discharge from the left ear, with occasional shooting pain behind each, more especially on sitting up in bed, when she has also some "giddiness". Her appetite is improving; but she is allowed only beef-tea. The pulse is as yesterday. The tongue clean and moist.

Jan. 11th. The discharge from the ear continues. The pulse has got up to 96, but is soft and readily compressed. The "pain and feeling of heaviness" on lifting the head from the pillow are not so great. The tongue is clean and moist; the gums are less tender. She was allowed pudding extra daily.

Jan. 12th. She is still doing well. The pulse has gone down to 88. The skin is cool and moist. The discharge from the ear continues, but in diminished amount. She takes her pudding and beef-tea with a good appetite.

Jan. 14th. There is still slight purulent discharge from the ear. The "giddiness and sense of weight in the head", though much diminished, are still felt on sitting up in bed. Still she sits up in bed and talks cheerfully to her friends.

Jan. 16th. She has gone on well since the 14th. There is still a slight purulent discharge from the left ear, and some giddiness on rising in bed. The strabismus is scarcely perceptible.

Jan. 18th. She is doing well in every respect; there has been no discharge from the ear during last night or this morning. She was allowed to have broth, pudding, and an egg daily.

Jan. 22nd. She is out of bed. There is no pain in the head, but still slight giddiness, and occasional sense of weight, which she attributes to weakness.

Jan. 24th. She has got up each day without any unfavourable symptoms, and with gradual improvement in strength. Mr. Shaw has given permission for her to leave the Hospital to-morrow.

Jan. 25th. She walked out of the Hospital to-day, merely supported by the arm of a friend, and complaining only of "feeling rather weak." She had taken no medicine since the 8th.

Jan. 26th. Mr. Brend visited her, by Mr. Shaw's request, at her own house. She had slept well the previous night. She was then cheerful, and free from pain, except slight aching of the forehead, and occasional slight giddiness on sitting up. On applying a watch to the left ear (that from which the discharge had proceeded), the right ear being at the same time stopped with the finger, she declared that she could not hear the watch tick; and she further stated that she had convinced herself from experiments that she had entirely lost the sense of hearing in the left ear.

Jan. 28th. Mr. Brend visited her again to-day. She expresses herself as "quite well, except for the loss of hearing on the left side." When asked, she says she has no pain in the head, but still occasional giddiness.

Since January 28th, she has called at the Hospital twice to inquire for a young woman, one of the sufferers by the accident, and still in the Hospital from fracture of the lower jaw. When last there, the sister stated that she was cheerful, and complained of nothing but the loss of hearing in the left ear. She had much improved in strength, and had taken some pretty long walks.

REMARKS. Our report of these interesting cases has already reached such a length that we must confine our commentary upon them to a very small space, merely indicating the leading points of interest in each of them. In the first, there could be no doubt of the existence of fracture of the vault of the skull, with slight depression at the seat of (but not exposed by) the scalp-wound. This fracture, however, not being compound, and being unaccompanied with depression, was left alone; and with the happiest results, no symptom of irritation of the brain having supervened. Nor is the old rule of surgery—always to elevate a compound fracture with depression—by any means absolute in our modern hospital practice. We observed, a short time ago, a notable example of the success of the expectant plan, which we shall be able, perhaps, to lay before our readers. It is possible that the fracture in Mr. Shaw's first case might also have extended into the base of the skull; and in fact, in the great majority of the cases of fractured vertex which occur in civil life—*i. e.*, those which are occasioned by falls and heavy blows—the fracture will be found to extend into the base. But there was no absolute proof of this in the case before us, as the amount of hæmorrhage was not greater than occurs sometimes without fracture, and there was no loss of hearing. It is interesting to note the threatening symptoms of inflammation of the brain, and the way in which they yielded to the antiphlogistic action of calomel and tartar emetic.

The second case is a more unusual one. Here the existence of fracture of the petrous portion of the temporal bone was indubitable, being proved by the escape of a serous fluid from the ear *immediately after the accident*, and by the persistent lesion of the auditory apparatus, occasioning deafness on the affected side. It is well known that the symptom which used to be relied on as pathognomonic of fracture of the petrous bone—the escape of a serous fluid—has been observed where no fracture existed. Such a case is reported by Mr. H. Gray in the 6th volume of the *Pathological Transactions*, p. 22; but if that case is read attentively, it will be seen that, although it presents a considerable analogy to the present one, the evidence of the escape of the serous fluid *directly* after the accident, which is the vital point in this inquiry, is not at all distinct, and if our memory of the case (which we watched at the time) does not deceive us, there was always considerable doubt upon that point. Now there is no difficulty in understanding that when the membrana tympani has been ruptured, as it was in that case, and therefore the mucous lining of the tympanum and mastoid cells exposed, a large quantity of fluid may be secreted in a short space of time by the latter membrane, which, if mixed with blood, would be indistinguishable from the sub-arachnoidean fluid which escapes in cases where the petrous bone has been fractured and the tube of arachnoid laid open which coats the seventh pair of nerves. But when the discharge occurs immediately, it is difficult to see from what source other than the sub-arachnoid space such a quantity of clear fluid can run. That this was the source of the discharge here is further proved by the fact of its flow being increased by strong respiratory efforts. Such efforts would have had no effect upon the contents of the tympanum until a communication had been opened with those of the skull, which receive a distinct impulse from every respiration.

