"Osteitis Deformans & other Diseases of Bone." This may seem a very wide and vague definition for a theme. Nevertheless, I propose to dwell chiefly on the remarkable case which caused Sir James Paget to introduce the new term of Osteitis Deformans, & to consider other diseases of bone merely in their relations to it.

In this way I hope to be able to show that the case in question is really one "for generality," that it cannot be properly placed under any of our present headings. I will first of all shortly allude to my own connection with the case, then quote Sir J. Paget's report & conclusions regarding it, & finally consider separately each of the other diseases with which it might be confounded, dwelling principally on their points of similarity & difference.

In regard to the first point it will be seen any connection with the case was but small, nevertheless it has greatly improved me as being the most remarkable I have been since graduation. I have concluded that a careful consideration of it would be of more service than an attempt to draw deduction from a number of less marked cases. A chief reason for coming to this conclusion is that in general practice, though many cases of the greatest interest are met with, there are so many points
of difference in the habits of the patient, in his habituation, in his nursing, clothing, food, 
&c., that it is very unsafe to draw conclusions as to the cause of any disease, or its course, or the effect of treatment, without a much wider experience than I at present enjoy.

The gentleman (Mr. P.), in whom the disease occurred, was a very old patient of my father's, he having attended him over thirty years ago. I only remember him at a tall, 
shaggy man, troubled with a slight lassitude. Later the lassitude had increased, he had a decided cough, but what most impressed me was the remarkable size of his head, my father's telling me it was growing so fast that he had to have his helmet (for he was in the latitude) enlarged yearly. He left the neighbourhood some eight years ago, only returned a fortnight before death. He then seemed generally breaking up his lungs being chiefly at fault, his mind clear to the last. Sir J. 
W. had obtained permission to perform a post-mortem examination & came down from London for that purpose. I had the pleasure of giving him some little assistance, of securing some of the phlegm & tissues for microscopic examination. Sir James 
W.embodied the results in a paper, read before the Royal Medical 
& Chirurgical Society, published in the Lancet for Nov. 18 1836. I have since obtained his permission to make this report the basis for a thesis, & to publish it at length, as it contains much fuller particulars than I could elsewhere obtain.
A paper "On a Form of Chronic Inflammation of Bones (osteitis deformans)," by Sir J. Paget, Part iv. It opened with a detailed account of a case which had been for many years under the author's observation. It was that of a gentleman in whose family there was the history of gout or gout-removal, but one of whose relatives had died of chronic cancer of the breast; he was a tall, thin, well-formed man, the father of healthy children. When forty-five years of age he began to suffer from pain in the thighs and legs, at the end of one year he noticed the left thigh to be somewhat enfeebled. Sir J. Paget first saw the patient in 1856, or two years from the commencement of the disease. He was then in good health, prematurely grey, walked stiffly. There was some enlargement of irregularity of the left tibia, inner half of the left femur, but no tenderness. The urine deposited lithiate. The case being regarded as one of chronic periostitis, isaid of potassium chlorate, but without results. Many years later the author again saw the case, this time in conjunction with Mr. Stanley. The left tibia had become longer, so that it was curved anteriorly; the femur also was more distinctly enlarged, and was arched forwards ventrally. The side of the pelvis appeared widened. The whole limb was about a quarter of an inch shorter than the other. There was very little suffering, the clumsiness of the limb being the chief trouble. He had taken much quinine with medicine, with out the least effect. For the next seventeen years the
disease steadily but clearly progressed. The left tibia continued to enlarge, the bone became curved, and a similar change taking place on the right side, the two limbs in time became asymmetrically affected, and at the same time the knees became gradually bent. The skull also slowly increased in size, the head retaining its natural shape, the face but being at all affected. The spine became slowly curved and almost rigid, so that the patient thought diminished from six feet one inch to five feet nine inches; the chest became narrower, shortened, and deeper from before backwards; all movement was much restrained. The head was bent forwards, the neck consequently shortened. The arms, and thence in the shortening of the trunk, seemed long in proportion, the arms, formed by that shaft, with the neck of the femur was diminished. In 1770, the left knee joint became acutely inflamed, it was left more stiff of bents afterwards: at the same time, some inaccessibility of the internal sleeve was detected. In the summer of 1774 the patient suffered partial loss of vision from retinal hemorrhage; he also began to be somewhat deaf. He then also suffered from neuralgic pains, chiefly in the upper part of the body. In January, 1775, pain in the left forearm & elbow, followed by swelling in the upper part of the radius, appeared; but he was otherwise in good health, enjoyed a good appetite, his mind was quite clear. From this time he began to fail, and it was evident that the painful swelling of the forearm was due to a cancerous growth. In the 24th of March, after suffering from pleuritic affections, he died. At the autopsy, the head was retracted to a level with the sternum,
the lower limbs rested upon the posterior heels from the arching of the foot. The peroneum and tibia were healthy. The lungs were compressed and contained a few nodules of cancer in their surface. The mediastinum was adherent to the cardiac: the aortic slightly adherent to the vena cava. The knee, tibia, patella, upper part of the skull were removed for examination. The upper third of the left radius was involved in a large grey mass of medullary cancer, the rest of that bone was healthy. Some cancerous nodules also occurred in the skull. The spine was shortened, but presented no extraordinary nor remarkable.

