

Myositis ossificans / by Alfred Austin Lendon.

Contributors

Lendon, Alfred Austin, 1856-1935.
Keith, Arthur, Sir, 1866-1955
Royal College of Surgeons of England

Publication/Creation

Adelaide : Printed by Webb, Vardon, & Pritchard, 1887.

Persistent URL

<https://wellcomecollection.org/works/krkh8er3>

Provider

Royal College of Surgeons

License and attribution

This material has been provided by This material has been provided by The Royal College of Surgeons of England. The original may be consulted at The Royal College of Surgeons of England. where the originals may be consulted. This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.



Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
<https://wellcomecollection.org>

6

Dear Sir

skeleton

Myosotis

the Musca

just co

by the Le

as well

the ske

of the cl

In view

6

Adelaide,
S. Australia

Dear Dr Keith,

There is a
skeleton of a case of
Myositis Ossificans in
the Museum here. I have
just come across a paper
by Dr Lendon which gives,
as well as a description of
the skeleton, a full account
of the clinical & life histories
In view of the skeletons in

I therefore asked Dr. Leach
if he would give me a
reprint to send to you.
If you have ^{already} not seen this
paper, which is a good
many years old & Australian
at that, I thought you
might like to see for the
account is so full.

So I take the liberty of
sending it by this mail
with kindest regards
Yours sincerely,
Harold Richhill

the Museum at the
College of which, as far
as I could ascertain
when I was there, not
very much is known on
these two points (please
pardon me if I am wrong)
I thought you might be
interested in the account of
this case. As far as I
remember them this case
greatly resembles them in
anatomical details.

MYOSITIS OSSIFICANS. 6.

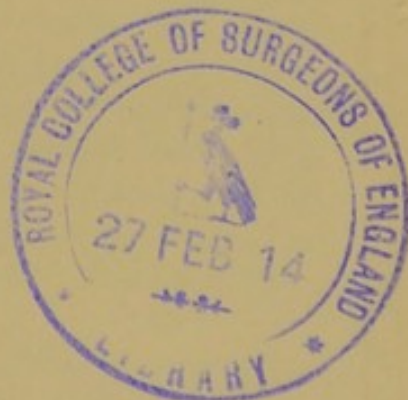
BY

ALFRED AUSTIN LONDON, M.D. (LOND.),

LLECTURER ON FORENSIC MEDICINE IN THE UNIVERSITY OF ADELAIDE;
HONORARY ASSISTANT PHYSICIAN, ADELAIDE HOSPITAL; HONORARY
MEDICAL OFFICER, ADELAIDE CHILDREN'S HOSPITAL.

WITH SIX ILLUSTRATIONS.

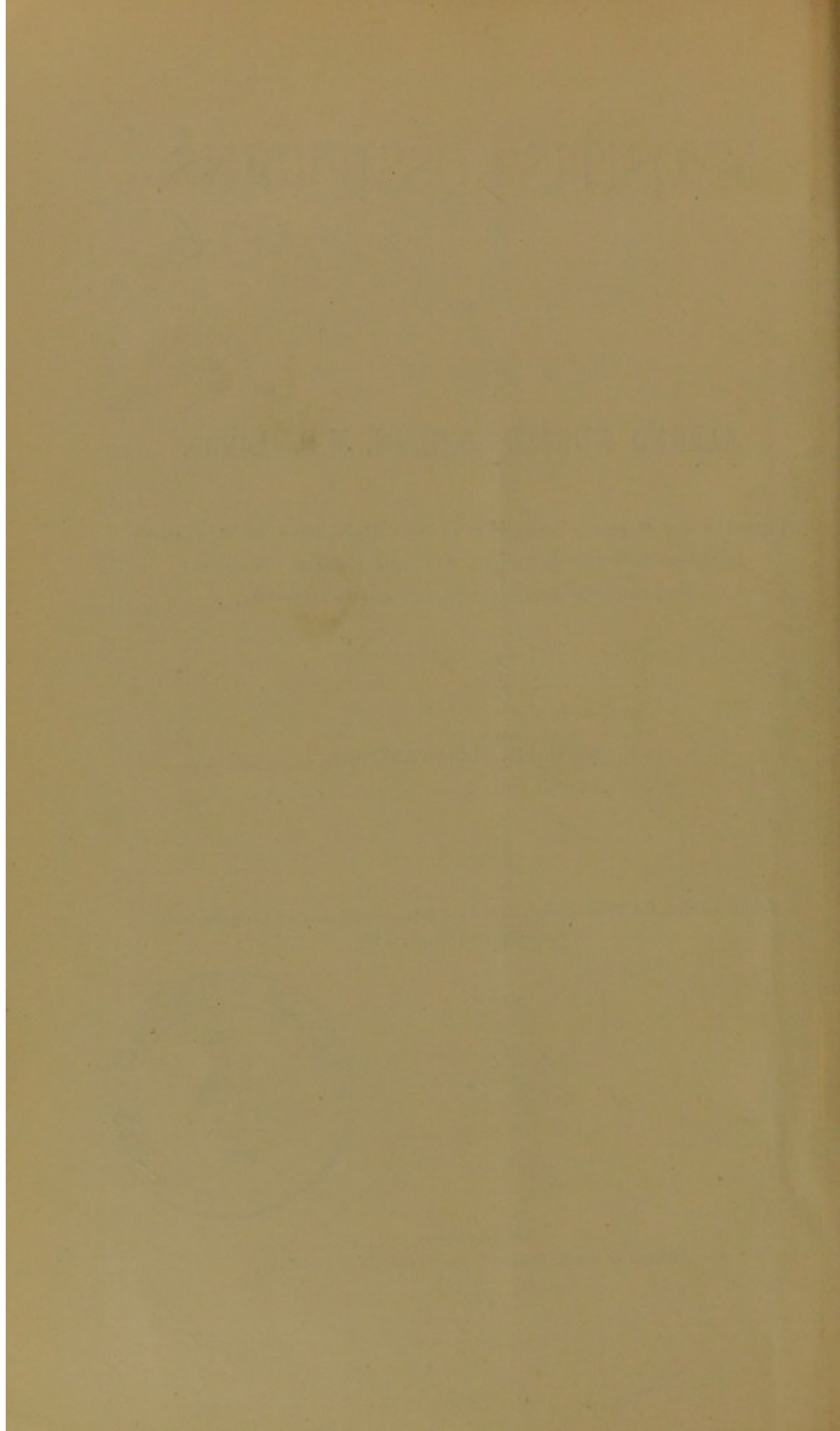
Reprinted from the Transactions of the First Intercolonial Medical Congress, held
at Adelaide, Aug.-Sept., 1887.