The case was a most fortunate one in its event; and it is not improbable, as was conjectured by the reporter, in some ingenious observations with which his notes were accompanied (but which we were obliged to omit for want of space), that the very profusion of the discharge, by unloading the vessels of the brain, might have acted to diminish the chance of inflammation.

Original Communications.

AN ACCOUNT OF A CASE OF MOLLITIES OSSIIUM.

By EDWARD LATHAM ORMEROD, M.D., F.R.C.P., Physician to the Sussex County Hospital.

[Read before the Brighton and Sussex Medico-Chirurgical Society, June 2nd, 1859.]

THE deformed bones which I have the opportunity of shewing you this evening, are those of a man, formerly of some notoriety in this town. The chief particulars of his history have been kindly collected by Mr. Tuke, to whom I am also very much indebted for his zealous and able assistance in procuring the skeleton.

The father of the subject of these remarks was a shoemaker, about five feet ten inches in height, and stout in proportion; he was a man of dissolute habits, and died of diabetes at the age of fifty-five years. His mother was a Spitalfields weaver, a hard-working industrious woman, who died at the age of ninety-three.

They had six children. One daughter died young, and the other from flooding in childbed. One son died young; another of hæmoptysis, when about thirty-six years old; another was drowned; and the sixth lived to the age of sixty-eight, to be the subject of the very singular pathological changes to which I propose to call your attention. After his birth, his mother had some miscarriages, and bore some children, which died within a few days of their birth: he was the youngest surviving child.

There were no traces of a similar affection in any of his brothers or sisters; and when he came into the world, with both his arms broken, a reason was found for this anomaly, in the fact of his father having kicked his mother in the stomach during her pregnancy. The statement of the fact was probably more correct than the inference. However, he was a

fine child in other respects; and, though rickety, he improved as time wore on, till he was thirty years old, when, in spite of his deformities, and an accident four years before, by which he seems to have injured his thighs, he was five feet three or four inches in height, and had full use of his arms and legs. He could then walk several miles, and do a good day's work at his trade, of a shoemaker, without any inconvenience. He was then in his prime, and at this age he married.

At the age of forty, he seemed to have lost all his bodily strength; and his bones were so brittle, that they would break with the slightest blow. His marriage, and some pecuniary losses which had reduced him to poverty, may have had something to do with the change which had come over his health during these ten years; but in one of the possible causes, he had found a certain cure of his numerous fractures, for his wife had a specific remedy, compounded of various unsavoury ingredients, which she used to apply freely over the injury. Under her management, she says, in twenty-four hours the swelling and pain subsided, and in a month or less, the bone, large or small, was firm again. He had sore need of such a specific, for at one and the same time he had no fewer than seven fractures of different bones. Without any intention of detracting from the merits of the specific, the observations of his wife may be taken to show that the fractures in this case followed the ordinary rule of such fractures; being attended by little pain or swelling or constitutional suffering, and uniting even more readily than in healthy bones. It does not appear that he suffered any pain in the bones preceding the occurrence of the fractures, as has been often noticed in these cases.

It was subsequently to the age of thirty, when he married, and poverty overtook him, that the chief changes in his skeleton, both the gradual bending and the sudden fractures, occurred. But I cannot obtain any exact history of these changes, so as to assign precise dates to the various fractures which we see now. He was well known, like his son and daughter, as a frequent applicant at our Hospital, on account of fracture of one or other bone, which united badly or not at all. But, as I have said, his wife soon got used to his bones breaking, and such an occurrence might often pass wholly unnoticed in the family circle, especially when he lay in bed, as he did almost entirely for the last few years of his life. He died, worn out by the constant pain caused by his distortions, and by some ulcers on his legs, at the age of sixty-eight; when he measured, as he lay on his back at his full length, no more than thirty-nine and a half inches.

