

*Observations on a peculiar Condition of the Bones of two Insane Patients who had fractured Ribs.* By EDWARD LATHAM ORMEROD, M.D. Cantab.

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The frequent occurrence of fracture of the ribs in the inmates of Lunatic Asylums has recently attracted much attention. And the more attention has been called to it, the more frequent does the occurrence seem to have become. This fact alone would make one suspect that the injury was not due to improper violence on the part of the attendants. Without, however, entering into this question, I propose here merely to record the results of my examination of the bones of two patients who lately died in the Sussex County Lunatic Asylum with fractured ribs. Whether or not further observation may justify a wider extension of the conclusion that the bones break so readily because they are diseased, at least I cannot hesitate to adopt it in the present instance.

I am indebted, as on many other occasions, so here also, to my friend and colleague, Mr. Jowers, for the opportunity of examining these bones. And I gratefully acknowledge the prompt kindness with which Dr. Williams, the Medical Superintendent, at once fell in with my wishes, and placed at my disposal the means for making the enquiry, in which he heard that I was engaged, as complete as possible.\*

The subjects of this accident were of very different habit. One was a little shrunken woman, looking quite seventy, though no more than fifty-eight years old. She had been in the asylum for about one month, suffering from restless rather than violent mania. She had been confined in the padded room about a fortnight before her death, and it was supposed that she fractured her ribs by her own muscular exertions at that time. The injury was known of before death, and on examination of the body, the fourth and fifth right ribs were found broken about three inches from their

\* I was not aware, when I was engaged in these observations, that the subject had been investigated by the late Mr. Dalrymple ("Dublin Quarterly Journal," New Series, vol. ii. p. 85) and Mr. Durham ("Guy's Hospital Reports," Third Series, vol. x. p. 348). I am gratified to find my independent conclusions confirmed in their papers. Only I must differ from Mr. Dalrymple in regarding the large bone cells without fringes as young and active, not effete organisms.

sternal extremities, the fractured ends being loose and bathed in pus. The other patient, in whom the changes of the ribs were less marked, was a man forty-six years old, short and fat, suffering from dementia and general paralysis of the insane. He had been an inmate of the asylum for six weeks. Two days before his death a fracture of the sixth left rib, about two inches from the sternal end, was discovered. A post-mortem examination revealed the ends of the bone in close apposition. Other ribs of both these patients were brittle, breaking under a force quite inadequate to fracture healthy ribs, and soft, allowing a scalpel to be passed through them. The costal cartilages were less advanced in ossification than was to have been expected at the ages of either of these patients.

Besides the fractured ribs, there were sent me a left clavicle, a portion of the left femur, and two other ribs from the second patient. These bones differed strangely from some bones of a patient aged twenty-five years, dying of phthisis, which I procured for the sake of comparison. They were dark, singularly wet and greasy, and, considering the short time that had elapsed since death, unusually advanced in decomposition. And, as sections from the diseased and from what we will call the healthy bones lay macerating in different jars, the distinctive characters were still preserved. The sections from the phthisical bones grew whiter and harder, while those from the bones of the insane patient remained dark and rotten, and very offensive, day by day. On any pressure of the ribs from the insane patient dark blood oozed from the comparatively large vessels on their surface, and when forcibly bent they snapped suddenly across with a clean fracture, the edges standing out sharp and smooth all round, like a hemlock-stalk, without splintering. Within they contained medullary tissue, softer and darker than usual. In the neighbourhood of the fracture in the first patient I did not happen to notice any difference, but in the second patient the neighbouring medullary tissue was pale and slightly infiltrated with pus. No further indication of any attempt at repair could be traced in either of them.

The appearance of a transverse section of one of these ribs was very remarkable when laid by the side of a section from the corresponding rib of a woman aged twenty-five years, who had died of phthisis, and still more so when compared with the corresponding rib taken at random from the Museum stores. The first thing that struck one was, that the diseased

rib was so much larger than a healthy rib, as if the loss of substance within had been to some extent made up by a deposit of bone on the outer surface. And this view was favoured by the observation of numerous bone-cells, as of growing bone, not yet stretched and withered into lacunæ and canaliculi, lying in the subperiosteal laminæ. The centre of the bone was traversed by a very light open net-work made of the fewest possible slips of osseous tissue. All the strength of the bone lay in its outer shell of compact tissue, which yet was no thicker than cardboard.