ADELAIDE:

PRINTED BY WEBB, VARDON, & PRITCHARD, GRESHAM-STREET.

1887.



MYOSITIS OSSIFICANS.

[By ALFRED AUSTIN LENDON, M.D. (Lond.), Lecturer on Forensic Medicine in the University of Adelaide, Honorary Assistant Physician, Adelaide Hospital; Honorary Medical Officer, Adelaide Children's Hospital.]

The above title is a convenient abbreviation of the somewhat cumbersome, though more expressive, term employed in Germany, (*Myositis Ossificans Multiplex Progressiva*) to designate a disease of which there are very few cases on record, although I venture to predict that in the future instances will be more often discovered in Workhouses and Homes for Incurables. Of this disease I am enabled to bring before you notes and illustrations of two cases, one having been under my observation for the two and a half years preceding death, and the other having been accidentally discovered in an old volume in the library of the late Robert Waters Moore, sometime Colonial Surgeon of this province, and shown to Professor Watson as a curiosity of medical literature.

CASE I.

J. W. A——, who died on July 22nd, 1886, at the age of 46, was born in Cornwall a month before his parents emigrated to Australia. His family history is good, his father having lived to the age of 74 years, and his mother to that of 82 years. He was one of a family of eleven, of whom two pre-deceased him, one in early life of fever, and the other, a sister, at the age of 50, of pulmonary and intestinal phthisis, aggravated by years of constant and devoted attention to her brother. Of the eight surviving members of the family all are healthy except a sister, who is supposed to have weak lungs; but one brother and one sister are said to have had rheumatic fever. There is no history of gout.

The patient was a healthy baby with the exception of an attack of convulsions during teething, and he was an active boy. The disease is supposed to have commenced when he was about eight years of age, although prior to this it is known that he was always clumsy with the right arm, and unable to supinate the forearm, so that he

invariably held his spoon underhand, but at the aforesaid age his schoolmaster, chastising him with a ruler, inflicted a blow across the shoulders, in consequence of which a huge lump formed, for which he required medical advice: dozens of leeches were applied, and every endeavour made subsequently to "gather it:" a stiff shoulder (the right, it is believed) was the result, and this formed the subject of a consultation between Drs. Beyer and Mayo, who considered that it was an unusual case of rheumatism. Stiffness seems to have invaded other muscles, and incapacitated other joints, creeping on very gradually indeed; but it is certain that injuries trivial in character were responsible for some, if not all, of these extensions of the disease; for it is remembered that when at school a blow stiffened one of his legs, and later on when he was a lad of fourteen years of age he was seated on a bench when some one in play slapped his thigh: he started crying, and was reproved for his babyishness; but next day he justified himself by showing his mother a huge lump (not termed a bruise), greatly to her astonishment; and, again, when about 25 to 30 years old, a fall down a cellar caused the leg which was already stiff to be bent backwards, and rendered it much worse.

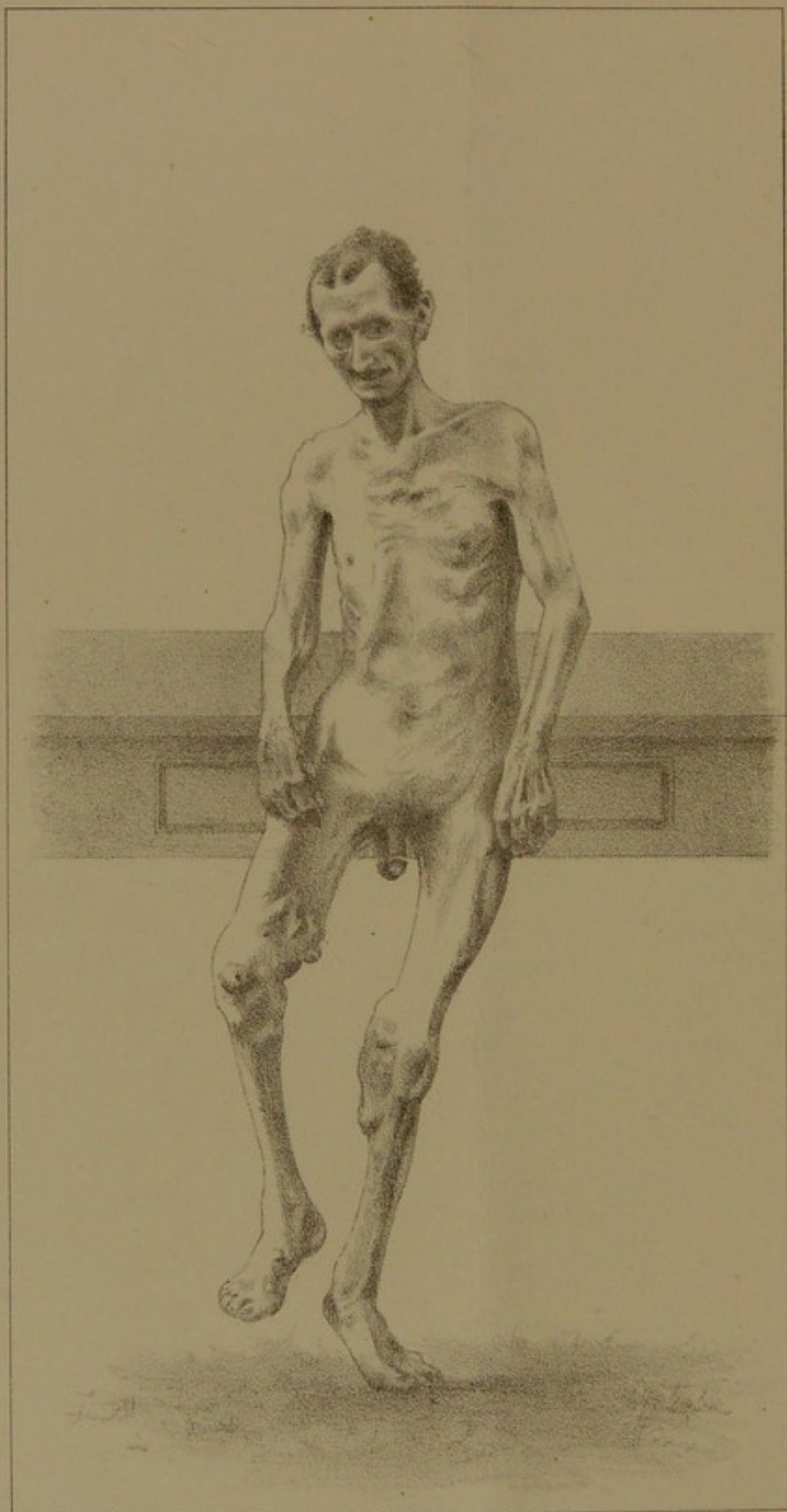
When he left school the disease had so far progressed that he was unable to stoop to put on his socks or tie his shoes. The next fifteen years of his life were spent at Gawler as assistant to a store-keeper. For six years he managed to serve behind a counter, although unable to stoop low or reach very high, but as he became more crippled he was made clerk and cashier, standing always at a high desk. He sat very awkwardly at meals, and on this account never joined the family when they had company. At the age of thirty he left this occupation, being utterly helpless to clothe or feed himself, and the remainder of his life was spent at his parents' home, and after their death at his sister's. His general health was always good, and his intellect unclouded. His disposition was cheerful and contented, reading being his chief occupation. Dr. Mayo had him under observation for about thirty years, and remembers the case clearly: at one time he entertained the idea of treating him by salivation.