This little deformed body contained a mind of considerable power, to however ill purposes it was applied. I am not idly raking up the records of a life of low blackguardism. We must not think how bad this man would have been had his ready wit been associated with a more able body to carry out its biddings: we may rather charitably believe that it was the disproportion which existed between his intellectual and bodily development which so deprived him. The condition of the brain in rickets is a psychological study of much interest; and I think the subjects of angular curvature of the spine have much to complain of, in the mental and moral faults properly belonging to rickets having been hastily and groundlessly ascribed to them.

This poor cripple was a shoemaker, and kept a low lodging house. While his money lasted he lived a very profligate life; and, so long as cockfighting was in fashion, he kept an establishment for that purpose. He was hasty and violent in his temper. Among his neighbours he always passed as a clever and ready man, and his intellect remained clear to the end of his life. He lived well, and chiefly on animal food; for the last seven or eight years of his life he took about three grains of opium daily, and was rarely without his tobacco-pipe in his mouth. I have no information as to the state of his urinary secretion, nor, indeed, as to any of the bodily functions, beyond mere general statements.

He had four children, all healthy-looking at their birth, two of whom, however, survived for a few hours only. These were both boys. The third boy lived to the age of sixteen years, when he died of small-pox. He was a frequent applicant at our Hospital, on account of broken bones, where he is still remembered as a most thorough-paced precocious little blackguard; or, as his mother has it, a singularly lively and sharp-witted child.

The poor daughter's history is a very sad one. She too, like her father and brother, was always breaking her bones, and was a frequent applicant at our Hospital. And, under the same domestic moral training as her brother, her precocious mind

was similarly developed. The two children used to attend public houses to enliven the company as singers and jesters; and, when she could not walk, she used to be carried from one low pothouse to another, in her degrading vocation. She grew up as deformed as her father, and, in an evil hour, some one was tempted by her portion of twenty pounds to marry her. She became pregnant several times, but aborted at a very early period. One pregnancy, however, was unfortunately protracted to the eighth month, and it became necessary to perform the Caesarean operation, from the effects of which she sank after three days, at the age of twenty-three.

The late Mr. Stafford extracted, by this operation, twin children, one already dead, and one which survived its birth only a few hours. The children were, to all appearance, well-formed for their age; but so had their unfortunate mother and her brothers been at their birth, and it is scarcely a matter of regret that by their early death this decrepitude was prevented from propagating itself to the third generation.

When I point to this almost perfect skeleton, as you see it now, which we owe to the careful manipulation of Mr. Charles Humphry, you will hardly sympathise with my regret that the examination of the body was so superficial. But, although it would have been of the greatest interest to have studied the morbid changes throughout, we were compelled, under the circumstances, to limit ourselves to the abstraction of the bones. And I take this opportunity of sincerely thanking the gentlemen who so very kindly gave me their assistance in a work of great fatigue and discomfort, and some little danger.

I may mention that the preparation of these bones has been attended with unusual difficulties: for the cold weather interfered very much with the putrefactive process during the first few days of the maceration, on which so much depends; and the bones are so soft and brittle that it was unsafe to submit them to any of the processes by which we complete the cleaning of healthy bones. I offer this apology for the stains which you may see here and there, disfiguring the skeleton to the eye of an anatomist. I have also to regret the loss of several bones, namely, the coccyx, and several of the bones of the toes, which have fairly melted away during the process of maceration; a circumstance not to be wondered at when we observe that all the bones of the feet which have been preserved consist merely of a mass of greasy adipocere, enclosed in a shell of periosteum.

At the suggestion, and with the assistance of Mr. F. Humphry, I have laid the skeleton in the recumbent position, very nearly that which the man occupied during the last bed-ridden months of his life. By this means the bones are exposed to the least possible strain; but with all the care that has been spent upon them, I fear that this singular preparation will not be a very permanent addition to our Museum.

There are three forms of disease of bone, all more or less closely allied, if not absolutely identical, which find ample illustration in the specimen before us; namely, mollities and fragilitas ossium, and rickets. On each of these I would make a few general remarks.

The points of difference between mollities and fragilitas ossium are not, for the most part, considerable. In both cases the disease is essentially an atrophy of bone; only in the former the earthy constituents are the first to be removed, and the bone gradually bends; while, in the latter, the softer constituents are chiefly affected, and the limb retains its proper form till the bone is broken by some accident. We might say, perhaps, that in the case of mollities ossium there is a degeneration, the earthy part being replaced by a more flexible, fatty material; while, in the case of fragilitas ossium, there is simple atrophy, the bony structure being weakened or disintegrated, rather than degenerated.

