proved to be most tiny particles of cartilage. These were, I have little doubt, the seeds, as it were, of the second tumour, and I do not believe that any further prosecution of the operation would have prevented another growth. If I had another case of this kind to treat I think the following plan of treatment would be fully justifiable after the result of this case. There is something very characteristic or rather definite about the tumour, and it occurs in a region where we have the opportunity of forming a diagnosis of its nature by the method of exclusion; thus—Is the swelling inflammatory? There is a tumour for the origin of which the patient cannot account; perhaps there is a history of a blow upon the part. Then the swelling might depend upon chronic periostitis, with its characteristic products, or upon effusion of blood, or some such specific cause. Assuming inflammatory action to be the origin of the swelling, there would be almost certainly more pain accompanying its formation or pressure upon it, as we observe in nodes, for example. Supposing it to be caused by effused blood, decrease of its size rather than progressive increase would be noticed; but after steadily watching the progress of the tumour whilst under treatment, and being unable to associate its advance with either of the above-mentioned causes, we now arrive at this inquiry—Is it a new growth? The slightest irregularity of surface, a circumscribed outline, pressure causing little, if any,

pain, a certain amount of firmness, and, at the same time, elasticity on compression, would lead the surgeon to suspect a new growth.

What now should be the next step in treatment? I would strongly urge an exploration. Even if the disease now turned out to be inflammatory, an incision would not be attended with harm; but if it showed itself to be dependent upon a growth of cartilage, or any other tissue, now would be the moment to eradicate it from the affected bone.

The humerus.—Sir Astley Cooper has published a very fine example of a cartilaginous growth attached to the humerus, on account of which he performed amputation at the shoulder-joint.¹ The preparation of this disease is in the museum at St. Thomas's Hospital (sect. C, 224). The patient was a female, æt. 30. "The tumour situated at the upper and external part of the left arm, so high up that on a superficial inspection it seemed to be connected, not only with the humerus itself, but also with the clavicle and scapula, rendering it probable that it had an attachment to the glenoid cavity of the latter bone." I have quoted this passage because it has an important relation to the operation of amputation at the shoulder-joint. The disease seems to have followed injury of the part, and to have been growing about three and a half years before its removal.

Mr. William Adams describes an enchondromatous tumour occurring in a male, æt. 61, which sprung from the right humerus, grew rapidly for two years, ulcerated, and destroyed the life of the patient.²

The following is of great interest :

CASE 6.—*Enchondroma of the humerus, twenty-five years' growth (first observed when the patient was about fifty-five years old), reaching an immense size.* (Drawing 5¹⁵.)

When on a visit to Mr. Rump, of Wells-next-the-Sea, Norfolk, he took me to see the man whose case is here recorded. It was then difficult to be certain whether the humerus

¹ Essay before quoted, p. 203; and 'Med.-Chir. Trans.,' vol. ii, p. 264.

² 'Trans. Path. Soc.,' vol. i, p. 344.

or scapula was the bone affected, in consequence of the great size of the tumour; but from the account given by the man it seemed to be probable that the growth sprung from the upper part of the humerus in the first instance, like the one described by Sir Astley Cooper.

The following account was written in July, 1848.

W. H—, æt. 68, was born in Burnham Market, Norfolk. At the age of fourteen he went to sea, and was on board the *Bellerophon* when Napoleon surrendered to the British flag. At the conclusion of peace he was paid off, and went to reside at Wells, about thirty-four years since. He obtained employment as a woodman on the Holkham estate. One night whilst in bed, after a day's work of wood-carrying, he was suddenly seized with great pain in the left shoulder, and for a time he lost the use of the corresponding arm. Soon after this he noticed an enlargement about the size of a walnut, and perfectly movable, on the summit of the shoulder. It increased very slowly in size and was not attended with much pain, so that he was enabled to follow the occupation of an oyster-man. This state of things continued until about ten years since, when the tumour began to grow rapidly, and the arm became powerless and the movements limited.

The upper division of the tumour increased rapidly, whilst the lower remained movable and grew but slowly. From this date the enlargement has steadily gone on, and his general health, which had been good hitherto, began to fail from continued pain and suffering.

In 1844 he was admitted into the Norwich Hospital under Mr. Crosse, where he remained two months. The integuments over the tumour were not discoloured, but in different parts they were traversed by large, blue, tortuous veins. Pressure upon the tumour does not cause pain, but it feels of a uniform stony hardness throughout.