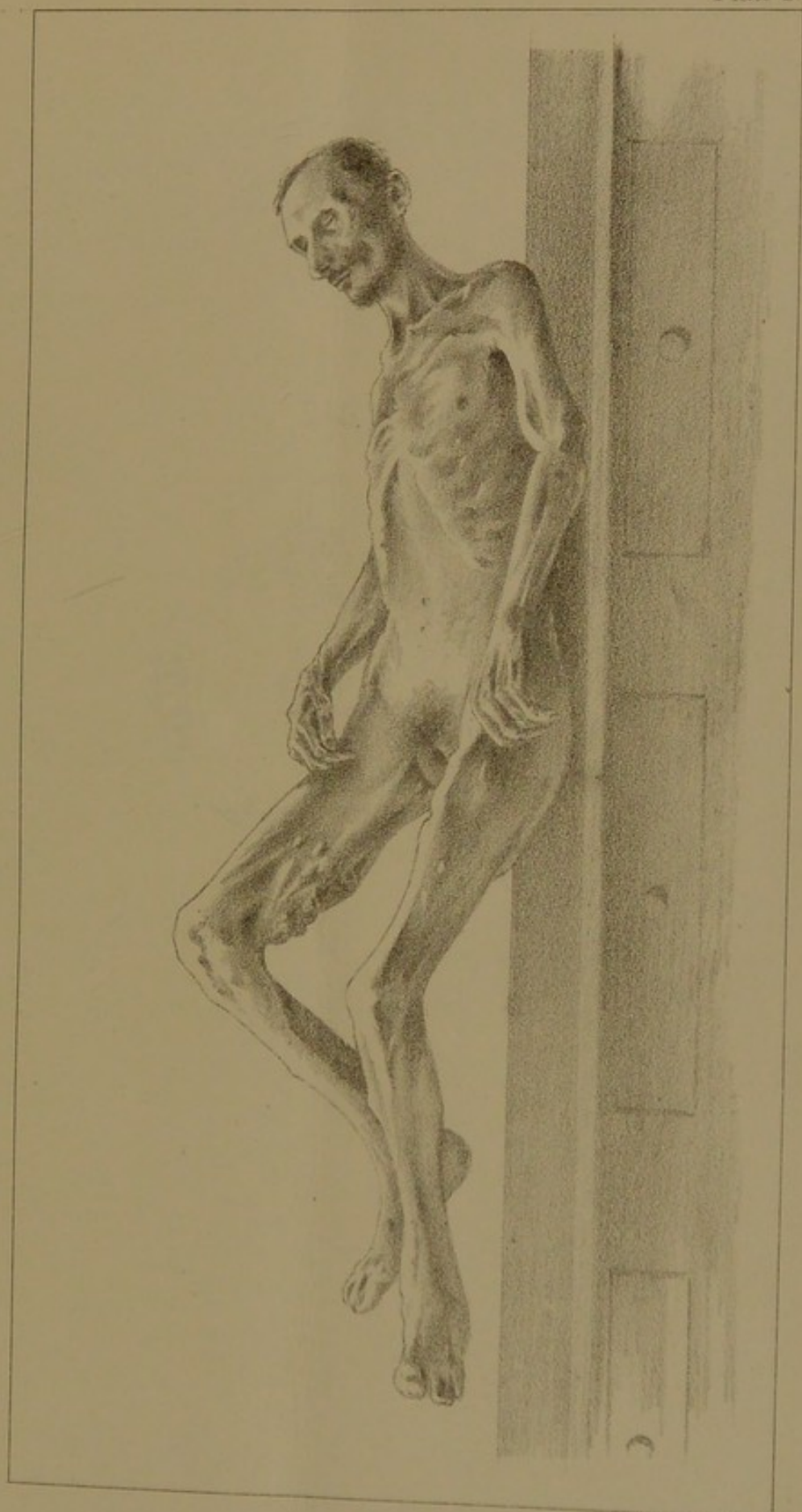
A brief description of his condition when seen in December, 1883, will be rendered more intelligible by a glance at the accompanying plates from photographs taken after death.

The whole of the day was spent out of bed: after being dressed in the morning he used to move along by himself with the aid of sticks from his bedroom to the sitting-room, a distance of only about a dozen yards, which, however, it took him a considerable time to accomplish: here he used to sit with his rigid body reclining at an angle of 45° with the horizon, the buttocks just touching the edge of



Plate I.







the sofa, the head resting upon a small cushion nailed to the wall, and the back being supported by pillows, which he always arranged for himself by means of his sticks. He could not stand alone without his sticks, and if he fell down was quite unable to rise, but a favourite attitude for reading a newspaper or book was leaning against a table. He had sufficient movement in the right elbow, though scarcely any in the left, to allow him to turn over the pages with a couple of shorter sticks, for which he now exchanged his walking-sticks.

His appearance in the upright posture is well shown in Plate I., the head being slightly flexed on the chest, the upper limbs abducted, the forearms pronated, the elbows slightly flexed, as also the fingers, the left hand touching the outer aspect of the thigh, the right hand being more in front. The hands were clawed, and the interossei wasted. The left lower limb was slightly flexed at knee and hip, and advanced in front of the right, which was bent at the knee to very nearly a right angle, the fore part of the right foot only just touching the ground. Both legs were spindle-like, and the left foot was fixed in a position of talipes equino-valgus. The great toes were considerably adducted, rather short, and perfectly rigid. The second toes projected beyond, and pressed slightly into the great toes, and the third toes were unusually large.

