A CASE OF OSTEOMALACIA IN A CHILD.

Read in the Section of Diseases of Children.

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THE specimens of tibia, radius, ulna, and rib, exhibited to-day, were obtained from a female child aged 8 months. When first seen, about a fortnight before death, the child was much wasted, and very small for its age; it weighed 5 lbs., and the length of the body was 45 centimetres (about 17.75 inches), which is at least 10 centimetres, or about four inches, shorter than it should be at that age. All the limbs were bent; the tibiae were strongly arched forwards, and felt thickened, the femora were bent outwards and backwards, and the arms and forearms presented an outward curve. The chest was fairly shaped; there were no grooves, and no detectable enlarge-

Fig. 1.—Tibia drawn from measurements given in Professor Kohn's case. Child aged 16 months.

ments at the junction of the ribs and cartilages. The occipital bone yielded to pressure in one or two places. The mother stated that the child was born at the full time, that the limbs had been bent since birth, and that the midwife who attended her had remarked on their bent condition. There was no history of syphilis, and, beyond the soft spots in the occipital bone, nothing to suggest the presence of hereditary syphilis. The mother had another child aged two years and a half, who was quite healthy. At the *post mortem* examination, the fragility of the bones was very striking; the femur, or the radius, or any other bone, could be bent, with the greatest ease, and it required the utmost care to remove a rib without breaking it. The ribs presented spontaneous fractures near their angles; at the junction of bone with cartilage, there was not a trace of beading; the epiphyseal line was perfectly straight; and the microscope did not reveal any proliferation of cartilage; the columnar zone was of about normal depth, and the line of advancing ossification was perfectly even.

On slicing the tibia, red pulp bulged out; after washing this away, it was found that, beyond a thin shell of cortical bone, the rest of the shaft was filled up with soft, dark red, medullary tissue, together with a scanty trabecular framework. The upper and lower epiphyseal lines were quite even, and not wider than natural. It is important to note that the upper centre of ossification was very large, and that the lower was already present (Fig. 2A), though it normally appears in the second year (Fig. 1). The other bones were in a similar condition. A piece of the parietal bone was ob-

tained, and, on squeezing it, red pulpy material exuded. You see how thin and fragile the bone is. The spleen and other viscera appeared quite natural.

We have then a condition of softening of bone, without a trace of proliferation of the zone of cartilage which intervenes between the shaft and epiphysis. Does the absence of the latter sign exclude rickets? It is the most constant sign met with in rickets, but is it a pathognomonic one? That is, is it found in every case of rickets, and never found in any other disease? We know that, in rickets, enlargements at the growing ends of the bone and softening of bone-tissue may coexist in varying proportions; but if the latter condition *only* be present, have we another disease, osteomalacia, or are we to consider osteomalacia and rickets as different phases of the same disease? Dr. Rehn of Frankfort has recently reconsidered the existence of osteomalacia in childhood. He reports what he considers six examples of this disease, and in one of them he obtained a *post mortem* examination. The case is as follows. The subject

Fig. 2.—Section of Right Tibia. Child aged 8 months.
A. Increased ossific centres in epiphyses.

was a girl aged 16 months, very slender; and the skeleton was very thin. There was much softening of the parietal bone at the posterior part, and considerable thickening at the junction of the ribs and cartilages. Both scapulae were thin at the edges. The clavicles and the bones of the forearm were fractured. All the long bones, with the exception of the left tibia, were flexible; the lower limbs were quite straight. Von Recklinghausen gives the following account of the right tibia and the right radius. The tibia was quite straight and somewhat flexible; it showed osteoid trabeculae, which were easy to cut; they were next to the periosteal layers of bone, especially in the middle of the shaft, but were also found in the middle of the spongy axial substance, and also in the bone-cortex. At the upper end, there was a rachitic zone, 20 millimetres broad, and 5 deep; there was also one at the lower end, measuring 15 x 4 millimetres. The radius exhibited a similar appearance; there was no medullary canal, the substance of the bone was uniform, cartilaginous, and finely porous. At both ends, there was a distinct rachitic zone. Microscopically, the appearances were similar to those met with in osteomalacia; thus the bone-trabeculae, except those in the cortical parts, were almost devoid of lime; the growing ends, however, showed the proliferation of cartilage met with in rickets. In three or four of the other cases, recovery took place.

Professor Rehn then gives a summary of premonitory symptoms; he mentions feeble nutrition, marked restlessness, sleeplessness, and especially great irritability on movement. The characteristic signs he considers to be the association of great softness and flexibility of the long bones with only slight swellings of the epiphyses and ribs.

In consequence of the softness of the bones, fractures occur, and even in the scapulae. Cranio-tabes was present in two cases. The intensity of the disease was greatest in the forearm and leg-bones, then in the humeri, and the femora suffered least. There was no diarrhoea. The spleen was enlarged in three cases. Anæmia and emaciation were marked in all. No pyrexia was observed in uncomplicated cases. The urine did not show any increase of earthy phosphates.