All the sections of the skull were obliterated, the thickness of the bone being about four times the natural. The whole outer surface of the skull cap was finely pitted and reticulated for the passage of bloodvessels, vasa mala. The grooves for the middle meningeal arteries were deepened by layers of black-white bone formed the inner table, but in places were intervals where reticulation was marked, in which a quantity of cancerous material was contained. The condition of the eye bones was that of some modification of the outer surface without any visible change in the keratoconus, the surface being perforated extensively for transmission of vessels. The medulla was natural; the cancellous had a normal disposition, but the compact substance of the shaft, especially of the articular ends, was greatly increased in thickness. In places the outer layers of bone appeared to be separated in the form of thin plates, in other parts large hard patches occurred. Dr. Fulton made a careful microscopic examination of the skull of the tibia, and found a diminution in the
Member of Henleian Canals, which were formed very confluently, were occupied by a large amount of fibro-necrotic tissue, leukocytes, occasionally round cells that surrounded the contained vessels. The neurites and canaliculi were numerous, but not different from ordinary bone. A chemical analysis by Dr. Russell showed very little difference in comparison to that between the thinned out and normal bone. The disease which this case is an example of is very peculiar in its course that clinically it is not difficult to distinguish it, but specimens of the affected may be met with in most other cases under the general name of osteo-fibrous hyperostosis, osteo-chondritis, etc.

Sir James Park then proceeds to give a much shorter sketch of four other cases he had met with, in none however had he an opportunity of making a post-mortem examination. All were in men past middle age, two of whom died of cancer. He had been unable to find recorded any cases precisely similar to these. He considered the following to be the chief characters of the affection:

- To begin in middle age or later, in very slow in progress, may continue for many years without influence on the general health, and be as other trouble than those which are due to the changes of the time and direction of the diseased bone. Even when the skull is largely thickened, all its bones being altered in structure, the mind remain unaffected. The disease affects most frequently the long bones of the lower extremities, the skull, in usually symmetrical. The bones enlarge more often than bearing weight yield and become
unnaturally curved & misshapen, suggesting the proposed name, "Osteitis deformans." The spine, & either by yielding to the weight of the overgrown skull, or by changes in its own structure, may sink & seem to shorten, both greatly increased dorsal & lumbar curves; the pelvis may become wide, the necks of the femora may become nearly horizontal, but the limbs, however misshapen, remain strong & fit to support the trunk. In its earlier periods, sometimes through all its course, the disease is attended with pains in the affected bones, pains widely various in severity, variously described as rheumatic, gouty, or neuralgic, not especially nocturnal or periodical. It is also attended with fever. Its characteristic condition of anemic or of fever have been found in it. It is not associated with any constitutional disease, unless it be cancer, of which three out of the five cases recorded in the paper were the subjects. The bones examined after death show the consequence of an inflammation affecting in the skull, the whole thickness, in the long bones chiefly. The compact structure of their walls, & not only the walls of their shafts, but in a very characteristic manner, those of their articular surfaces. The change of structure produced in the earliest period of the disease have not yet been observed, but it may be believed that they are inflammatory, for the thinning is accompanied with enlargement, with increase production of imperfectly developed structure, with increased blood supply. Whether inflammation in any degree continues to the last, or whether, after many years of potasse, any reparative change ensue, after the manner of so-called secondary hardening, is uncertain.
Having now given the full report of the case of Mr. J. I will proceed to the third part of my paper, I consider the various diseases more or less resembling it. Before doing so, however, to facilitate further inquiry, it will be best to examine somewhat fully the changes in, results of chronic inflammation of bone, so as to determine whether or not the apparent changes were due to that process.

**Inflammation of Bone.**

Drumpt (Surgeon Radcliffe, Vol. 1, p. 128) says chronic inflammation of bone is most frequently the result of some constitutional disorder, generally attacks several bones simultaneously. It is denoted by dull enlargement, tenderness, weight of bone increased at night. If caused by injury, it may lead to perforation, but in general it produces the above change, some irregular enlargement. The case of Mr. J. would come under the definition in all points, with the slight exception of the increased pain at night being absent. It is however much too general.

Smith (Lectures on Surgery, Sect. xxxv. p. 244) says "In a bone affected with chronic inflammation, the trabecular canals are much larger, more opened out than normally: the dense texture of the bone is also lighter than usual. It becomes granular in texture, approaches in character the cancellated texture, and afterwards it becomes consolidated, when the chisel and section goes on longer. There is often also
A medullated canal of the bone from the deposition of new spongy matter on the surface. The enlarged noridian canals can then admit vessels of a very considerable size, which are able to relieve themselves of their termo-atropic contents, in the symptoms of the disease are thus for rendered less intense, but as in all other forms of chronic inflammation, the tendentia tends to produce organic changes. A larger amount of nutrition goes on than natural, but that the tendentia becomes consolidated till the canal of the bone may be entirely closed. In some cases, become partially solid. The bone is then enormously thickened and irregular; but when the diseased action ceases, gradual absorption takes place, the bone tends to regain its normal form. This description would also include the case of Mr....

In the granular degenerative state, the hard bone is said to be reduced to in the early stage of the process, especially worthy of notice, for some such change must have occurred to allow the characteristic alteration in the shape of the affected bones.

Eichhorn. Science of Surgery, 5th Ed. Vol. II (P. 401) says: "In chronic inflammation the change in the nutrition of the part from the principal element, in acute than in the blood vessels. He proceeds to quote Billroth to the same effect. In latter incur in the point that inflamed tissue become at first more souple, than normal. Eichhorn further points out that there are change in colour, size, sensation, function & temperature in chronic inflammation but that these are..."
different in origin, in degree, in extent, or in duration, to what we find in acute. Swelling is incident to an early and important lesion, and is due to the action of the effused fluid, whether of serum which may be absorbed, or of plastic matter which is liable to remain. Here is the result of injury.