Great difficulty was found in procuring a specimen to display its microscopic structure satisfactorily. For the bone yielded, like a section of hoof, instead of wearing away, under the pumice. A section of the right thickness to display the structure of a healthy bone showed nothing at all of the structure of these bones, the field was so clouded. And though, by one means or other, at last the oil was removed, yet the specimen remained obscure till it had been made very thin indeed; and then the obscurity was found in great measure to be due to a general granular condition of the laminæ. There were minute oil-globules floating all about the field, but, besides, the bone was finely granular, distinctly more so than in specimens of healthy bone prepared in the same way, and procured, to avoid every chance of error, at the same recent date. This granular structure affected no uniform arrangement, and I know of nothing which it more exactly resembled than the granular appearance to be seen at the ossifying edge of cartilage and in new bone. Like this it was unaffected by ether and benzol, but, unlike this, it was almost entirely removed by dilute hydrochloric acid, which dissolved the earthy constituents of the bone. It was most marked in the laminæ immediately surrounding the Haversian canals, in which laminæ, coincidentally, the lacunæ and canaliculi were comparatively ill-marked or altogether wanting. I suppose that this granular marking was due to an integral change of the substance of the laminæ. Another evidence of some general integral change was supplied by the presence of numerous irregular fissures between the laminæ, chiefly those which filled up the spaces between the Haversian systems. This appearance explains to some extent the loose yielding structure of the bone already alluded to.

Immediately beneath the periosteum, where the laminæ followed the general outline of the bone, the laminæ and canaliculi were normal. But farther in, where the Haversian

systems began, the structural arrangement of the bone was seen to have undergone a change. The Haversian systems were comparatively small, and though individually more numerous, occupied a more limited range. And here and there it seemed as if, near the medullary edge, one or two of the Haversian systems had dropped out, leaving large holes bounded by septa of osseous tissue not more than two or three laminæ in width. On these septa the disposition of the canaliculi was normal, as it was on the peripheral laminæ; but deeper within the systems the canaliculi seemed to be set more closely than in the corresponding part of healthy bone, and, as a necessary consequence of this, to run more nearly parallel to one another. I would not, however, insist upon this, for, as a rule, the deep-seated laminæ in healthy bone contrast in this particular with the laminæ more immediately beneath the periosteum, so that this peculiar disposition, even admitting the correctness of the observation, would be no more than an exaggeration of the normal typical distinction between the laminæ and canaliculi of the Haversian system and of the surface, respectively, of any long bone.

But the large size of the central aperture—that is to say, of the Haversian canal—was a point about which there could be no mistake. And this was most remarkable, indeed it was probably the most characteristic point in the whole series of changes which I am describing. The aperture, or, more correctly speaking, what should have been such, was filled with an opaque material marked with a few oil-globules. A longitudinal section of the outer shell of the ribs confirmed and explained this observation, showing the Haversian canals to be generally, but unequally and irregularly, dilated. Some of them had a distinct lining membrane, with an obscure spiral marking.

I have said that there was a difference in degree between the specimens obtained from these two patients respectively. The disease was much further advanced in the first than in the second patient, and again, from whatever cause, the change was much more marked in the ribs of the last patient than in the femur or the clavicle. Still the same process could be traced in sections of both these bones, and the conclusions drawn from these observations confirmed those drawn from examination of the ribs. The entire bones, indeed, were too thick and strong to allow one to measure their brittleness by the same ready means by which I could guess at the strength of the ribs. And there was not such conclusive

evidence of internal absorption. But there was the same difficulty in obtaining a transparent section, and from the same cause—the structure being obscured by the abundance of oily particles and by a general granular condition of the bony laminæ. As in the ribs, the periosteal laminæ preserved their integrity and, with this, the form of their lacunæ and canaliculi.

From a review of the observations of these two cases, it may fairly be inferred that the brittleness of the ribs depended on a morbid condition of the bones, and that this condition was general, affecting different parts of the osseous system coincidentally, though more marked in the ribs than in some other, more compact, bones. The process was essentially one of absorption of the internal structures of the bone; the osseous tissue being replaced by an excessive deposit of the fatty matter normally existing in its interior. And it was effected by the same steps as external absorption follows.\* Thus, the usually invisible membrane lining the Haversian canals, and forming the coats of the vessels lying there, was thickened into a membrane of cognisable structure and dimensions. The space for this thickening was obtained by removal of the innermost concentric laminæ; and from this point a change was propagated which resulted in or tended to the removal of each entire Haversian system. Besides, a change seemed to have crept over the whole bone, showing itself in the loosening of the mutual connections of the laminæ, and in an obscure disintegration of the osseous structure itself. And this was accompanied by a general infiltration of oily matter into the substance which had intruded itself within the Haversian canals, and into whatever part of the compact structure of a bone could find room for it. So far is clear; but I must be allowed to hesitate before giving any precise opinion as to the real import of the molecular disintegration, and so far anticipating the possible results of an inquiry which still occupies much of my leisure. And the more so now that an available source of supply of diseased bones seems to have offered itself in the inmates of lunatic asylums, whereby all the previous inferences may be corrected or confirmed.