In walking the left foot was advanced an inch or so, the sticks brought up into position, and then the right foot was shuffled forward a little: progress was naturally very slow, and he was unable to surmount any obstacle by raising the foot, so that even the thinnest of doormats had to be removed. It was a curious but painful sight to witness the process of putting him to bed. Fatigued by his walk to the bedroom, he had still to stand a long time whilst being undressed and having a bed-sore attended to. He then moved to the side of the bedstead, and suddenly flung himself on to his back across the bed, and was afterwards rotated into the proper position: the effort seemed to exhaust him for a few minutes: then the undressing was completed, and the ulcers of the legs dressed and bandaged: pillows were placed under the head, but the limbs sank into the soft feather bed. Plate II. shows well the attitude the limbs would assume were he placed on a hard mattress instead.

In appearance he was of medium height, gaunt, and cadaverous, with very little hair on his face, that of the scalp being sparse and fine, and of brown colour; the eyes were blue: the skin was shiny and greasy, and stretched over the bony protuberances with very little subcutaneous fat. Dentition was fairly good, but the jaw

could only be opened for a short distance; he could swallow solid food, if cut up small, and was always fed with a spoon. He could frown and make grimaces, and the ocular muscles were also unaffected. The external genital organs were well developed. Over the sacrum was a bed-sore which had existed for over six years at least, and from which pieces of bone were constantly exfoliating. On the legs were ulcers for which he had worn elastic bandages for some time, but there was no œdema. The various ossified muscles were felt to be immovable on the subjacent bones, the most remarkable being those on the lower limbs. Both on the fingers and toes were small sores, which are described as originating in callosities of the epidermis.

Very little change took place in his condition during the two and a half years he was under my observation, until within a few weeks before his death, when the bed-sores became troublesome, the supuration extending along the planes of cellular tissue, the discharge becoming terribly offensive, and gritty pieces of bone coming away in numbers. Towards the last few days of his life he had retention followed by incontinence of urine, constant vomiting, and severe abdominal pain, necessitating morphine injections. He died of exhaustion.

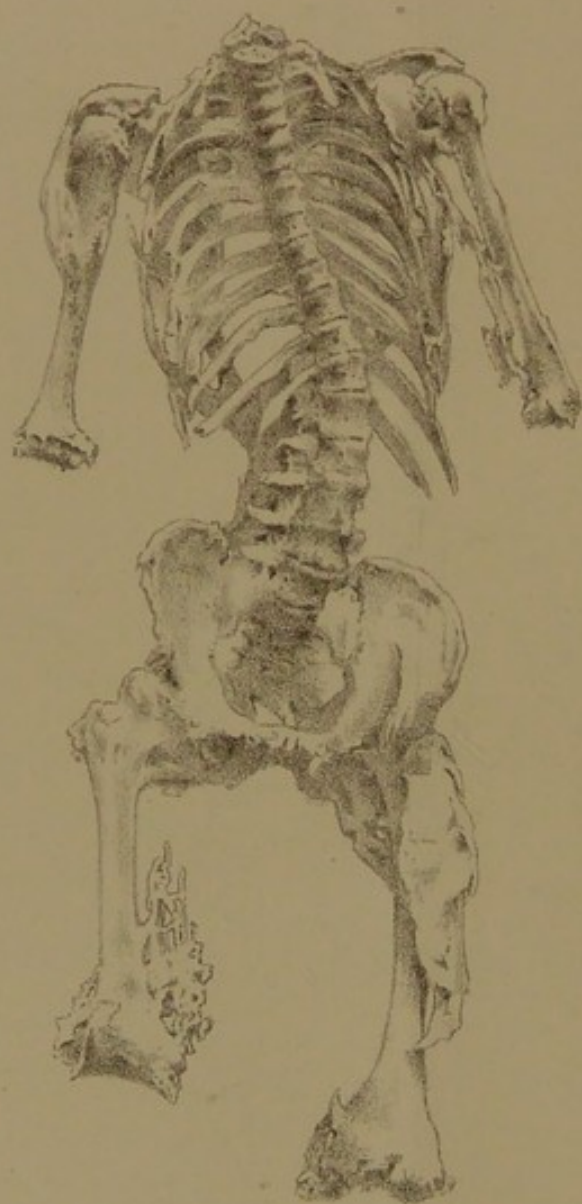
The examination of the body was made about eight hours after death, by Professor Watson. The coffin had to be made of unusual depth and width, on account of the distortion of the trunk and limbs. Several photographs were taken of the cadaver. No. 1 shows the body in the upright position poised upon the ball of the left great toe, and with the sacrum resting against the edge of a table. In taking this one of the bones of the great toe broke with an audible snap. No. 2 represents the man as I was accustomed to see him during life in bed, save that now there are no supports under the head or limbs, and only the left elbow and lower part of the trunk touch the table. Other views show the body lying on either side.

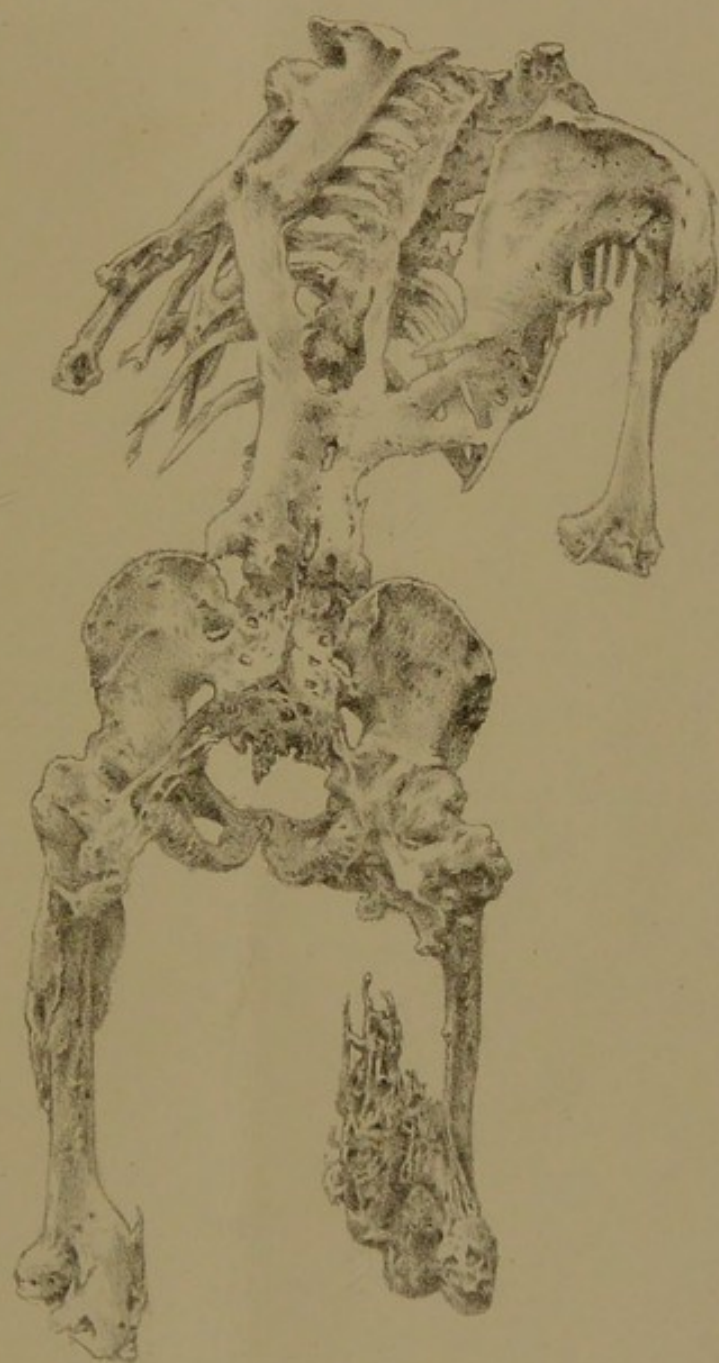
There was noticed a slight recent abrasion on the left frontal eminence, probably sustained after death: also ulcers on both legs and on the dorsal surfaces of the left middle and right little fingers. The large sacral bed-sore, from which a copious and horribly fetid purulent discharge was issuing, was found to open directly into the lower portion of the spinal canal, the bones being exposed and carious, and further the pus was burrowing into the retro-peritoneal areolar tissue on the right side, presumably along the nerve trunks of the sacral plexus.