As regards inflammation of bone, Eberlein (Schedl, vol. ii, p. 180) says: "When a portion of bone is inflamed, the periosteum and medullary membrane participate in the morbid action, and together with the affected osseous structure, become highly vascular; at the same time the inflamed bone becomes enlarged and partly in consequence of changes induced in its organic constituents, partly in consequence of the cancellated structure becoming expanded from interstitial absorption; the cancelli being filled with a porous-bone fluid. The compact structure of inflamed bone undergoes a peculiar kind of laminated expansion, so that a section of it presents an appearance of concentric parallel layers. When the inflammation is chronic its character will vary according as it is in tension or not. When it is chronic the bone is expanded, softened, and reddened. When traumatic when occurring in healthy subjects, the bone becomes very dense, incrustated, and hard; appearing on cutting more like ivory than ordinary bone. In these cases the medullary canal becomes closed by deposit of new hard bone. Sometimes considerable elongation without much or any thickening takes place. Have been, at the result of chronic freezing, the finger from one to half to two inches longer than its fellow?"
The case of Mr. T. does not seem to agree with this description as well as with those of Drs. VL and Du, but I think a satisfactory explanation of this may be easily found. The swelling and softening of the cancellous tissue described by Ehrlich was certainly present again to describe the cancelli as filled with a sero-
ecirrus, myeloid cells, etc., found by Drs. Weller; the appearance of concentric parallel layers also agrees with the thin plates found in the outer layer. Ehrlich gives as the final result of the inflammation in a healthy man, the production of a hard, dense, compact mass of bone with the medullary cavity filled up; this was undoubtedly absent, but I think such absence may be said to be the strikingly evident, the patient having died before the first stage had ceased, at any rate in some parts of the bone.

Paget (Lecture on Surgical Pathology, 2d Ed. p. 298) says: "Perhaps the most striking instance of softening in inflammation is to be found in the... In inflammation... caries of bone, in addition to the softening caused by the removal of the cartilage matter, there is also a considerable widening of the metaphysical canals, lacunae, & canalicularia, so that many of them disappear, owing to numerous spaces & canals being thrown together. The enlarged metaphysical canals present the appearance of medullary spaces, very filled with a soft polyhedral growing tissue, not unlike that of granulation. The softening of bone may permi..."
peculiar subsequent changes, especially their swelling &
expansion. The characters of a bone thus enlarged are
easily discerned. Its substance may be irregularly cancellous
or porous, but the most striking change is a more or less exten-
sive vande separation of the concentric laminae of the walls of
the bone, so that the longitudinal section of the enlarged wall
appears composed of two or more layers of compact tissue,
with a more or less cancellous tissue between them. Usually the separat-
ed layers have carried onwards, the bone appears vastly ex-
larged, but sometimes the inner layers of the wall are pressed
inwards & encroach upon the medullary tissue. In the first period
of the disease, the cancellous tissue between the separated layers of
the wall has wide spaces, which are usually filled with a blood-
coloured fluid. But the tissue, after the often coincident
external formations of new bone appears to have a tendency
to become solid & hard, vitreous, & laminae may thicken till
they coalesce into a compact rock-like substance, harder than
the healthy bone? This description might have been written
especially to include the case of Mr. J; it does so to completely.
For in this case we have the Jutting; one have the Concentric
Laminae; the hard patches; the enlarged hollow canals;
the sub-nuclear tunic; the corresponding to the deep
nucleus, growing bone. From it also we see how the enlargement
of the bone occurs: by the separation & carrying onwards
of the concentric laminae of the walls.
I think I have now fully demonstrated the changes in the bones of Sec. 1. to be the result of chronic inflammation, for in all particular, they agree with the descriptions of that process & its results, given by Dr. B. S. E. & Dr. R. F.

The determination of this point will facilitate (after what remark) the consideration of the bearings of the case in regard to other diseases. I will first take

**Rickets.**

Rickets is defined by Dr. B. E. as a Constitutional disease of early childhood (Pattern of Practice of Med. C. 200).

From edge: (Text-Book of Practical Medicine, translated by Sampson of Rochester. Vol. II. P. 509.) says it is a disease of childhood, that it is doubtful whether the same cases, where the disease is said to have occurred in adults, or during fetal life, were actually Rickets?

Billroth (Surgical Pathology, Sect. XXXV. P. 463) says: the disease in children is childhood; it is a disease of the development of bone, which however usually affects so many bones, that it must be regarded not as a local, but as a constitutional disease. He however thinks that certain disease, such as flat foot, genu valgum & varum, not convex curvature of the spine, are due to weakness of the bones, which cannot be distinguished from a mild form of Rickets. Such cases occur later in life, but generally between ten & twenty years, while the disease usually termed Rachitis is mostly seen in very young children.
Erickson (Science & Art of Surgery 6th Ed. Vol. II. 1887) says

"Scrofulous children are never occurring after the age of puberty."

"Adolescents are all alike in considering scrofula a disease of childhood, which is undoubtedly the general idea of it."

"If this view be accepted, we cannot for a moment entertain the opinion that the disease could first manifest itself in a man forty-five years of age, over the foot-trench, who had previously enjoyed good health. The German observers seem to admit the possibility of cases occurring in adult life, we will proceed to examine the changes found in scrofula, and compare them with those met with in sarco."
talts, which again are eliminated through the bowels.
According to the new theory, which may be called Wilkie's
as he originated it, in its simplest expression, the affections
is due to a diminished supply of chalky salts merely, not
to their resorption. This explanation is now generally
accepted & has many strong points in its favour, such as
the benefits derived from giving them affected the carotids.