The connection between insanity and a wasting of the phosphates of the osseous system is readily intelligible on general, though somewhat conjectural, grounds. Yet I would

\* Virchow, "Cellular Pathologie," S. 379, 2te Auflage.

not be understood to assert unconditionally that the changes which I have described are peculiarly liable to occur in lunatics; for were it even established by statistics that a brittle condition of the bones, whatever we may choose to call it, is more common among the insane than among the sane, still we must remember that the causes to which we somewhat vaguely refer this change of the osseous system are counted also among the predisposing causes of insanity. Such are want, disease, distress of body and mind, old age, and all that brings on premature old age. And these might induce this change of the bones without any intermediate mental affection; so that the mental and the physical effect might be common results of the same cause and mutually independent. Again, the unhappy circumstances of insane persons render their brittle ribs more liable to fracture. For a rib which would last a feeble, quiet, bedridden patient to the end of his days, might readily break under the wayward movements of a lunatic and the mechanical restraints, however gently and judiciously applied, necessary to control these movements. And, lastly, it may be added that a fracture which would pass unnoticed in a private family becomes most properly the subject of public judicial enquiry when it occurs in the inmate of a lunatic asylum. Until further observation has cleared up this point, the attendants of the insane will remain under the painful suspicion of having done by violence what will be found, I believe, really to have been due to disease of the bones.

The two cases here referred to by Dr. Ormerod are thus detailed by Dr. Williams in *The Lancet*.\*

Two patients having died in the Sussex Lunatic Asylum lately, in the first of whom two ribs were fractured, and in the second one, very careful inquiry had been instituted as to the cause of these fractures. Remembering how much the public mind has of late been disturbed by the report of improper treatment in lunatic asylums, it has struck me that the cases are of sufficient importance for a *résumé* of the investigations and their results to appear in *The Lancet*. In both cases, although death had resulted from natural causes, I applied for an inquest, and in both I obtained the valuable aid of Dr. Ormerod, physician to the Brighton Hospital, and Mr. Jowers, surgeon to the same hospital, in making the pathological examinations, and in giving evidence at the coroner's inquiry.

\* On Fractured Ribs in the Insane, by S. W. D. Williams, M.D., Medical Superintendent of the Sussex Lunatic Asylum, Hayward's Heath.—*The Lancet*, Sept. 3rd, 1870.

CASE 1.—S. L.—, wife of a labourer, aged fifty-nine years, looking sixty-nine, never had any children, suffered much from menorrhagia thirteen years ago for three or four years, and has never recovered her former health, but remained weak, thin, and unfit for work.

*State on admission* (July 2nd, 1870).—Mentally she was in a state of melancholia of a very distressing character. Physically she had all the appearance of a person who was, or had been, suffering from some exhausting disease. She was painfully thin; her features were blanched and sharp, and her hair perfectly white.

*Progress of case*.—On the day after admission she became more excited; delusions gained possession of her that she was too wicked to live, and that she was unfit for anyone to approach her. She would throw herself violently on the ground, and cry and whine, and unless constantly watched, would undoubtedly have seriously injured herself; yet, withal, she would do as she was told, and seldom or never resisted the nurses. She also refused to eat any food, but would drink liquids when they were held firmly to her mouth.

She remained in much the same state as this mentally, but getting physically weaker, until the 14th, when she became so extremely restless, that it was necessary to place her in the padded room for some hours. During the time she was there, she employed herself in pulling the bed to pieces, and lifting the floor pads about, fancying that she heard some one in the floor. On the 15th she was rather quieter. On the 16th she seemed much better mentally, but weaker physically, and she complained of tenderness in the chest on the right side. On examination, this tenderness was found to be due to a fracture of the fourth and fifth ribs, about an inch from the juncture of the bone with the cartilage. On the 17th she was attacked with diarrhoea of a most intractable character, and which continued almost without abatement, and notwithstanding most active treatment, until the 26th, when she died through exhaustion. During the week previous to her death, a carbuncle formed on one shoulder, and an abscess under the right jaw, adding much to her debility.