The head, hands, and legs were not dissected, so that the examina-



Plate 3.







tion was necessarily somewhat incomplete, but the specimen produced was removed *en masse* and allowed to macerate. The muscles of the body, although reduced in bulk, had retained their natural red colour; the thoracic and abdominal viscera were all healthy, there were no pleural adhesions, and no atheromatous degeneration of the heart or great vessels. A microscopic examination was made of the lower portion of the cervical cord, but revealed nothing unusual except a sprinkling of corpora amylacea. The stiffness of the neck, in which there was a diffused curve with the concavity directed forwards, was ascertained to be due to ossification of the capsular ligaments, and synostosis of the neural arches, and not to ossification of the deep muscles of the neck. All the muscles above the clavicles and scapulæ had been spared, including those of mastication, facial expression, and deglutition, and the articulations of the jaw, and of both clavicles were also free.

The Skeleton.—The specimen which has been preserved, and which comprises the vertebral axis as high as the sixth cervical body, the shoulder and pelvic girdles, and the limbs as far as the elbow and knee joints, together with about two-thirds of the thoracic wall, will repay a careful inspection.

For simplicity and convenience of description it will be best to start from the extremities towards the trunk.

(a) *Upper Limbs and Shoulder Girdle.*—Both humeri are somewhat abducted from the axis of the trunk, and immovably fixed in this position, the right by ossification of the deltoid from its acromial origin to its insertion, the left by implication of the coraco-brachialis, but there is no synostosis, and indeed the articular surfaces were seen to be covered with cartilages, though of a degenerate or degraded kind. The scapulæ, although separated from the thorax by unaltered muscle, are immovable on the trunk, their inferior angles being soldered by a buttress of bone on the right side to the eighth and ninth ribs, and on the left side to the seventh and eighth ribs. In addition they are attached to the vertebral column by the somewhat symmetrical ossification of the latissimi in nearly the whole of their length from the dorso-lumbar spines to beyond where they blend with the scapular slips of origin: these bony sheets formed a kind of carapace to the erectores spinæ lying beneath them quite unaltered. There was slight movement still in the left elbow in spite of the almost complete ossification of the brachialis anticus, and the addition of a bony rim around the articulation. In the right elbow, in which there was slightly more free movement than in the left, the rigidity was due to a similar rim around the articular surface.

(b) *The lower limbs and pelvis.*—The ilia are fixed to the sacrum by the ossified sacro-iliac ligaments, but the pubic synchondrosis was not affected. The right hip joint is rendered immobile by ossification, in front of the anterior portion of the capsule and behind of the quadratus femoris, and the left hip joint by ossification of the upper part of the rectus femoris and the iliacus, and of the internal portion of the capsule. In addition there are rods of bone developed in the lower fibres of each gluteus maximus, and extending from the sacrum to the femoral insertion, simulating at first sight the sacro-sciatic ligaments: that on the left was exposed by the sacral bed-sore. The right femur is considerably flexed, and apparently slightly abducted. The left femur, on the other hand, is less flexed on the pelvis, and seems somewhat adducted. The pelvis itself is tilted upwards to a marked extent on the right side, and slightly projected forward also, in compensation for a spinal curvature, to be hereafter mentioned.

The interior of the hip and knee joints was but slightly altered. The hyaline cartilage was replaced by a fibroid substitution, and in the left knee it was slightly uneven, and the condyles were soft and spongy. This joint was absolutely immobile owing to ossification of the inner head of the gastro-enemius, which was broken through in the removal of the specimen. The right knee possessed a slight degree of mobility, and was not externally much altered. The huge projection on the back of the femur (so well shown in Plate II.), by which the saphena vein was deflected, proved to be not a solid mass of bone as was thought, but a phantastic arrangement partly stalactitic, partly fretwork, of soft bone covered with a spongeoid layer, and evidently still in process of development. The meshes are wide, and there are grooves through which ran the popliteal artery and vein, separated from one another by an osseous ridge formed in the adventitial layer of their sheath. The internal popliteal nerve ran by itself through the middle of the mass, isolated from the external popliteal nerve by a buttress of bone.

(c) *The vertebral column and thorax.*—There is no lordosis, but a dorso-lumbar curve, with slight rotation, to the right side. Indirectly the latissimus on each side being ossified is sufficient cause for the spinal rigidity, but more directly it is due to ligamentous rather than muscular ossification. The capsular ligaments of the articular processes and many of the supra-spinous ligaments are converted into bone, and in addition there is a general synostosis of the neural arches. The anterior common ligament is ossified in the upper dorsal region, and in the lumbar region, but not in the lower dorsal region, where the intervertebral discs have macerated out.

All the ribs, with the exception of the eleventh and twelfth on the right side, and the eleventh on the left side, are ankylosed to the vertebral column by ossification either of the costo-stellate or one or other of the costo-transverse ligaments, the twelfth on the left side having in addition a bony connection with the transverse process of the first lumbar vertebra, formed in the lumbo-costal ligament of Henle.