Black holes of time, the epiphyses from which Achielic
children generally suffer for in the epiphyses there is the
albuminoid (the chalky salts are introduced as albuminoid)
taken into the system. It however cannot be looked on
as proved, for it does not account for the softening of the
epiphyseal cartilages, nor for the bones being so much more
affected by the diminished supply of nutrition, than other
bones, nor for cases occurring in non-epiphyseal children.

To enable the case of Nutt. to come under the head of Achielic
one must suppose that their objections to Wilkie's theory,
are unanswerable, that the old idea of absorption of the chalky
talts is correct. This is another improbability, but a
consideration of the character of the bones themselves, in
Rickets & other deformities, will finally remove any re-
maining doubt as to their being the direct causes. In Achielic the bones are short, thick, & clumsy, the ends are
enlarged, & the shafts distorted, very chiefly to curves
at the point of junction of the epiphyses & diaphyses,
The two parts of the bone often become club-like and deformed. In Deformans the bones are long, thick, with ends enlarged; the shafts are round with ill-defined margins, they are curved, but the curve is gradual throughout the whole length of the bone, & in the vitreous body curve is from before backwards. The tibia of Pechet is flattened laterally, curved inwards, has sharp narrow margins. We can now, I think, safely conclude the case of Mrs. J. to be one of Pechet, for there are three primary symptoms to its favour: 1st the age at which the disease occurred, 2nd the manner in which it occurred, & 3rd the result as seen in the bones.

Osteomalacia.

The descriptions given of this disease vary considerably, and this is perhaps due to the distinct ones being classed under one head. The true Osteomalacia, Osteoporosis, Malakosthenia, Rachisosthenus adultorum, appears to be much more common in France & Germany than in this country, though cases have been recorded here by Prof. Galton and Dr. E. Jones (Phil. Trans. 1848), and Dr. Maclean (Med. Chirurg. Trans. vol. XXXIII). It is found, in the great majority of cases, to occur in females, though generally when in the premenstrual condition. The disease then usually attacks the pelvis, as insisted on by Rakitansky, & gives it a characteristic shape; it becomes
often affects other bones, and causes deformity of the spine, arms, or legs. The growths appear in these bones as actual reabsorption of the bone tissue present in normal bone. The medulla in the long bones gradually increases in extent, the cortical substance diminishing in equal proportion. The spongy bone also becomes weaker from the trabeculae becoming thinner, fewer in number, the fatty matter present. The bone becomes so small in amount, that the bone may be easily bent or cut. In the beginning of the disease, Shibayama has shown (Berträge zur Kenntniss der Pöntenalter, translated by Dr. Matthias Duncan, Ed. Med. Jour. 1862) the medulla to be very thick in blood, partly in the vessels, partly extravasated, so that it has a congealed, almost black colour; the fat cells are greatly diminished in number, but the connective cells are numerous. When the disease is more advanced the medulla appears redder, more gelatine, consisting of granulation tissue. Much fat. The cause of the above changes is a phlegmato-zonit.

Takayashu Macintyre believed it to be a malignant disease, for they have shown the material within the periarthritis to be composed of granular matter, nucleated cells, and a few connective tissue. They, however, admit it to differ from other malignant diseases in that, instead of progressively reproducing themselves without limitation, the most morbid products seem, at an early stage of their existence, to be removed by absorption and carried out of the system. The objections to this theory are
I think inapplicable for they seem to find it merely in
the microscopic appearance of a cell, and it is now generally
admitted that the appearance of nucleation, or clumping, is
sufficient to diagnose one as malignant; the clinical history
is of much more importance, than the cells he has gained them.

Ref: Bichat (General Pathology of Therapeutics, translated by Dr.
Hickley, p. 468). The absorption of the bone cells is due
to the presence of lactic acid, which he thought was found in
the medulla of the hollow bone.

Further, of course, Bichat's theory is reasonable on the other
hand, the gelatine, escaping from fresh osteoelastic bone,
takes an alkali reaction. 

He (Haller's Practical Medicine, Vol. II, p. 27) classifies the disease amongst hemorrhagic
inflammation where an interstitial exudation is dependent,
but where the inflammatory disturbances of nutrition affect the
fleshy elements of the affected organ. This view has to many
points in its favor, that Haller ever thinks it probable the
especially from the bone tissue, the lumen, change, vascular
condition of their bones, which are perfectly analogous to the
changes in aortic proper, the frequent occurrence of the
ulceration in the superficial state, its customary origin from the vein
which has been injured during parturition, yet the severe
pain accompanying it?

In true Osteomalacia, then we may conclude we have a disease
of bone, depending on inflammatory, causing deformity, occurring
Generally in adults; in their parts, they closely resemble Osteitis Deformans, but those of divergence between were marked, for it occurs generally in women, attacks chiefly the pelvis, causes the affected bone to become lighter, weaker; the two inflammation may run the same course till the taking up of the bony delta occurs; then they separate, in Osteitis it seems to be no effort at repair; granulation fat cells fill the place left vacant; in Osteitis Deformans on the other hand new formation appears to be formed from the blood vessels, to in these, healing causes the bone to become larger, stronger than before.