Regarding the most prominent distinctive character of these two forms of disease, namely, the alternative of bending or breaking, as a mere accidental circumstance, there is yet one important differential feature in their pathology.

I believe that mollities ossium is always a primary disease, while fragilitas ossium is sometimes secondary to other diseases, particularly to cancer; always, however, remembering to distinguish the fractures resulting from this general pathological condition from those which are dependent on a cancerous deposit in the bone, a point not always easy of discrimination from the symptoms alone. For, accidental as the fractures in fragilitas ossium may seem, yet, not unfrequently, the patients have been able by local pain to foretell the occurrence of a fracture of any particular bone.

In rickets another element has to be considered. Here is

not only atrophy, but arrest of bony development. The childish characters of the skeleton linger on into advanced years, and are clearly to be traced along with the results of the degeneration of particular bones. The large cranium, the small face, the narrow pelvis, and the stunted, feeble lower limbs, are quite as characteristic of rickets as the distorted extremities are. But these effects of rickets on the skeleton have been so fully elucidated by Mr. Shaw, that I can do no better than refer to his interesting essays for all further information on this subject. (*Medico-Chirurgical Transactions*, vol. xvii, and xxvi).

In rickets, again, there is this very important peculiarity, distinguishing it from mollities ossium, namely, that the disease is remediable. The bent bones, indeed, do not become straight, but they are made as strong as they would have been under any other circumstances. The undeveloped bones, indeed, never acquire the normal proportions; but they grow, and the limbs may have their natural bulk, though they want perfect physiological symmetry. But the disease ceases at last, and a period in the child's pathological history passes away, for the most part never to return.

The recorded histories of cases of mollities ossium do not lead us to believe in the power of any remedial agency to check the disease, nor justify any expectation that the disease will stop of itself. A fractured bone will sometimes repair itself under these circumstances, even more rapidly than in a healthy subject; perhaps from the limited affinity displayed by the rest of the body for the accessible phosphate of lime with which the bone is to be repaired. But some such unnatural stimulus seems to be required to induce ossific action, for elsewhere the disease steadily goes on to disorganise the bones.

The opinion thus far implied of the close analogy, if not the essential identity, which subsists between these forms of disease of bone, though very generally received, is objected to by no less an authority than Rokitsansky (*Pathological Anatomy*, Sydenham Society's Translation, vol. iii, p. 177); and Mr. Solly has also been led, by observation of two cases of mollities ossium (*Medico-Chirurgical Transactions*, vol. xxvii, p. 459), to doubt its identity with rickets.

Still, the general opinion is that the results are the same, and referable to a similar process of atrophy, or fatty degeneration. And, just as fatty degeneration of different organs may own many different causes, all imprinting their own characters on the results, so may it be with fatty degeneration of the bones. No one would hesitate to name inflammation as one of the most frequent exciting causes of fatty degeneration; but pathological evidence, on the strength of which we refer some cases of mollities ossium to this cause, must be allowed equal weight on the other side, when it leads us to infer that there has been no inflammation at all, whether of the heart, or the liver, or what concerns us at present, of the bones. Not doubting that some of these cases are of an inflammatory origin, still, we are not in a position to maintain that they are all such. And, excepting only this change in the lower end of the right femur, I do not believe that such is the pathological nature of any of the morbid appearances in the preparation before you.

With these few general remarks, I will proceed to the particular examination of the skeleton.*

The skull displays the ordinary character of rickets in the disproportionately large size of the cranium as contrasted with the face; not so much from a general excessive development of the cranium, as from an arrest of the development of the face. Individually, the cranial bones are imperfectly developed, the sutures are not closed, and Wormian bones are present in unusual places, as on the anterior edge of the left parietal bone, and the upper edge of both squamous bones. In their usual situations, along the mastoid and lambdoidal sutures, they are so numerous and so loosely compacted, that the skull might readily be broken by slight pressure. The outer surface is smooth and healthy looking; but the bones are so thin that in

many places a pin may be pushed through them, and the left frontal sinus is only imperfectly closed in. But, in contrast to the want of development of the several bones, the great width of the forehead and the length of the cranial cavity from before backwards, are particularly remarkable. Equally remarkable is the depression at the upper angle of the occipital bone.

This arrest of development and atrophy appear in a more marked degree in the facial bones, which, notwithstanding all the care that has been taken in their preparation, look rough and papery. The alveolar processes of the upper jaw are hardly represented at all, and the lower jaw displays all the characters of edentulous old age. From behind the symphysis springs a strong forked bony process, calculated to give increased attachment and leverage to the muscles which have their origin here. I think that this is almost the only instance of such a provision to be noticed in this skeleton.