A few processes resembling exostoses are seen in different situations, notably a slender spike on external surface of the left ilium, and loose portions of bone were found in the left pectoralis major and the left peronei.

The bones are found to have undergone a considerable amount of eccentric atrophy, and are in consequence rather light.

CASE II.

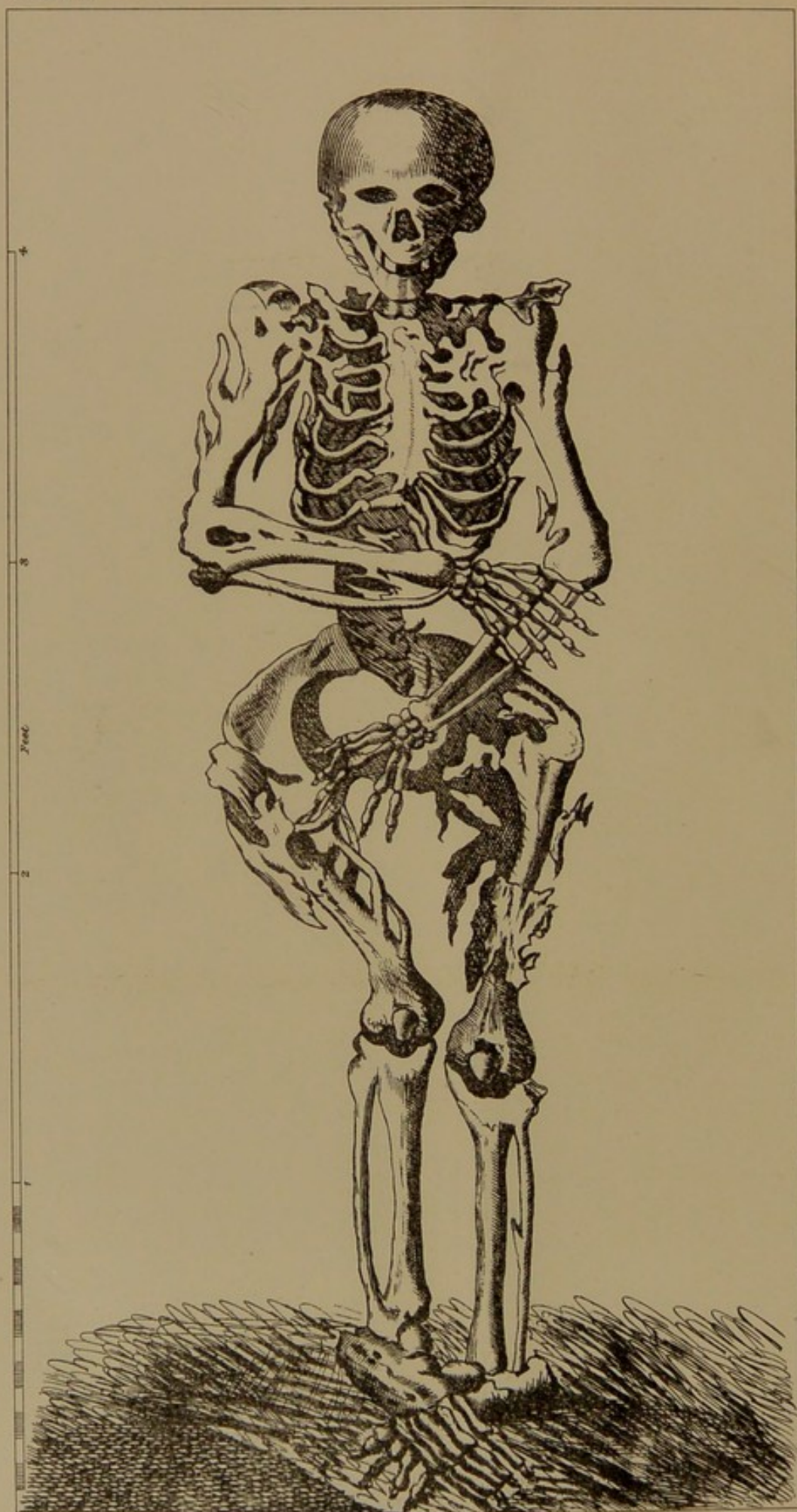
The case of Wm. Clark, as described in Chapter XI. "Of Remarkable Persons Born in this County," Book IV., and Vol. II. of the "Antient and Present State of the County and City of Cork," by Charles Smith. (Dublin: Printed by A. Reilly for the Author, and sold by J. Exshaw, Bookseller on Cork Hill, MDCCL.)

"William, the son of John Clark, a soldier in Sir Richard Aldworth's Company, was born at Newmarket, in this county, in 1677. In his infancy he never was observed to turn his head round, nor bend his body. When a boy he could only reach his hands as high as to the level of his elbow, nor could he ever put them behind his back. His under jaws being fixed, he could never open his mouth, but his teeth being broken by some accident, he sucked in spoon meat, which was his chiefest food. He spent a great part of his time in preparing his diet: when he took any solid food he laid it on a long flat knife and pressed it with a stick made for the purpose, and so forced it within his teeth. Though he was often intoxicated with liquor, he never vomited but once, and was then very near being suffocated. When he walked, he was always obliged to step first with the right foot, which he did with much difficulty; he then dragged the left foot to the right heel. When he fell by accident he was never able to rise without assistance. When he lay down, he had cavities made in his bed, in which he placed his hips, heels, and elbows. In his youth he made a shift to creep with difficulty through the village of Newmarket; but as he advanced in years he grew more unactive, so that at last he could scarce go the length of Mr. Aldworth's kitchen, where he spent most of his time. That gentleman maintained him in charity while he lived; the only use he was capable of being put to was, that of watching the workmen,