Having now considered the true form of Osteomalacia, as met with chiefly on the Continent, let us turn to that form found especially in England. It has been generally described under the name of Pseudotuberculum, with the distinction from atrophy accompanied by fatty deposit. This disease appears to be a fatty degeneration. It was well described by Hunter in his essay entitled "Observations on the Case of Pseudotuberculum," described by Sir Goodrich, in the Lancet Med. Journal Vol. XX 1795. He says, speaking of the lamellae, the component parts of the bone, were totally altered, the structure being very different from other bones, wholly composed of a new substance, resembling a species of fatty tissue, giving the appearance of a change bone deprived of its earth, soaked in soft fat.

J. James Park (Lectures on Surgical Pathology, 3rd Ed. p. 102)
Describens a femur presented to the Museum of the College of Surgeons by Mr. Sampson, the medulla of the bone had the bright yellow, fatty, and deep crimson hues, which are so striking in many instances of the disease. But the constituents of this apparently peculiar material were, free oil in great quantity, crystals of wax, some free, or enclosed in fat-cells; a few fat-cells full of oil as in health, but many more, opaque, collapsed, worked up in strange & deceptive forms. The pink & crimson colors were owing to the bright trance of a part of the oil globules of the nuclei & granules in the collapsed fat-cells. There was no appearance or indication of an excess of blood in the bone, or any of its contents. Periostitis Osteum attaches the bones of the extremities more often than those of the trunk, of males as often as females; in these respects it resembles Osteitis Deformans more than true Osteomalacia does. It however does not seem to be due to inflammation, of the soft, oily, fragile state the affected bones are reduced to is of course equally distinct from the healthy, cartilaginous, strong bone of Osteitis Deformans.

Chronic Rheumatic Arthritis.

In the discussion, which followed Sir J. Paget's paper, Sir Barnwell remarked that the case described resembled one of the disease, as the German, now call it Arthritic Deformans, noted that in it the bones were changed in an equal degree with the joints. I think a recital of the opinions of the chief authorities on Chronic Rheumatic Arthritis, will show
Surface of the bones, & in a central induration of the epiphyses, accompanied by a proliferation of bone substance at the periphery.

On an anatomical examination of the bursa, Mescherykoff, finds the articular capsule decidedly thickened & covered with tagged proliferations. The joint contains a very small amount of synovia. The articular cartilages are broken down into fragments, occasionally ossified; in advanced cases they have entirely disappeared by absorption away so that the ends of the bones come in contact, & have smooth, articular surfaces. As a result of inflammatory atrophy, the cartilage parts of the epiphyses appear porous, while their base is decidedly increased, with regulars, or in rotary metamorphoses, by the formation of osteophytes. We see from the above extract, that Mescherykoff does not support Mr. Rawlinson's idea of Chronic Rheumatic Arthritis, & that the deformities being one of the same origin, that in the description of the joint we mention in made of the bones being affected; what the changes described in the latter are carefully confined to the ends, & are altogether different to those found in the case of font.

Chronic Rheumatic Arthritis specially attacks the joints of the fingers, toes, metatarsals, metacarpals, & causes characteristic deformities of obliteration. All these changes are remarkably well seen played in a maiden lady living under my care. She is now sixty years of age, & for the past ten years has been unable to walk or stand, her knees are enlarged & fixed in a semi-squared position, her feet & toes enlarged & useless, with them over them
The resemblance to be very slight, Dr. Barnhill's idea about the changes in the bones is that disease is wrong. In the first place, as Sir J. Platt replied, Dr. Adams of Dublin denies that chronic arthritis rheumatica ever attacks the shaft of the bones. Ziemer (Practical Medicine, vol. 2, p. 489) says, "Chronic articular rheumatism is the same applied to a chronic idiopathic inflammation of the joints, which usually attack only one or a very few joints, which differ from the joint to another far more rapidly than acute articular rheumatism does, which, in that of the long duration, induces comparatively little anatomical change." The anatomical appearances are thus described, "the capsular capsule and ligaments of the joints, thickened, the synovial layers, processes of the menisci, hypertrophied, just as frequently degenerated, the cartilage, related to harsh, the synovia cloudy. Arthritis Deformans is placed in a separate chapter, but from the great elasticity of the term rheumatism, Ziemer thinks it may with equal propriety be classed with rheumatic affections, or considered as a distinct disease. He thus defines it (p. 492) "By arthritis deformans, we mean those forms of articular inflammation where not only the capsular capsule and ligaments of the joint exhibit the signs of a chronic inflammation having the tendency to suppuration, but where, at the same time, the cartilage, surface of the bone in the joint, some peculiar change characteristic of the form of arthritis deformans. In other words, chiefly a loss of the articular cartilage, \[ \ldots \]"
appears better whenever her hands are however the most remarkably affected. Some of the fingers are stiff, straight, even, almost dislocated backwards at one joint, forwards at another, so as to assume the most eccentric shapes. With all this deformity, with hardly any power of grasping, the lady is able, by inserting the middle phalanx her finger, & exhausting or of remark &c. the fineness. Indeed hardly any one of them appears more present in the hands, a fact of which, a comparison of the two at once occurred to me, as one of the more amusing at Deve-Barnwell's classicising them together.

The late Prof. Laycock in his lectures gave the principal symptoms of Chronic Rheumatic, or, as he preferred to call it, Chronic Osteo-arthritic. 1st. The first stage, more or less inflammation in the joint, with the resulting attacks of pain, swelling, or oozing: 2nd. The occurrence of an analogous transformation of articular, muscular, & soft fibro-elastic tissue to bone, to the formation of loose cartilage, from which at last appeared mere nodules of fibrous; 3rd. Osteotomy, or, the further transformation of bone into ivory.