Every possible inquiry was made, both when the injury was discovered, and after her death, as to whether she had been ever ill-used, but without the shadow of a suspicion of any improper treatment being able to be detected. She herself, during a lucid interval some days before death, told me that she believed she hurt her side lifting the pads about in the padded room on the 14th, when she thought a man was in the boards.

A coroner's inquest was held on the 27th of July, and, after several hours' careful inquiry, the following verdict returned:—"That deceased died from exhaustion from diarrhoea, accelerated by a fracture of two ribs on the right side; and the jurors further say that such fracture of the ribs was occasioned by the action of the deceased, and is not attributable to improper treatment or neglect of the deceased by the officers or attendants of the asylum."

The only evidence I need trouble the readers of this with is that of Mr. Jowers. It was as follows, and is copied out of the *Sussex Express* :—

Mr. FREDERICK WILLIAM JOWERS deposed—I am a surgeon to the Brighton Hospital. I was present at the examination of the body of the deceased this morning. The outward appearances were those of an ill-nourished and very feeble old woman. There was a carbuncle on the right shoulder, and an abscess below the lower jaw. There were no signs of bruising or violence of any kind. On examining the chest, two ribs were found broken on the right side. There was a slight amount of inflammation of the lungs, and pleura in the neighbourhood of the fracture. The bones were excessively brittle, so much so that with a slight pressure of my thumb I broke one rib on the left side. Those were all the appearances worthy of note. The heart was feeble and soft, and every other organ in the same state. I attribute death to exhaustion consequent on the diarrhoea. I have no doubt the fractured ribs contributed to her death, but there was nothing about them which in a strong and healthy person need have shortened life. My opinion is, that in one of her falls, or more probably by muscular action on the night of the 14th in lifting the pads about, these brittle ribs gave way. There were no external marks where the ribs were broken. At this distance of time I should not expect to find any.

CASE 2.—J. C——, aged 46 years, widowed; an innkeeper. His insanity, which had been coming on for some time, was supposed to be due to drink and dissipation.

*State on admission.*—He had the usual symptoms of a person suffering from the second stage of general paralysis of the insane. Mentally he was bordering on dementia; and although he looked stout and well nourished, he was very helpless, falling about whenever he attempted to move, and generally exhibiting a marked want of consentaneity in the use of his muscles.

*Progress of case.*—After admission he became very restless and excitable; and every other day for some time he suffered from an exacerbation of the mental symptoms, and it would then be necessary to seclude him in the padded rooms, otherwise, as he was so restless and helpless, he would have come to harm. On the 28th he was extremely excited in the morning, but towards midday a change took place, and he gradually lapsed into a state of coma, from which he never rallied, but died on the evening of the 29th. When this fatal change first took place he was carefully examined, and by chance a fracture of the sixth rib on the left side, about half an inch from the cartilage, was detected. There was no displacement of bone, and not a trace of any bruise or injury to the soft parts, either in the neighbourhood of the fracture or in any other part of the body. Mr. Jowers again made the post mortem examination, and Dr. Ormerod carefully examined the bones microscopically. I append their evidence as given before the coroner, and as it appeared in the *Sussex Express* :—

Mr. FREDERICK WILLIAM JOWERS, surgeon, of Brighton, and one of the surgeons to the Sussex County Hospital, deposed— I was present at the examination of this patient on the afternoon of Friday last. There were no marks of bruises or violence to be seen on the body. On examining the chest there was found a simple fracture of the sixth rib on the left side. The skin, the fat, and the muscles overlying this fracture were in a perfectly healthy state, as were also the lining membrane of the chest inside, the covering of the lung, and the lung itself. What I mean to express is, that there were no signs of violence. There was no displacement;



the bones were lying in their places. The ribs were remarkably brittle, snapping like a dry twig upon the slightest pressure. My opinion is this fracture was caused by some irregular muscular contraction, acting suddenly upon this diseased rib, and that the fracture had nothing at all to do with the death. I have no doubt, having heard Dr. Williams's evidence, that deceased's death was due to natural causes. I might add that these cases of fracture from muscular action are not unknown to surgeons. I once attended a gentleman in Brighton, who broke his arm from simply tossing some biscuit to a boy; also a lady, who broke her leg from turning in bed.