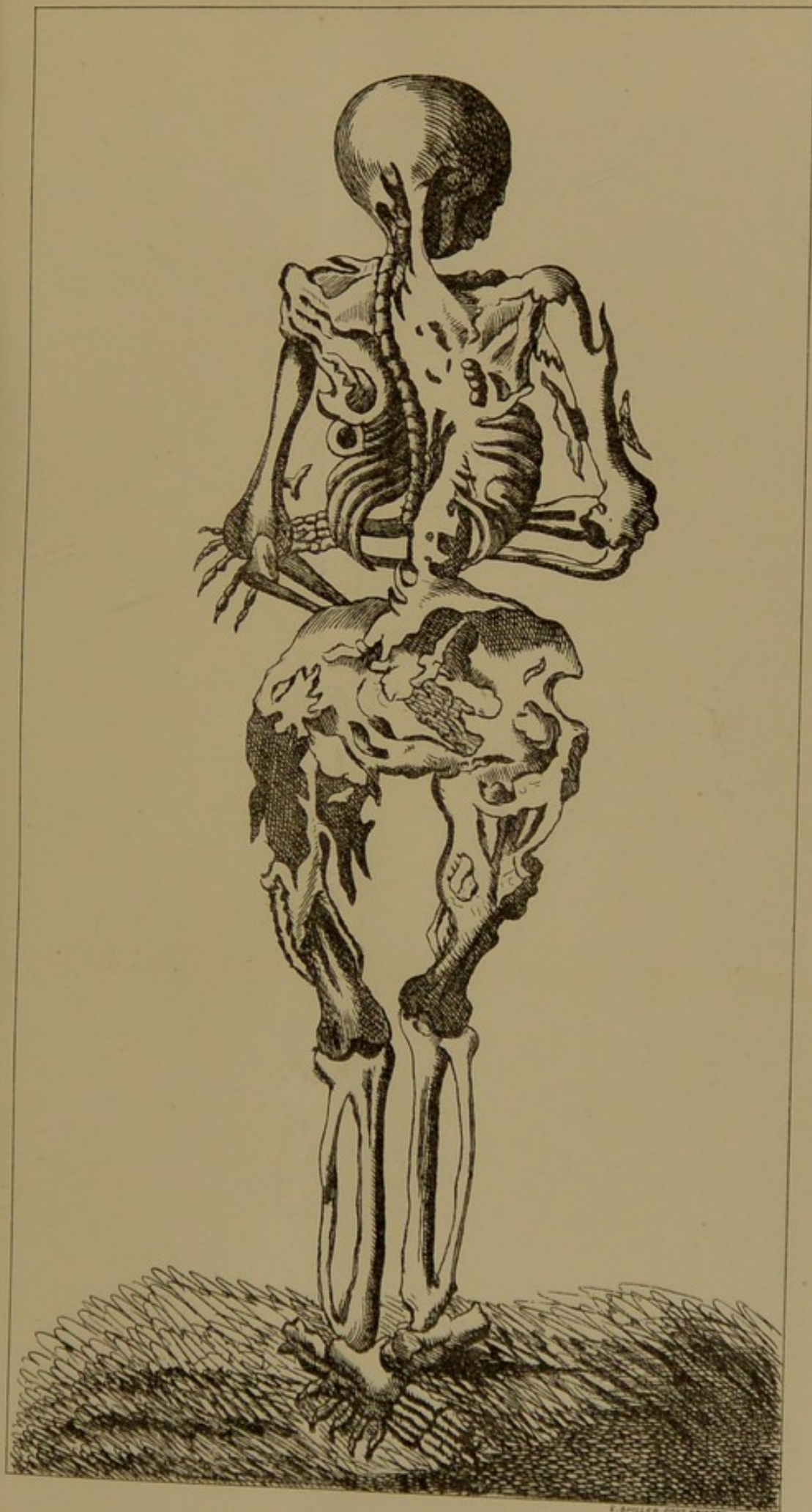
for when he was once fixed in his station it was impossible for him to desert it. He generally stood in a kind of centry-box, with a board placed in a groove as high as his breast for him to lean upon. He had always a boney excrescence issuing out of his left heel, which sometimes grew to the length of about 2 inches, and when it shed, as a deer does its horns, it still continued to sprout as before. Towards the later part of his life several long excrescences were observed in his thighs and arms, which he had not in his youth. He died in the year 1738, in the 67th year of his age; the cause of his death was probably an inflammation of his lungs, for as they adhered to the pleura and ribs, they were immoveable, the diaphragma could scarce change its situation, and the capacity of the thorax was always nearly the same; for these reasons he had a constant quick respiration, which terminated in a fatal oppression, otherwise he might have lived till all the bones had been so much encreased as that the ribs and whole thorax would become one trunk of bone. He had been 5 days dead before he was opened, so that the muscular parts began to putrify. His viscera had nothing in them remarkably preternatural, except his lungs, which adhered closely to the pleura.

The posture into which he fixed, sometime before his death, is somewhat like that of the Venus of Medicis. The vertebræ of his back are exceedingly bent inward, with an inclination to the left hip. The os sacrum is so bent outward as it is not seen when the skeleton is viewed in front; there is scarce one bone in the whole of it's proper natural form, except those of his legs, which are not much distorted. He is one entire bone from the top of his head to his knees. The sutures of his skull are more united than in common skulls. The jawbones are entirely fixed, as is before mentioned, and the hinder teeth joined together. A bone grows from the back of his head, which shoots down towards his back, and passes by the vertebræ of the neck at about an inch distance; this bone unites to the vertebræ of the back and the scapula of the left shoulder, from whence it disengages itself again, and continues distinct, till it divides into two, towards the small of the back, and fixes itself into the hip bones behind. The vertebræ of the back are one continued bone. In the fleshy parts of his thighs nature seems to have sported herself in sending out various ramifications from his coxendix and thigh bones, not unlike the shoots of coral, but infinitely more irregular, some behind and some before, some in lumps and clusters, and others in irregular shoots of 8 to 9 inches long. His knees are pretty close together; they incline to the right; his left shoulder is the highest. One of the bones of his left arm was broken once by a fall, and nature had shot out another bone a little

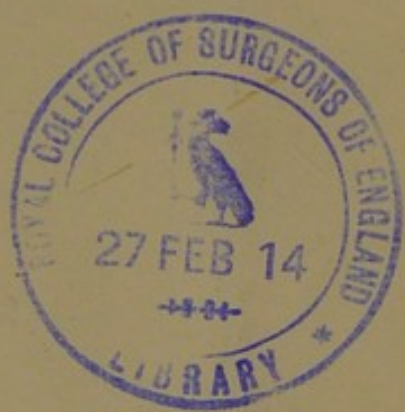




FRONT VIEW.



BACK VIEW



above the bending of the arm, which unites to the broken bone, and makes it much stronger than it was before. All the cartilages of his breast, four only excepted, which served to move his breast in respiration, were turned to bone. When he was dissected a bone was found in the fleshy part of his arm quite disengaged from any other bone; it is very thin, about four inches long, and the 4th of an inch broad, with several ramifications; what is odd is that while these bones were growing he never complained of any pain in his muscles. It would require a volume of itself, composed of a new kind of osteology, to give a minute description of this surprising skeleton and its irregularities, being as difficult a task, as to describe Calypso's grotto; however, the design is undertaken by the gentleman who has this curious skeleton in possession, Dr. Edward Barry of Dublin, who has composed a learned and accurate tract on the subject, with a compleat history of his life; therefore, I shall not pretend further to anticipate the account intended to be published by the Doctor, when his leisure shall permit him to put his notes in order for that purpose; but as he has been so kind as to communicate them to me, I have given the above short abstract out of them, rather to raise than gratify the Reader's curiosity, till the Doctor's more accurate performance shall appear; and this I have done the rather, as some relations already published in the *Philosoph. Transact.* of this skeleton are far from being accurate, nor is the history of his life given there much more just."