The course of the disease was chronic, and lasted many months. Death occurred in two cases in consequence of diffuse bronchitis in one, and bronchopneumonia in the other. With regard to etiology, all the cases occurred during the first two years, and the disease began in the first year. They were all females. The food was, in all probability, poor in phosphoric acid and lime. No hereditary influence could be traced, and no evidence of hereditary syphilis. The disease is to be diagnosed, Dr. Rehn says, first, from congenital syphilis, secondly, from rickets; the softening of bone that sometimes occurs in syphilis being associated with other indications of the presence of the disease, is easily recognised. He finds the following differences from rickets:

1. The high degree of softening, and the slight epiphyseal swelling;
2. The thinness of the whole skeleton; in rickets, thickening of the bones;
3. The straightness of the lower extremities, which in rickets are usually curved;
4. Pain on movement much greater than in rickets.

It seems to me very difficult to see anything distinctive in the two last signs; and the diagnosis, if one is to be made, between osteomalacia and rickets surely depends upon what views we hold with regard to the importance of the relations between what Sir William Jenner calls "the increased preparation for ossification" in the epiphyseal cartilages and softening of bone-tissue. The bones that I have brought before you certainly seem to be more closely allied to the disease known as osteomalacia than to rickets. Dr. Rehn's case might be looked on as a sort of link between the two diseases; but without presuming to criticise the opinion of such a high authority as von Recklinghausen, perhaps I may venture to say that, if we are to hold on to anything as a sign of rickets, it is to the proliferation of cartilage-cells, to the hyperplasia that occurs in front of the irregular advancing line of ossification; and it must not be forgotten, too, to what a great degree erosion and softening of bone may take place in unmistakable rickets; this is well seen in sections across the middle of the shaft of this rickety radius kindly lent by Dr. Ashby.

There are three leading differences between the tibia in Dr. Rehn's case and that in mine. The former is straight, and thinner than natural; the latter is curved, and at least as broad as natural; the former has epiphyseal zones, measuring respectively five and four millimètres, the latter scarcely one millimètre; and, lastly, the structure of the shaft is different. A bone may be flexible from at least two causes: either the framework, though abundant, is deficient in lime; or there is no want of lime, but the trabecular framework is very scanty; the former holds in Dr. Rehn's case, the latter in mine. When the trabeculae in this specimen are touched with the point of a knife, they feel quite gritty, and the microscope verifies this. They have not been deprived of lime, but are being gradually eaten away, as a whole, and replaced by a soft cellular tissue; and you see that in places the process has led to the formation of cystic-like cavities. The defective calcification in Dr. Rehn's case may be explained in two different ways: either lime has been abstracted from previously healthy bone, or the latter has been gradually absorbed, and new bone, deficient in lime, laid down in its place. The latter view is strongly held by Kassowitz, in his recent monograph on rickets; and he dogmatically asserts that, both in osteomalacia and rickets, all the limeless parts of the bone are new formations, laid down in the place of absorbed calcified bone, or formed independently at the surface of bone; and that the process is never due to decalcification. Varying degrees of calcification are easily seen in carmine preparations of rickety and osteomalacic bone, not primarily softened by reagents; the bone deficient in lime takes a brilliant red colour, and contrasts with the silver-grey of the still calcified parts. I have a section showing this very well, and I pass round a rough painting of the appearances seen. One of the principal arguments of Kassowitz is, that the new uncalcified layers which stain bright red are never found to be continuous with the calcified lamellae; as would be the case if lime were simply abstracted from formerly existing calcified lamellae; and he says that those who, like Volkmann, Ribbert, etc., believe in an abstraction of lime from fully formed bone, have

never explained how it is that the limeless parts, which are concentric with the medullary spaces, are never continuous in series with the yet calcified portions. Kassowitz would, I suppose, regard the condition of these bones as a support to his theory. They illustrate his first stage, when the whole bone, not merely the lime, is removed; but it would be out of place here to enter into a histological discussion.

LARGE DORSAL TUMOUR REMOVED TO RELIEVE DYSPŒNEA AND CARDIAC DISTRESS.

Read in the Section of Surgery.

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MARY ANN N., widow, aged 65, came under treatment on March 1st, 1883. She had a large dorsal tumour, which had been growing fifteen years; and, for four years, it had been rapidly increasing in size. The circumference at the base was 28 inches. She stated that

she had suffered from cough and shortness of breath ten years, and occasionally from severe bronchitis. On admission into the Royal Portsmouth Hospital, she complained of the weight of the tumour, and great distress during movement. The chest-symptoms were very severe. At night, she slept in the sitting posture. Her face was livid, puffed, and marked with prominent venous markings. The act of expectorating was attended with prolonged distress. On examination, loud bronchial sounds were heard at all parts of the chest, with some crepitation in the dorsal regions. The cardiac impulse was weak, and the second sound loudly accentuated. The pulse 96, soft, compressible, and irregular. The urine was normal, and free from albumen. An attempt was made to sling the tumour, but it was abandoned, as it caused pain and respiratory trouble.

An operation was performed on March 15th. The tumour was placed on a wooden tray, and this was supported by ropes secured to the roof of the theatre. It was an ordinary fatty growth, intersected with very thick fibrous bands, and covered with dilated veins, which were very varicose about the base. The weight of the mass was nearly thirty pounds.

For some days after the operation, the temperature was high, and the chest-symptoms very urgent, but the patient gradually made a complete recovery, and the wound soundly healed.

A few days since, she came again to the hospital to report progress. Her appearance was much improved, and she could walk