Between July, 1848, and September 1851, the tumour had enlarged, and the integuments in places became slightly red; at these spots an indistinct sense of fluctuation is perceptible.

Measurements of the tumour were taken in 1848 and 1851, and were as follows:

	1848.	1851.
Vertical measurement, from above to below	18 inches.	21 inches.
Transverse or horizontal, from back to front	18 „	21 „
Circumference at base	28 „	30 „
Circumference at largest part	30 „	33 „

From these figures it appears that the growth increased at about the rate of one inch per annum in all directions.

This man survived until November, 1858. For the last two years of his life he had been confined to bed in consequence of the great bulk and weight of the tumour, which rendered him perfectly helpless. Before his death, which was occasioned by chronic bronchitis, at seventy-eight years of age, the forearm of the affected side became very œdematous, and slight ulceration from pressure existed in two or three places, but no disintegration of the tumour itself occurred. At the period of this man's death Mr. Rump was seriously ill, and therefore the tumour was not preserved. An after-death examination of it, however, showed that it was composed of cartilage in great part, with here and there patches of bony hardness.

The striking feature of this growth, as well seen in the drawing, is the subdivision of the great mass into four divisions, an upper, lower, and two lateral. Its remarkable prominence, too, is very characteristic, and the firmness and hardness throughout were good indications of its structure.

A case very much resembling the last one is related by Mr. Liston in 'Practical Surgery.' The tumour had been growing for nearly forty years around the superior three fourths of the humerus of a surgeon in the navy. "Amputation at the shoulder-joint was performed, and the patient recovered from the operation, but died two months afterwards with disease of the chest." The preparation is in the museum at the Royal College of Surgeons.¹

In connection with the bones of the *forearm* I have not seen a cartilaginous tumour.

The bones of the *carpus* are rarely, but those of the *metacarpus* and *phalanges* are very commonly affected by growths of cartilage developed upon their surfaces. In the majority of instances the cases which have been under my observation

¹ 'Descriptive Catalogue,' vol. ii, p. 167.

were boys and girls; and where the tumour was seen in this region of an adult the commencement of the growth was clearly traced back to childhood or youth. Very commonly, these tumours have a marked and very decided bony shell or capsule; their centre consists of cartilage, with granules of bone, and their base of attachment seems to be the surface of the bone upon which they grow. These conditions are illustrated by a series of drawings, numbered 29¹⁵ to 29¹⁹, and preparations 1121 to 1122⁵⁰ and 1124⁵⁵.

In one instance the growth seems to have sprung from the cancellated tissue of the head of a metacarpal bone (drawing 30, prep. 1124⁵⁰, and cast 3). This patient was under Mr. Aston Key, who was obliged to remove the whole finger in consequence.

A very fine example of these growths, which began in childhood, is shown in the drawing (5¹⁰⁵) of a hand which, from the neglect of the patient, nineteen years old, became excessively deformed in consequence. This young man was under the care of Mr. Cooper Forster, who was obliged to remove a finger. A section of the growth is delineated (drawing 5¹⁰⁶), and a preparation is preserved in the museum (prep. 1122²⁵), as well as a model.

Bones of the inferior extremity.

Femur.—There are in the museum some fine drawings and preparations to show cartilaginous growths about this bone.

One, a large enchondromatous tumour affecting the upper part of the thigh-bone (prep. 1160⁸⁶), was removed after death from a patient under Mr. Key. The growth reaches as high as the neck, and involves the trochanters as well as a large part of the shaft. In this particular instance the cartilage not only grows around the bone, but it has quite destroyed its form, so that only a few portions of the shaft are seen in the midst of it. This condition contrasts strikingly with the relations of the growth to the femur described in the next case.

Mr. Busk describes a case¹ in which a large irregular tumour, partly enchondromatous, was situated at the lower end of the right femur at its posterior surface. It was developed in a male,

¹ 'Trans. Path. Soc.,' viii, p. 375.

twenty-seven years old, and was first observed in boyhood, at the age of thirteen. It was therefore about fourteen years' growth. The tumour was removed by amputation of the member above the middle of the thigh. The lithographic drawing in the 'Transactions' of the society shows that at a short distance above either condyle a well-defined, nodulated, irregular-pointed growth was attached. For the full details I must refer the reader to Mr. Busk's description. The patient did well and is still alive now ten years since the operation. The preparation of the tumour is in the museum of St. Bartholomew's Hospital.