The vertebral column is contorted in the strangest way. There is very little bending in the antero-posterior direction; the distortion is lateral. One large curve, with the convexity to the right, begins at the third cervical vertebra, the chord of the arc touching the twelfth dorsal. While the chord of the other curve, which has its convexity to the left, reaches from the upper edge of the sacrum to the fifth dorsal. The length along the curves is seventeen inches; from the atlas to the sacrum, in a straight line, only fourteen; being half an inch less in the bones as they are mounted, than in the recent specimen.

There is not much to notice in the vertebrae themselves, they are small, and of a light porous texture. Their shape has been accommodated to the gradual distortion, the bodies being thinned on one or other side, and the spinous processes twisted according to the direction of the curve of the column in that part.

Their bodies, as is usual, are turned slightly round to face in the direction of the convexity of the curve. The ribs, here and there, have contracted slight bony adhesions to the vertebrae, but these are not, in any instance, ankylosed to each other. How, under these circumstances, any form of a thorax could be preserved, and the functions of the thoracic organs maintained, was a problem on whose correct solution hung this man's life. Let us try to trace this solution in detail.

The sternum and clavicles, almost alone among all these diseased and distorted bones, retain their shape and structure; the sternum being only turned a little towards the left. The first rib is in its natural position, or nearly so, on both sides; but below this the ribs on each side require a separate description. On the left, generally, down to the eighth rib, these bones are thin and slight, placed horizontally, rounded on their outer face, with a well marked ridge along their convexity, and marks along their upper and lower edges as if of articulating surfaces. They lie close along the transverse processes to their ends, over which they are stepped as it were, and thus sweep backwards in a bold curve, to give as much room as possible to the thoracic viscera. Below this the ribs have more of their natural form, though their direction is very irregular, and the want of space at the vertebral end has necessitated their overlapping one another. The seventh and eighth ribs are thus overlapped by the sixth, and the ninth overrides the tenth and eleventh ribs near their vertebral extremity, though they all lie pretty evenly at their sternal ends.

I know of nothing which explains the incongruous positions in which the right ribs, stripped of their integuments and the connecting pleura, seem to lie, so well as a sheet of wet paste-board, folded in the same way as the pleura must have been folded here. On careful observation, it will be seen that the walls of the chest on this side have been creased, as it were, though the regularity of the folds has been disturbed by the unequal yielding of the several bones.

The cavity of the thorax on this side is much narrowed. The ribs are broad and strong, but they are bent like fishhooks at their angles, and, as they lie overlapping one another, some of their angles come almost into contact with the bodies of the vertebrae. The five upper ribs lie regularly one below the other; the sixth turns upwards, overlapping the three immediately above it, and being itself crossed twice by the seventh rib. The eighth rib is in the return of the fold, but is a little overlapped by the lower ribs, which extend outwards and downwards to cover the right ilium, which seems thus drawn within the thorax.

Such is the position which the right ribs occupy now that they are mounted; and such was very nearly the position which they occupied in the recent specimen. But, with all my care to restore them to the positions which they formerly held, I am

* More complete information on the subject of rickets and mollities ossium may be found in—

CUMIN. On Rickets. *Cyclopedia of Practical Medicine*.

STANLEY. On Diseases of the Bones, p. 217.

SHAW. On the Conformation of the Skeleton in Rickets. *Med. Chir. Trans.*, vol. xvii, p. 434.

SHAW. On the Effects of Rickets upon the Growth of the Skull. *Med. Chir. Trans.*, vol. xxvi, p. 336.

CURLING. On Atrophy of Bone. *Med. Chir. Trans.*, vol. xx, p. 336.

SOLLY. On the Pathology of Mollities Ossium. *Med. Chir. Trans.*, vol. xxvii, p. 435.

PAGET. Lectures on Surgical Pathology, vol. i, p. 131.

Catalogue of the Hunterian Museum, vol. ii.

ROKITANSKY. *Pathological Anatomy*. Syd. Soc., vol. iii.

These works leave little to be desired, but that we might find some means of preventing or removing the effects which they so accurately describe.

conscious that the deformity of the right ribs has been exaggerated. I think that the bones are made to overlap unduly, and I am sure that, instead of diverging as they now are placed, they ought to lie closer to each other. Some of this error may be due to the half-inch which has been lost in putting the vertebrae together; some, I think, to warping of the ribs themselves. But I am afraid that there is no remedy; for the bones are so delicate that they could not safely be drawn into closer proximity; and, singularly enough, the bones whose sternal ends diverge the most widely are just those about the correct position of whose vertebral ends there is the least doubt. I am inclined to think that the error is rather in the overlaid than in the overlying ribs. At least, the measure of the lower circumference of the chest now is just what it was in the recent specimen.