Dr. Laycock was opposed to the generally accepted theory of the grating, or wearing away of the articular cartilage, & concluded that their absence was due to their being changed into bone. This bone in time to a porcelainous material like ivory. He agrees with Rhinowur in saying, nothing about any change in the shape.

Erleburn (Skelet. & Art of Surgery. Vol. 2, p. 106) says, Chronic Rheumatic Arthritis, is an active disease of the bones & fibrous
Seems not be acquainted with the researches
of Benjamin Cole, or the late Mr. Smith of Dublin.
expansion about the joint: it is especially characterized by considerable increase in the size of the articulation in the shape of the articular surfaces, which become porous in some parts, for cellular in others, by thickening of the fibrous capsule of the joint, with deposition of nodules or plates of bone in it. Ultimate destruction of the cartilage and synovial membrane. bzchkein it would be seen how it is a disease of the bone, but with this important addition 'about the joint.' He then proceeds to your Allerwher's ideas, which however are more fully referred to in his Surgical Pathology, "Lect. xi. p. 306. Allerwher says: 'The disease chiefly affects the cartilage, secondarily the synovial membrane also, as well as the periosteum.' The description of the changes in the cartilage and synovial membrane agree very much with that of Meneyer, the breaking up of the intra-cellular substance into filaments being insisted on. I believe the cartilage to be worn away. Then explains the result: Immediately under the cartilage there is always a layer, even if it is very thin, of compact bone substance. Being next in the order of the ends of the epiphysis, after the cartilage is destroyed the friction affects this layer, as a result of this mechanical irritation, new bone substance is formed in this layer; under the joint of irritation the medulla of the flabby substance adheres to a slight extent. The bone in its turn slowly becomes away, but for the above reasons, its surface is always found from smooth when motion remains. Allerwher also says the inflammation may affect other structures about the joints as the periosteum, tendons, muscles.
These occasionally occur very certainly, so that the ends of
the bones are often covered with long, broad, 'Articular Deformity'
in said to be almost always articular, rarely affecting
similar points in the two sides.

Robert the Quaker, Laycock, S. Erckhan makes as mention
of the shafts of the bones being affected, many alterations in them
is directly denied by Dr. Adams. He certainly admits them
being changes in the articular ends, but then instead of them as
well understood as those in the joints, are insinuated
as being secondary to them, I simply due to mechanical irritation.

I think they may be in the Barrow's attention the wrong;
to me it appears that Chronic Rheumatic Arthritis might almost
be shortly defined as an inflammatory disease of the joints, the
bones. With the exception of their articular surfaces, being normal,
Articular Deformity as an inflammatory disease of the bones,
the joints being normal. The two therefore resemble one another
in the age at which they occur, in being due to inflammation
in causing deformity; the inflammation however attaches dif-
ferent textures in the two cases, the deformity in the to different
causes. The results cannot be one another.

Curved shaft of the bone affected with Osteitis, the absence of
osteophytes from its extremities, the smooth normal articular
surfaces are entirely distinct from the changes above enumerated
as peculiar to Chronic Rheumatic Arthritis, or what we may
regard as its sub-division Articular Deformity.
Would it be correct to class the disease in this country under the head of tumour? To answer this question it will be necessary to consider somewhat fully what is meant by that term, which are the definitions of it given by different authors.

Hunter says: "A tumour is a circumscribed substance produced by disease, of different in its nature and consistence from the surrounding parts." 

Stecher (Semen Art of Surgery, 6th Ed. Vol. I. P. 378) says: "By a tumour may be meant a mass or a circumscribed mass, growing in some tissue or organ of the body, and dependent on a morbid cause of, or detachable from, the nutrition of the part. These growths may then be considered under the two heads of local hypertrophies, or outgrowths of the normal structure of the part; and new formations, presenting structural characters which more or less radically differ from those of the parts around. The tumour thus formed increases in size by an inherent force of its own, in proportion to the growth of the part of the system, but still obeying the same laws of growth which govern the body generally. In order to constitute a tumour, it is necessary that the normal form of the part be widely departed from; a mere increase in its size, so long as it preserves its usual shape, being scarcely considered in this light. Thus, if the liver be uniformly enlarged to double its natural size, the enlargement is hypertrophy; but if a comparatively small
round that cancer of bone project directly forwards from its
interiority, it is said to be a tumour but a mere hypertrophy.
These may be considered the old or the surgical veins of a
tumour. They depend on "circumscriptio" as their leading
feature, I seem to have intended to limit the application of the
term to growth which are capable of being linked to the
largeca, at any rate, as far as their connection to the tissue
in which they grow is concerned. They could at one exclude
the case of Mr. T. for the enlargement found in this bone was
remarkable for its diffuse character. Further inquiry, however,
will show that the idea of circumscriptio is quite cast
away by more recent authors, for instance I find from my
mind that Professor Sander's says "A tumour is a formation of
tissue, not typical, without physiological function, with an inherent
tendency to increase? As further says that they have been called
Parasitic, and like them in many respects, but differ from them
in having an aggressive part, in regard to adverse tumours that
it is often difficult to distinguish them from enlargements the results
of the process of inflammation.