Note.—A photo-lithograph has been taken of the wood-cut which accompanied the foregoing description of Clark's skeleton, and in studying this it must be remembered that the terms right and left have to be transposed, and moreover a considerable allowance must be made for artistic license, the engraving probably not being the work of a trained anatomist. However, it shows well the ossification of the fused left latissimus and trapezius muscles throughout their whole length from the occipital protuberance to the sacrum and iliac crest, and their attachments to the vertebral spines and to the scapula; in the left forearm the supinator longus is seen to be completely ossified, and as fragments may be noticed the insertions of the deltoids and portions of the brachiales antici and bicipites humeri and pectorales majores; the intercostal and diaphragmatic muscles are not involved, there is marked curvature of the spine with the convexity in the dorsal region to the left, and a compensatory curve in the neck to the right; there is apparently no lordosis, and the femora are in fairly natural position, surrounded by ossified masses of the vasti and hamstrings; the tibiæ and fibulæ appear to be soldered together by ligamentous ossification, and so, too, are the

tarsal bones, but the process does not appear to have invaded the muscles below the knee and elbow joints, with the exception of the left supinator longus, which is evidently the bone described as being formed in consequence of a fracture of the arm, of which, however, no trace can be detected in the illustration. Where there is joint ankylosis it appears to be the result of muscular and ligamentous ossification, and not true synostosis.

REMARKS.

In a recently published paper by Mr. Sympton*, of Lincoln, will be found an interesting summary of what is known about this curious affection, as well as several references to cases reported by previous writers, in addition to which I may mention the specimen in the Royal College of Surgeons of England, and cases described more or less fully by Cæsar Hawkins†, Skinner‡, Nicoladoni§, Godlee||, Helferich¶, Volckmann¶.

As most of these cases have been described during life-time and are incomplete, I have not hesitated to republish the history of Wm. Clark, forming as it does with my own case and that of Mr. Cæsar Hawkins, a trio of instances of myositis ossificans which closely resemble one another; an additional reason, however, for doing so is the suggestion that in this case we may perhaps have lighted accidentally upon the history of the original of the specimen in the Museum of the College of Surgeons, of which, I believe, but little is known, except that it was obtained by Hunter.

As in Adelaide we have only the nucleus of a medical library of reference, I have been unable to study the whole of the literature on the subject, and my remarks will therefore be brief.

With respect to diagnosis, the only disease with which this might be confounded in its earlier stages is, I think, the rare form of hereditary multiple osteomata, of which an illustration is given in Pepper's "Elements of Surgical Pathology."***

Myositis ossificans has in all probability little, if anything, in common with the ossification (or calcification) which sometimes occurs in the tendinous attachments of muscles as the result of oft-repeated though comparatively slight traumatic irritations, and of which we have

* "British Medical Journal," 1886; vol. II., p. 1,026.

† "Holmes & Hulke's System of Surgery," 1883 edition; vol. II., p. 168.

‡ "Medical Times and Gazette," April 20, 1861.

§ "Medical Times and Gazette," June 22, 1878.

|| "Clinical Society's Transactions," vol. XIX.

¶ "Congress of German Surgeons," 1887.

*** "Elements of Surgical Pathology" (Pepper), p. 448.

familiar instances in the "drill bone" in the deltoid of the old Prussian Army, or the bone developed in the adductors of the thigh in those who ride much. Similar bony growths have been observed in the brachialis anticus after violent gymnastic exercise,* and in the adductor longus from slipping:† all these are of purely local origin and may be dealt with surgically. In myositis ossificans, however, the muscles themselves are primarily affected, and the process tends to become generalised, the result being the development of true bones, exhibiting not only compact and cancellous tissue with periosteal covering, but even at their extremities true epiphyses covered by cartilaginous surfaces, reminding one of the exostosis cartilaginea of Virchow.‡ Some of the masses of bone are dense on section, such as the left gastrocnemius; others much more porous in structure, and branched like coral: this may be merely a question of age and growth, but however slow the process may be in development, at its onset it is often very acute, and obviously of an inflammatory nature, commencing immediately after an injury, and in some cases even going on to suppuration.§

In my own case, and I think also in that of Wm. Clark, it is a notable fact that the disease is mainly seated in the muscles of the appendicular skeleton, and has spared those of the axial skeleton. Possibly these might have become affected later on, as they appear to have been in Hawkins' case. Ossification or calcification of the vertebral ligaments is of such common occurrence that the question of its relation to the process in the muscles need not be discussed. It is a matter for regret that no evidence, positive or negative, can be adduced with respect to the existence in these cases of that peculiar deformity of the toes and thumbs which has been noted by others.||

With regard to the etiology one cannot help agreeing with Mays' opinion that congenital predisposition is an important factor in its occurrence; on the other hand there seems to be but little evidence to support Helferich's suggestion that possibly the predisposition may be hereditary. So far as the influence of rheumatism is concerned, although in my case there is a distinct family history of this complaint, I think it would be dangerous to draw any inference from this fact, more especially as the patients themselves do not seem to

* "Medical Times and Gazette," Podrasky, 19-7-73.

† "Medical Times and Gazette," Thiriar, 31-7-80.

‡ Volekmann, Congress of German Surgeons, 1887.

§ Helferich, Congress of German Surgeons, 1887.

|| Sympson and Helferich, *vide supra*.

suffer from rheumatism, nor do their joints show any particular evidence of rheumatic arthritis.

Hayem has hinted at the possibility of the seat of the disease being in the spinal cord and peripheral nerves, but most writers believe it to be independent of the nervous system.

That local injuries have a great deal to do with determining the attacks of inflammation, I think is plainly shown by mine and similar cases. Pinter dissents from this view, and contrasts the frequency of injuries to children with the rarity of the disease, but I would point out that however common injuries to children may be, the predisposition to the termination of slight injuries in the ossification of muscles must necessarily be extremely rare. The want of symmetry in the lesions is an element in favour of the theory of local injury superadded to congenital predisposition.

The various photographs have been reproduced by the process of photo-lithography, and for this I am much indebted to Mr. Spiller, the Government Printer, without whose kind assistance it would have been impossible to have had the illustrations which accompany this paper.

I would also wish to express my deep sense of obligation to Professor Watson for his assistance in various ways. Indeed, to him must justly be attributed whatever merit this communication may possess.