There is scarcely a rib on this side but gives evidence of the strains to which it has been exposed, by more or less unequivocal traces of old fractures. The tenth left rib has a fracture still ununited, though the thickened ends of the bones shew the fracture not to be very recent.

Among all this disease, the healthy condition of the clavicles is very remarkable; only they are small, and have had to accommodate themselves a little to the altered form of the other bones. The scapulae are reduced to thin shells of bone, altered both in their outlines and in the direction of their surfaces by the general conformation of the side of the chest on which they have lain. The general convexity of the outer surface, the thin paper-like structure of the body, and the seeming lengthening of the coracoid process, due to the entire removal of the articular prominence, are very remarkable. But the bony structure, as much of it as is left, appears sound, like that of the skull; only the acromial and coracoid processes are soft and powdery. Both the coracoid processes have been fractured, and the point has taken a new direction downwards. The fracture of the left still remains ununited.

It would be difficult to assign any precise anatomical reasons for having placed the upper portions of the humeri on the sides of the body to which they seem respectively to belong; their natural characters have been so altered by long estrangement from their natural uses and positions. At the lower fractured end there are still prominent ridges for the attachment of muscles; but the articulating surfaces and the tuberosities are altered almost beyond recognition in the shrunk and withered head of each humerus.

The dry powdery condition of the upper fragments, constituting two-thirds or a little less of the whole length of these bones, contrasts strongly, as we shall see again in the lower extremities, with the solid waxy condition of their distal portion. This is a little triangular bit of bone, which has evidently been disconnected from the upper end for a very long time; the stump of the shaft and the articular surfaces having been all moulded to adapt themselves to their new uses and relations.

The position which the hands take is nearly the same on both sides, the bones of the forearm crossing each other; but, on the left side, both the longitudinal bend and the lateral twist occur near the middle of their length; while, on the right, this same position of the hand is produced by the radius being twisted half round the ulna at its upper end. The right bones are stronger, and have bent less; so that this forearm is full three-quarters of an inch longer than the left. Both hands are light, and free from distortion; but the bones are all soft and greasy. Some of the right carpal bones have a porcelainous articular surface, as if from rheumatic gout.

The diminutive size of the pelvis as a whole is a pathological feature eminently characteristic of rickets, which not only, as has been said, induces disease or degeneration of the particular bones, but arrests their due development. The sacrum comes forward to an unusual extent, the ossa ili overlapping it behind, and being within an inch and a quarter of meeting. This also is a change usually referred to rickets; but, instead of descending straight, so as to enlarge the lower aperture of the pelvis, the sacrum is bent forward on itself, as if by disease supervening at a later period. The coccyx has been destroyed by maceration, so that we have no accurate knowledge of the extent to which the lower aperture of the pelvis was actually narrowed. The anterior superior spines of the ilium represent the points of the extreme divergence of the crista ili, and are only nine inches apart. Measures, however, can convey a very inadequate idea of the distortion at the upper outlet. Besides the general constriction from the arrest of development and the advance of the sacrum, the right pubic bone has been pushed back, so as to lie within a quarter of an inch of

the front of the sacrum. The acetabulum, with the sutures of the bones which usually meet to constitute it gaping widely, is occupied by the great trochanter; the head of the femur rests in front and to the outer side of the tuberosity of the ischium; while the joint, such as it is, is constituted by the upper surface of the neck of the femur rubbing on the thickened ramus of the ischium and os pubis. The shaft of the femur is bent very strongly, to accommodate the limb to this extraordinary position of its articular extremity. On the left side, the changes are much less marked; the acetabulum preserves its form, and discharges some of the functions of a socket for the atrophied head of the femur. The appearance of the articular surfaces, however, does not convey the impression that there has been any great amount of movement of this fragment of the thigh-bone.

In the absence of any reliable sources of information, we are left to conjecture as to the cause of these singular distortions; but I think that they may all be referred to the spinal curvature as the starting-point. First, the spine yielded, and the weight of the body was thrown on the right side of the pelvis and the great trochanter of this side. Under this pressure, the acetabulum gave way, and the distorted femur was drawn into its present position. A similar collapse on the left side would have probably quite interrupted the passage through the pelvis, and superinduced fatal obstruction of the bowels. But, besides being relieved of the weight of the body, the muscular pressure has been materially lightened on the left side of the pelvis by the fracture of that femur, and so its form has been preserved. I think that this is the correct mechanical interpretation of these singular distortions; and as mechanical we must regard them in the first instance, however largely disease may have contributed to the results, both in facilitating the distortion and the displacement, and subsequently in adapting the parts to their altered positions. But this disease was atrophy and fatty degeneration: there is not a single instance of caries or serofulous disease of bone in all this skeleton.