Dr. E. L. ORMEROD, physician at Brighton, deposed—I have examined a portion of one of the ribs of deceased. The bone was to all appearance healthy on a general examination, but there was a crack across it near the sternal end. The crack was on the outer side. The bits of bone were exactly in position; and on bending it more to examine this crack, I heard it extend, showing that the fracture was not quite through. The appearances inside the bone were very like those which I had seen in the ribs of the patient who had died here a few days before. The changes in the last specimen were not so far advanced as the previous one; but they were essentially the same, consisting of the removal of the internal structure of the bone, leaving only a thin outer shell of bone, which was to a greater or less extent, infiltrated with fat, and in the process of degeneration. I have no doubt that the fracture of the bone arose from its great brittleness, rendering it liable to be broken from causes quite insufficient to break a healthy bone. From the position of the fracture, occupying the outside of the bone, I do not think it could have arisen from direct local violence; I think much more likely from muscular action. Even healthy bones will break from such a cause. I have seen the thigh of a race-horse broken from such a cause. The disease which appeared in these two patients is well known to anatomists as *mollities ossium*, occurring in the subjects of any exhausting diseases, as cancer or after childbirth. It is not generally known to occur in insane patients, nor is it known whether it is confined to the ribs in them; probably not.

The verdict in this case was as follows:—"That deceased died from natural causes on the 28th of July, from general paralysis of the insane, that he received every attention while in the asylum, that he had sustained a fracture of the sixth rib, but it arose from the diseased state of the bone, and was not attributable in any way to the neglect or improper treatment on the part of the officers or the attendants of the asylum."

*Remarks.*—I cannot but think that the history and examination of these two cases will not only go far to explain the frequency of fractures of ribs in asylums, but may also to some extent help to relieve the press and the public mind of some of the doubts that have lately been expressed as to the treatment of lunatics in asylums. I would not, however, wish it to be inferred that I think the treatment of patients in asylums perfect. Far from it. Where do we find perfection? Neither can I for a moment subscribe to the, to me, absurd hypothesis that lunatics' ribs are more brittle than other people's. But here are two cases in which, after most separate and careful investigations by the visiting justices, the coroner, and myself, not the slightest ill-treatment can be detected. Indeed, neither of the patients was of the class of cases likely to be ill-used, as neither of them was ever violent, and the only trouble they gave was from their fears and their helplessness. And yet one had two ribs broken, and the other one. The explanation of this is, I think, clear. The woman had suffered from an exhausting disease some years ago, and had been a confirmed

invalid ever since. The man had had syphilis severely, had been a drunkard, and was in an advanced stage of general paralysis. They were, therefore, both cases in whom we might expect to find the state of bone Dr. Ormerod has so minutely described to us in the *British Medical Journal* of September 10th, 1859. This, after careful examination, Dr. Ormerod himself fully bears out; and I also can, from personal observation, bear testimony to. As Mr. Jowers said, the ribs of the woman snapped like a dry twig, and I saw him push a small scalpel through a rib of the man almost as easily as if it had been only a shell. Therefore, the diseased state of the bones being allowed—and I think that after such experienced evidence as Dr. Ormerod's, that cannot be disputed—I consider we may be fully justified in reasoning that a small amount of force during life might have broken the ribs of these patients, and that it is quite possible, remembering the very restless, aimless ways these poor creatures had, the fractures may have been due to irregular muscular action. Indeed, it must be remembered that the woman ascribed her injury to such a cause, distinctly telling me, as I have already stated, that she did it on the night of the 15th of July, when lifting the heavy pads about in the padded room.

I have purposely refrained from detailing the medical treatment pursued in these cases, thinking it foreign to the point at issue, and that it would only tend unnecessarily to swell the bulk of this communication.

I believe Dr. Ormerod contemplates writing a paper, carefully describing the pathological changes he has detected. Such a paper cannot fail to be of great interest.

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## OCCASIONAL NOTES OF THE QUARTER.

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### *Masked Epilepsy.*

The following account of an interesting and instructive example of masked epilepsy is contributed to the St. Bartholomew's Hospital Reports by Dr. Thorne Thorne:—

H. S., a coachbuilder, aged 36, of temperate habits, was admitted into Luke Ward, under the care of Dr. Andrew, on January 12, 1868, for an attack of subacute bronchitis. He is reported to have become, about a week after his admission, "strange in manner," and on several occasions he made the complaint that his wife was looking in at the window of the ward. He subsequently became quiet, but somewhat similar symptoms recurred about every third or fourth day. One