The following case is one of great interest, chiefly on account of the successful result of the operation. It is also a fine example of cartilage developed in the cancellated texture of a long bone.

CASE 7.—*Enchondroma of the inferior articular end of the femur; amputation five months after its discovery; cured.*
(Drawing 8⁵⁰.)

A married woman, æt 23, was admitted into Guy's Hospital, in July, 1848, under the care of the late Mr. Aston Key. She seemed to be healthy, although she looked very delicate. This appearance might be accounted for, as she was poor, lived in Southwark, and had had two or three children quickly one after the other, which she suckled. She had always enjoyed good health.

About four months before admission she noticed that her left knee-joint became enlarged. This was attended with considerable pain, and at last the limb became entirely useless. The inguinal lymphatic glands were not affected. Her general health, however, had not suffered materially, and, as the cure of the disease seemed hopeless, Mr. Key performed amputation through the femur, rather above the junction of the lower with the middle third of that bone. The stump healed favorably, without any untoward symptoms, except that a sinus remained open when she left the hospital, about two months after the operation.

The drawing in the museum represents a section of the knee-joint made through the patella from before to the popliteal space behind. The head of the tibia, the part of the

femur affected by the new growth, and a portion of the shaft of that bone, as well as a part of the patella, are seen. The only bone-tissue involved in the disease was the inferior articular extremity of the femur. Both the condyles of that bone seemed at first to have been expanded by a growth of cartilaginous tissue, which at one part was still confined by the original articular cartilage covering the end of the bone. The cut edge of this cartilage is well shown in the drawing, forming a crescentic white outline. At the anterior and posterior horn of this crescent the new growth has burst the confines of the condyles, and in front it has extended forwards and upwards between the femur and the extensor muscles and tendon, which are stretched over it. Behind, the growth pushed into the popliteal space, and downwards a process grew into the knee-joint, where it was lying between the patella and articular surfaces of the tibia.

The whole of the new growth consisted of cartilage-tissue, showing a very pretty foliated outline and its characteristic hyaline appearance. It was somewhat granular in texture, with here and there bony spiculæ or granules. It was invested generally by a well-defined envelope, which in some parts of its circumference was very strong. The inter-articular ligaments seem to have restrained the progress of the growth in some parts. The shaft of the femur was remarkably healthy, the texture being very hard and compact for the bone of a female. In close proximity to the cartilage growth, and for about an inch and a half above it, some new bony tissue was developed, which, like new bone in general, was rather spongy.

From the description above given it is quite clear that the disease was originally developed within the condyles of the femur, the cancellated tissue of which was, so far as visual observation extended, entirely destroyed by its invasion. It is a point of some interest to connect the development of the cartilage growth with changes which were probably taking place at the point of union of the condyles with the shaft of the bone, for, most certainly, the limit of the growth of cartilage did not exceed that of the line of the epiphyses. I was unable to obtain any history of an injury of the part, and the opposite limb was perfectly healthy, so that there was not any symmetrical action excited.

When, after careful examination of the tumour, it was pronounced to be cartilage, and the elementary tissues of cancer were not found anywhere, Mr. Key still doubted the innocence of the growth, and seemed to be fully prepared for its recurrence in the stump.

Some two or three months after leaving the hospital this patient returned as an out-patient under my observation with the stump enlarged, inflamed, and very painful. Her general health also seemed much affected. I well remember Mr. Key's expression when I showed him his old patient—"Yes, I thought it would be so." At that time she was not again admitted, but she continued from time to time to come to the hospital, the stump still inflamed and giving her much suffering. It became, however, quite clear before the summer of 1849 that the condition of the stump was entirely dependent upon some disease of an inflammatory nature, for suppuration took place, and as the induration of the soft parts subsided the enlarged end of the stump of the femur could be felt. Mr. Key died in the autumn of 1849. I kept sight of this patient, but could not persuade her to come into the hospital to have the dead bone removed from the stump until May, 1851. At that time her health and strength were very much reduced by many causes, but it soon became re-established after the stump had been opened and the source of irritation entirely removed.

I have frequently seen this woman since that time. The stump has continued perfectly well, and the general health has been as good as it usually was before the amputation. I saw her last year, in December, 1865, seventeen years since the operation, when she was quite well.