The lower end of the right femur displays another very singular change. The shaft is bent and twisted on itself; but, instead of swelling into the condyles, it is abruptly broken off, and the end of the shaft is forced into a thin shell, which preserves the outer form of the condyles, and articulates as usual with the tibia. The rounded edges at the end of the shaft, and the spongy or woolly deposit of bone in its neighbourhood, show that this separation of the epiphysis has been of long standing, and accompanied by some irritation. On the left side, the femur has been freed, as already noticed, from such a strain, by a fracture near the upper third; and the two portions of the bones preserve their normal shape. There does not seem to have been any attempt at union; on the contrary, absorption appears to have been very active here; and the two long oblique worm-eaten surfaces, which are visible on the outer side of the upper and the lower fragments alike, seem to need the presence of a third fragment, which has been entirely removed, to make up the substance of the bone here.

The lower end of the left femur, and the bones of both the legs and feet, are not of the light, spongy texture which the bones of the trunk display; but are heavy and greasy, like the distal fragments of the fractured humeri. This greasy condition does not prevail to an equal degree through all these bones, and in their entire length. It is most marked at the extremities, but the shafts are soft, and the boring tools came out greasy instead of being followed by a light, powdery adipocere, as in other parts of the skeleton. The bones of the leg are soft, not brittle, and, under the weight of the body and the traction of the muscles, they have bent till the fibula forms a curve of which the radius is no more than three inches and a half.

In both limbs the fibula is on the inside of the curve; in the right, it is received into a groove of the tibia; in the left, it is fixed in its position by ankylosis. But no more bone has been deposited than is actually necessary, and even the sites of chronic ulcers over the shins are marked by no deposit of bone on the rounded edges of the tibia.

It has been objected to a purely mechanical explanation of the bending of ricketty bones, that they do not always, indeed, very rarely, bend in the direction of least mechanical resistance. And these two legs might be taken as instances where the bending has taken place precisely in one of the two directions in which, in consequence of their relative position, the two bones would offer most resistance. The disease has been, therefore, supposed to exert a modelling influence on the distorted growth of the bone, independent of mechanical considerations. I would not hazard a general opinion from the exami-

nation of these bones. I would only observe, that before rejecting the mechanical explanation, we must thoroughly investigate the particular case: for the direction of the greatest muscular strain is as effectual a cause of bending, as the direction of the least bony resistance; and I can easily conceive the muscles of the calf to have determined the direction of the curve here.

The feet need not occupy us long. All the bones have been preserved except a few phalanges which have melted away under the protracted maceration. The tarsal bones are many of them distorted, though not to such an extent as to throw any real difficulties in the way of their proper arrangement. And they are all small and ill-developed, contrasting strongly with the bones of the hands. But it is not surprising that they have yielded to the constrained posture in which they were placed, considering that what we call bones by courtesy, are really nothing more than fatty matter, contained within a thick case of periosteum.

THE PATHOLOGY, DIAGNOSIS, AND TREATMENT OF CARDIAC DISEASES.

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III.—CAUSES OF PERICARDITIS.

INFLAMMATION of the pericardium is in no case to be regarded as an idiopathic inflammation. It may in almost every instance be traced either to local injury, or to some morbid condition of the system generally. Pericarditis, as the result of direct local irritation, has many different exciting causes. It may be produced by traumatic injuries, by blows and wounds. Tubercle or cancer deposited upon the serous surface of the membrane, or spreading into the sac from the parts around, will occasion it; so also may abscess of the liver, of the mediastina, and of the neighbouring parts, hydatids of the liver, ulceration of the œsophagus and of the stomach, etc., by opening into the sac, and there discharging their contents. Pleurisy, pneumonia, and peritonitis—all these, and similar local sources of irritation, may likewise excite inflammation in the membrane.*

Tubercle and cancer very rarely, if ever, arise primitively in the pericardium. These diseases almost invariably preexist in some other parts or organs of the body, before they appear here. Cancer generally spreads into the sac from the mediastinum, or some neighbouring organ affected with the morbid growth.

Pericarditis is more especially known to us as it appears in association with general disorders—with rheumatic fever, kidney diseases, tuberculosis, pyæmia, and the acute exanthemata. In such case, it is manifestly the local manifestation of a general affection of the body—the product, perhaps, of some morbid condition of the blood. But, though we have in these diseases evidences enough to satisfy us of the existence of some deleterious agent in the system, we are still quite in the dark as to the causes which determine the disease to fix itself especially in the pericardium.