Dr. H. (Surgeon, Vade Mecum, 14-2) gives a short definition
"The word tumour is used in pathological language to signify, not
any kind of swelling or enlargement, but only such enlargements
as are caused by marked growth. By marked growth, we understand
masses of living tissue growing independently, excessively, and
abnormally."
Spence (Lecture on Surgery, 1757, p. 107) says, "In its ordinary acceptance, the word 'tumor' means a preternatural swelling of any kind. In surgical pathology it has a special significance, it is understood to denote 'an overgrowth resulting from mortis or abnormal nutrition, which, instead of merely supplying clear material sufficient to repair wants of tissue, yields a redundant tissue leading to overgrowth, with mass or less alteration of structure and form.' Mr. Spence proceeds: 'When in the nature of growth independent of surrounding tissue, preceded by tumors, there are other points of distinction from hypertrophy, inflammatory swelling, or cyst, attempts to exact definition of the term 'tumor' fail. Places it in the great division of hypertrophies or overgrowth (Lecture on Surgical Pathology, 5th Edit., 1815). At the division of the growth consist of additions to the organized materials of the body, but there is that chief point of distinction between hypertrophy and tumors: that, to whatever extent the adapted hypertrophy may proceed, the overgrown part maintains itself in the normal type of the structure, while a tumor is essentially a deviation from the normal type of the body in which it grows; it, in general, the longer it exists, the wider is the deviation. The flaccid muscular tumor, one of the tumors, is taken as an excellent illustration of a tumor, it is contracted with the hypertrophy which it causes in the walls of the uterus. Ogles points out their chief difference between inflammatory swelling and tumor, is that the accumulation of tissue of.
Example in inflammation appears chiefly due to the altered state of the parts at, or adjacent to, the place of production; a tumour, at the other hand, increases of identity depending on the surrounding parts simply for its supply of blood; at the different separations for development produced by the new material; the inflammatory bodies in the first instance little more than that of forming connective tissue; that beginning, or added to, a tumour may assume then form, or any one of several other forms; & the most striking contrast in the whole: subsequent to the first organisa of the two material. Organized inflammatory products accumulate themselves to the ulcer; they shine, if not to the texture, of the parts among which they lie, as they are apt to break, degenerate, & be removed. They tend towards a better state; sometimes tend to a further & further devolution from the proper tissue of the body. Their structure may be homogeneous, but not their life; for common they are growing, which the tissue, for near around them are only maintaining their integrity, or ever degenerating, or undergoing alteration from pressure. I may finally conclude, that it is not enough to consider the true nature of tumours from their likeness or unlikeness to normal tissue, their morphology must be studied. It is, therefore, not enough to think of them as hypertrophic or overgrowth; they must be considered as parts forming, as it were, with appearance of inherent power, as reflection of the growing vegetation,
of the root of the tube, accordingly from its normal position, with no ensuing mischief.

These definitions of Sanders, Usher, Cleaver, etc., may be considered as the pathological, physiological, and anatomical views of tumors in contradistinction to the surgical, or practical view of tumors. They all agree in considering the inherent power of growth as the chief characteristic of a tumor, as anatomical marks are given by which it may be known, and circumstances incident to its growth needful to, of course, the idea of general health in men. They all held tumors to be first due to inflammation, whereas the fact of having already determined the idea of the growth to be due to that process, is enough to exclude it from them. Moreover, the exclusion might be difficult for, if we examine each of the three different views of tumors, we shall find them anything but conclusive. First, the growth was constant; we could not say whether or not there was any change in the surrounding parts giving rise to it; 2nd, we could not know of what material the excess of tissue was composed of; 2nd, whether any alteration was going on in it, though the breaking of the bone would certainly point to it not being normal osseous tissue; 3rd, the deformity was increasing. For another, evident to the contrary, the texture might be deteriorating, or effect of nature in the way of repair by injury could be detected.

Cancer. At the greater include the less, one thus exclude the form of tumors from the list of possibilities.
The remarkable number of cases (three out of four) in which the two diseases have occurred together, yet requiring an explanation, if the cancer had occurred in one of the bones affected with the syphilis, it might have been thought due to the irritation set up by the inflammation, just as erythema of the keratoma in ulcerous tumours is but the sign of fester, of the life in tunics, is that of the paper.

**Syphilis.**

The effects of this disease are too numerous to be enumerated, suffice it to say that all those most characteristic and constant, in the cutaneous, mucous, conjunctival, the broken down health, the enlarged glands, are present, etc. were absent in the case of Dr. H. Moreover, in certain cases, jaundice and its results are the only effects noticed by the sufferer, and let us consider what are the results of syphilis on the bone. As a rule the periostium is first inflamed, synovial or joint is effused between it and the bone giving what is termed a periostitis. The German Surgeon give this term to swelling of a firm consistency, calling the softer variety syphilitic. The effused material is reabsorbed, or in more cases, increases in amount; in the first place as a solid calculus is left, in the second we have a syphilitic osteitis formed, I find the bone of the bone rough, scale, sometimes the deeper parts consisting from the destruction of flesh, whereas another without its cancellous in the third the bone beneath is destroyed, from being deprived of
its blood supply. Cartils & crescents again may be the result of a primary inflammation of the bone itself, or of inflammation spreading from the soft parts. The ones most frequently attacked are those which are most exposed to external agencies, especially heat & cold; those of the face, skull, thorax, & limbs. In the case of Mr. P. we had no crescent or cartil.

the tissue more enlarged irregularly involved, but then the enlargement was throughout the whole bone (a change seldom if ever seen in Syphilis) & the perforation was healthy. Their surfaces consisted of normal bone & of the tough, leathery, & characteristic of Syphilis. I think this short consideration will enable us to determine the inflammation of the bone to be that of a syphilitic type, so that a more examination of the enlarged bone would lead to that conclusion, putting on one side the clinical history, which is certainly conclusive.