Tibia and Fibula.—I place these bones together because they are sometimes associated with cartilaginous tumours of the leg.

CASE 8.—*Enchondroma growing from the tibia; amputation; recovery.* (Models 52⁴⁰, 52⁴¹, prep. 1336¹⁰.)

The following case was under the care of Mr. Poland. A healthy man, æt. 32, had observed a swelling in the popliteal space for some months. The tumour had slowly

increased without causing much pain until lately. It was very hard and lobulated. Mr. Poland amputated the limb through the middle of the femur.

The models and preparation show a most beautiful example of a growth of cartilage from the posterior surface of the tibia. The characteristic outline of these growths is well displayed in the nodulated masses composing the whole. A section shows how the growth had sprung from the surface of the original bone, a portion of the compact texture of which still remains. The medullary cavity and cancellated head of the bone are not involved in the disease, nor, apparently, in any way affected. The cartilage growth may be seen running round between the head of the fibula and tuberosity of the tibia. The knee-joint was quite healthy. Now, if this tumour had been seated upon a more superficial surface of the bone, and the patient had applied early for advice, I believe the removal of the cartilaginous growth might have been effectually removed. The possibility of this simple attachment of the new growth to the bone surface only should therefore be remembered.

CASE 9.—*Large enchondroma of the leg, of many years' growth; amputation; recovery from the operation; death subsequently from disease of lungs.* (Drawing 33³⁷, prep. 1336²⁰.)

A patient was under my care in Martha Ward in March, 1866. She was a healthy looking person, æt. 51, the mother of several children, and had been a good deal distressed by social vicissitudes. For many years she had been troubled with a hard swelling of the right leg, which commenced about fifteen years since in what she termed a rheumatic attack. Of late the tumour had caused excessive pain, so that she passed sleepless nights and lost her appetite. Besides, the limb had become almost useless from the weight of the growth. The limb from the foot upwards to about the upper third of the leg was very much enlarged, and the healthy looking integuments raised into great bosses by a very lobulated mass beneath. The growth projected most distinctly at the sides. The tibia was distinguishable in front. In some parts the growth was very hard, in others soft, and here and there the sensation of fluctuation was perceptible. From the length of time the

tumour had been growing, the healthy appearance of the patient, and the palpable indications, the diagnosis of the disease was clearly that it was a growth of cartilage. The patient being told that amputation was the only means which could relieve her, she consented to the operation, which I performed below the knee-joint. The section of the bones and soft parts was quite healthy. She recovered from the operation, the stump healed, and she left the hospital about six weeks after her admission.

The tumour is a magnificent specimen of a cartilaginous growth. It appears to grow from the posterior surface of the tibia, near the ankle-joint, the texture of that bone being quite healthy. It forms a mass of several pounds' weight, and consists of lobes and lobules of cartilage, in a most healthy growing state. A vertical section was made through the tibia and foot, which should be examined to understand the relations and beauty of the textures of these growths. One fact is very remarkable. The cartilage growth has made its way completely through the os calcis into the sole of the foot, among the muscles there placed. One might suppose that the os calcis was the centre or nucleus of the tumour at its origin; but as far as the statement of the patient may be considered as a guide, I am of opinion that it commenced at the lower end of the tibia, and grew between the bones and the posterior muscles upwards and downwards.

The condition of the patient, as regards her general health, was not quite satisfactory when she left the hospital. She complained of a cough, which occurred in troublesome paroxysms; the mucus was sometimes slightly tinged of a brownish tint; occasionally this colour was certainly produced by the admixture of blood. She passed sleepless nights, lost her appetite; the pulse was feeble and powerless; and in spite of every attention from her family, and her medical attendant Dr. Henderson, and other friends, she gradually died exhausted in August of the same year. Unfortunately, it was not possible to make an after-death examination; but so far as the indications of the nature of the disease from which she died were manifested during life, it appeared that the whole of the pulmonary mucous membrane was affected by some chronic

inflammatory action. The pulmonary tissue did not break up, nor were there signs of any tumour compressing the lungs.

The foot and toes.—The bones of these regions are not so often affected with cartilaginous growths as those of the hands and fingers. There is in the museum a drawing (24⁸⁸) and a preparation (1285⁸⁵) of a cartilaginous growth between the great toe and next, removed by Mr. Hilton; and one on the little toe (drawing 24⁸⁹), removed by Mr. Bryant.