If we reflect upon the catalogue of diseases which authors record as causes of pericarditis, we shall perceive that what are frequently written down as causes are, in reality, merely co-existing manifestations of the self-same disorder as that which provoked the pericarditis. In this sense, acute rheumatism cannot properly be called the cause of pericarditis. Both the affections are the resultants of a morbid state of the blood, and, as it would seem, of the same morbid state. What may be truly said of their association and relationship is this—that the morbid element of rheumatism more frequently displays its presence in the joints than it does in the pericardium; and more frequently at an early than at a late period of life. This becomes still more clear, if we call to mind the fact, that the

pericardial inflammation does occasionally precede the arthritic affection in rheumatic pericarditis.*

Dr. T. K. Chambers, in his *Decennium Pathologicum*, gives us a list of one hundred and thirty-five cases of diseases in which recent signs of pericardial inflammation were found after death. These diseases are, as I have observed, ordinarily termed *causes* of pericarditis, but must be rather designated as coexisting disorders.

	Cases.
Rheumatic fever	18
Ditto, with diseased heart and kidneys	1
Uræmia from diseased kidneys, either alone, or with diseased heart	36
Diseased heart and dropsy	18
Pyæmia	18
Pneumonia	10
Pleurisy	5
Vomicæ in the lungs	8
Erysipelas	4
Typhus	3
Other causes	13

A glance at this table shows us, as Dr. Chambers remarks, how decidedly the constitutional predominate over the (so-called) local causes of pericarditis. Dr. Ormerod, for the better comprehension of these so-called causes of pericarditis, has reduced them all under two heads, viz.: 1. Rheumatic pericarditis; 2. Non-rheumatic pericarditis. This division of the inflammation will be found of practical utility. A study of the clinical history of pericarditis shows us that there are marked points of distinction to be observed in its nature, which enable us readily to class the disease under one or other of the above heads. These distinctive signs give us a clue to the nature of the disease, showing how its characters vary in different cases, and consequently how varied, and even opposite, its proper treatment must be under such circumstances. I shall, therefore, point out the distinctive characters which appertain to the rheumatic and to the non-rheumatic kinds of pericarditis.

Rheumatic pericarditis occurs at a comparatively early period of life. The average age of sixty-one of Dr. Ormerod's patients was twenty-one. The subjects of the disease are, for the most part, of (apparently) healthy constitution. As regards sex, women appear as often as—perhaps somewhat more often than—men, to be affected by it. The symptoms of the rheumatic pericarditis are prominent and well marked. The disease, except in rare instances, is associated with, and, in fact, preceded by rheumatic affections of the joints, which are of so striking a character that they cannot fail to excite the attention of the physician. The local pericardial inflammation, moreover, frequently reacts with violence on the system; and in such case, when death ensues, it is to the immediate consequences of the pericarditis—to the action of the inflammation on the heart itself—not to the ordinary effects of rheumatism, that the fatal result is ascribable.

The heart is overwhelmed and paralysed by the local action of the inflammation upon it. But though the symptoms of rheumatic pericarditis are usually severe, the disease, when uncomplicated with other cardiac diseases and pulmonary affections, rarely destroys life by its direct and immediate effects. A first attack of rheumatic pericarditis is, indeed, very rarely fatal.

Many observations lead me to suspect that there is an hereditary tendency, or family predisposition, to rheumatic pericarditis in the young; though, for obvious reasons, it is very difficult to arrive at any positive conclusions on this point. I have, for instance, remarked the existence of cardiac disease in the children of parents who have themselves suffered from rheumatism and heart disease. The following are examples of the fact which have fallen under my notice:—

In one family, the father and two children had disease of the heart. The father had suffered from several severe rheumatic attacks before the birth of these children, and there is now a constant cardiac bruit audible over his heart. In the children, about 14 and 15 years of age, the heart is so impaired as to produce the severest symptoms of cardiac disease. One seems to have once suffered from pains in the ankles; but, as far as I could learn, the other never had suffered from any external symptom of rheumatism. Her first complaints of illness were short breath and dropsical swellings, the products of the cardiac disease.

* I once saw a case of pericarditis, which resulted from ulceration of the œsophagus. The ulcer in its progress opened at last into the pericardium, and so permitted the contents of the stomach to pass into the pericardium. This is the only case of pneumo-pericardium which I have ever seen. The air, of course, came from the stomach in this instance. By gently pressing upon the stomach, its contents were readily forced, and seen to pass, up the œsophagus, and so through the ulcerated opening into the pericardium.

* A case of this kind is related by Dr. Graves, vol. ii, p. 159, "Clin. Med."