Hyperesthesia.

This term simply implies an increase in the dimensions of a bone. Taken in the broad way it will of course include the case of Mr. P.; we must therefore consider if any of its described varieties agree in its particulars with the case. Hyperesthesia may depend on inflammation, pressure, or injury; the process is merely an increase of normal substance without alteration of structure. The enlarged organ maintains its natural type, form, & structure. However much it may increase in size— it is, as it were, merely engorged. (Office. Lecture in Surgery. 1st Ed. Vol. i. p. 107)
Such hypertrophy, when due to increased use or strain, is regarded as natural, in fact in necessary to health, for without it the function of the part could not be fulfilled. When, then, in no such demand, the hypertrophy is pathological. In some cases it is very difficult to determine if the enlargement be due to hypertrophy or inflammatory inflammation, and microscopic examination may not enable us to decide the only destruction, if any, in that cited down by Page (Surgical Pathology, p. 34) "where the enlargement is due to the former there is an increase of functional power, where to the latter there is no such object attained." In the hypertrophy, as seen subject in loosening of tone, has been found in connection with His zone, Ophthalsmia, Tonic Abnorme, Tonic Hypesthesia of the right part of the brain. (See Franks, Scurr's Art of Surgery, Vol. II, p. 156) Such cases have been especially examined by Stanley and Page, and they have generally found some increase in the circumference of the bone also, which agrees with the observation of Langenbeck. Page explains the curved shape of the tibia, when the tightened, flat columns by its anatomical connection; it is round at each end to the femoral, which remains of normal shape, the elements connecting the two bones seldom or never give way, whence the tibia must bend. The bone elongated to test closely resembles that of Ophthalsmia, its diaphysis from a ditch, yet one there been already prints out. Hypertrophy of the skull has been divided by Page into those three (Nos. Pathol. p. 38, etc.) The first he calls "Osteotropic," it is generally due to Hydrocephalus, the skull in
enlarged but its lines are thinner & lighter. The second or concentric form is due to shrinking of the bone. A correspondent increase in the thickness of the bone to fill the vacuum so formed, then in the alteration in the appearance of the shell from roundness. Third form is rarer than the other, but is well seen played in the case of Mr. T., for there is great improvement of the thickness, elevation of the inner table, but no change in the capacity of the cranium.

The case of Mr. T. will be seen to offer the pretty closely similar hypertrophy as above described, the enlargement of the bones & the bending of the tibiae would at first appear identical with it, the bending of the femora might be accounted for by supposing the weight of the body above & muscular action to take the place of the skeleton in the case of the tibia. Then in however no increased functional power which points to chronic inflammation, keep the case of the enterocele, & a microscopic examination confirms this idea, therefore, the case from the class of hypertrophy.

Hypertrophy is also said to be due to chronic inflammation, so one must class the case of Mr. T. under this head, supposed to consider if it agrees in its minute points with any examples of that disease already described. They are generally divided into two classes, Osteoporoa & Osteotelerosis. In the former the bone is often cancellous in texture, it is however closely connected with Osteomalacia, if the two disease be not identical, but that has been already fully examined, need not further consider it, but may pass on to the other form of Hypertrophy, Osteotelerosis.
Osteosclerosis is thus described by Bellasota (Viee. Natale. p. 428). When Osteitis interna osteoplastica develops in the hollow bones it usually attacks the entire bone at the same time, and commences simultaneously in several bones. The result of this disease may be the complete filling of the medullary cavity with a tolerably compact bony mass; the almost complete filling of the Haversian canals with bone substance, or generally also the formation of bone in the sinuses. Thus the entire bone becomes very heavy and denser than normal. The process is also termed 'fossilization' of the bone, but more frequently 'osteosclerotic osteitis' (condensing osteitis, A. Fokkema). Besides the hollow bones, other parts of the skeleton are also occasionally attacked, e.g., bones of the face and pelvis; in such cases the bone deposits are thumb-sized nodules, so that the bone acquires a resemblance to that affected with elephantiasis; indeed, the disease is very analogous to that of Leontiasis ossea (Fischer). The cause of the above changes is obscure, during life a certain thickening and vascularity of the surface is noticed, but other symptoms are indicated. It shall moderate pain as a consequent slight impairment of function being the chief.

Osteitis Deformans (= the Osteitis interna of Perthes) have many points of resemblance, e.g., in both the original cause is unknown. Though the subsequent changes are the result of inflammation, 25% of both are attached with slight pain, slight impairment of function, 35% both generally attached many bones. In a recent case of the bone not a joint, 40% both cause the bone to enlarge, become finely tubulated in its surface.
The joints of difference are however as marked for 1st in sclerotic the form of the bone is little if at all altered, it is simply enlarged, in osteitis the alteration in shape is as remarkable if not more so than that in size; 2nd on handling the former feels dense excessively the latter of normal weight for its size; 3rd the texture of the sclerotic bone (as the name implies) is hard & clear, the medullary cavity & cancellous canals being encroached upon by some bone matter, that of the other normal or increased in density only in patches.

We must therefore conclude that Mr. F. did not suffer from osteosclerosis, or any other variety of hyperostosis at present described, & I think I have shown that his case will not come under any of the other headings which at first sight might be thought to include it.

In conclusion I can only hope that I have carried out in a satisfactory manner my original aim, that of proving the case to be one "sui generis" & worthy the new name bestowed on it by Sir James Paget—"Osteitis Deformans."

James C. James