The length to which the description of the cartilaginous growths has extended precludes any account of the bony ones in this paper. That will follow in the next volume.

DESCRIPTION OF PLATES

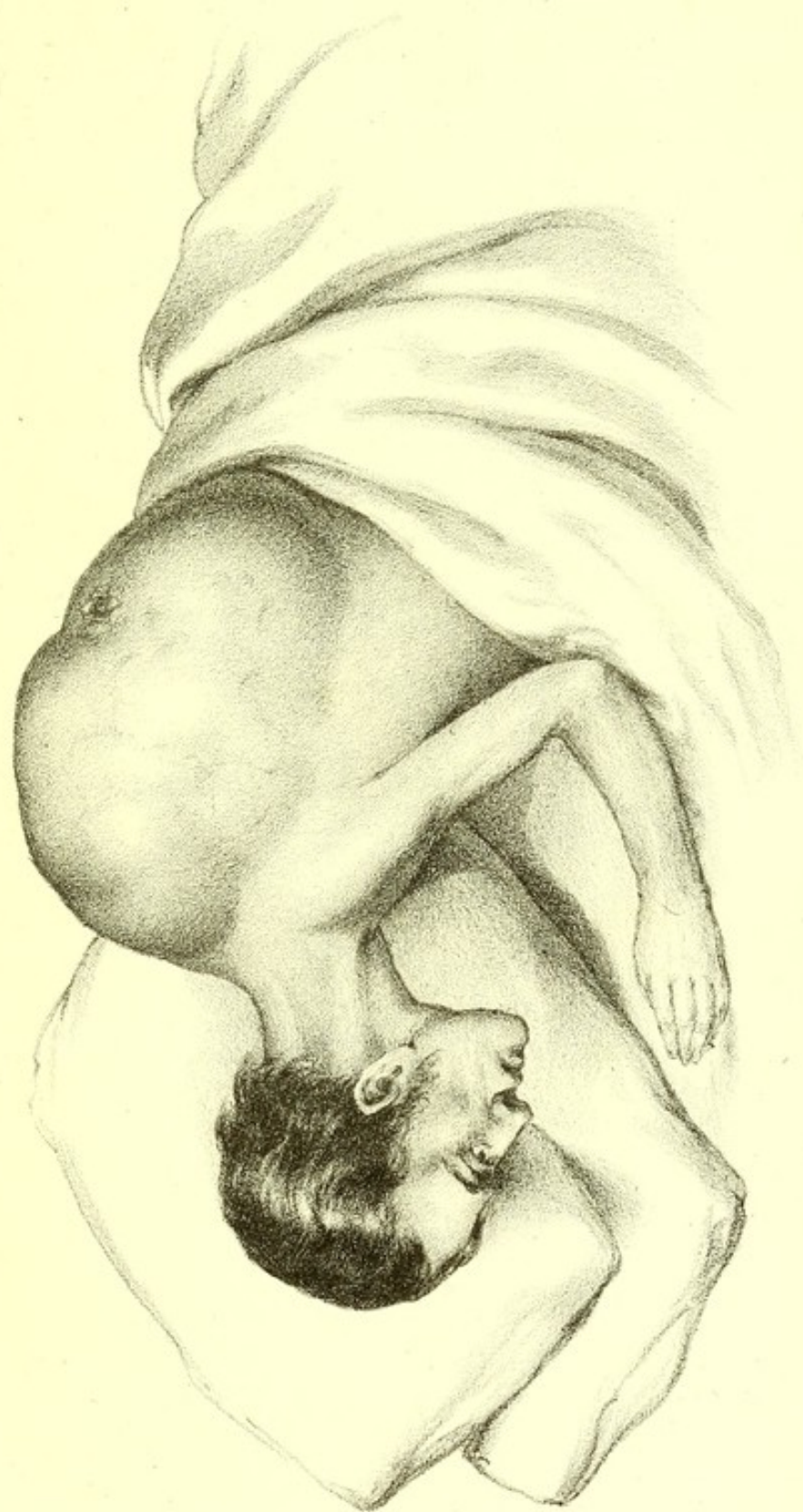
Illustrating Mr. Birkett's Paper on Enchondroma.

PLATE I

Illustrates Case 4, and shows the comparative size of the growth, and the ordinary position of the patient shortly before death.

PLATE II

Illustrates Case 1, and shows the general appearance of the chest, and the comparative size of the tumour after about nine years' growth.



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