THE ETIOLOGY OF CARIES OF THE SPINE.

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OPPORTUNITIES for making pathological investigations into the morbid anatomy of caries of the spine so rarely occur, that, in order to form an opinion upon the nature of this disease, we are compelled to extend our inquiries to the consideration of cases of caries of those bones which are more accessible to observation.

We meet with—1. *Chronic osteitis, commencing in the periphery of the bone*, usually following or accompanying periostitis; and 2. *Ostitis commencing in the centre of the bone*, and independent of periostitis. With regard to the former, we find its progress slow and insidious. The periosteum becomes thickened and less firmly attached to the bone, and beneath this membrane particles of new osseous deposit often occur. This form of chronic inflammation is common in syphilis. A further grade is that of suppurative *periostitis*, generally accompanied by superficial suppurative *ostitis* (caries superficialis). The salts of lime gradually disappear, and the organic framework is absorbed by the vessels the product of the inflammation.

Billroth emphatically urges that if an injury is the exciting cause of caries, there must yet exist a chief element "either in the injured part or in the whole organism, for otherwise the process would run its usual course, as in all traumatic inflammations, and soon come to a termination".

Syphilis and scrofulosis, as elements in the whole organism, will predispose to superficial caries. So also, as elements in the injured part, will those circumstances which interfere with the natural process of resolution in a simple and non-specific periostitis. Thus local disturbance of the inflamed part may cause a lingering, chronic process of inflammation (caries).

In the form of caries which commences in the centre of spongy bones (caries centralis), we find that the salts of lime become soluble and are absorbed, the surrounding tissue becomes more vascular, and the medulla (infiltrated with migratory cells), takes the place of "the gradually but constantly decreasing bony tissue". The bones become light and their cortical substance attenuated. It is rare for the medulla to undergo suppuration in these cases without some external cause.

Ostitis may occur in the spongy bones, and therefore in the vertebræ, in consequence of which the bones are penetrated by a mass of interstitial granulations completely breaking up their tissue without any suppuration (ostitis interna granulosa or fungosa). Sir Benjamin Brodie described caries of the spine as sometimes occurring without suppuration, and he considered the origin of such cases to be of a rheumatic nature.

Shaffer considers these cases of *caries sicca* to be non-scrofulous; and Billroth says that this form is just as variable as regards its vitality as chronic periostitis; that we can here also distinguish some cases which have a distinctly atonic, others a fungous character, while a series of cases lie between these extremes.

Ostitis with caseous degeneration is another form occasionally met with as a sequela of typhoid fever, scarlet fever, small-pox, etc. The distinction between simple and scrofulous caries is clearly described by Mr. Holmes; the former commencing superficially, the bone not being apparently much altered except in the immediate vicinity of the ulceration. In the latter, the whole, or nearly the whole, bone being softened and infiltrated with oily matter.

Billroth's opinion upon the etiology of chronic ostitis, under which term he includes caries, is, that primary chronic ostitis from a traumatic injury in subjects otherwise healthy happens but rarely. It may happen, however, from violent concussion and compression. He considers that scrofulosis and syphilis are the most frequent causes; that in syphilis the local disease is seldom set up by external agents, while in scrofulosis such may fairly be regarded as the rule.

Of the authors who have written upon caries of the spine, some consider the disease to be entirely dependent upon scrofula; some admit that an injury may be the exciting cause; and a few American surgeons have advanced the theory that Pott's disease is the result of traumatic causes alone, and is quite independent of the constitutional condition of the subject.

If the views which I have already expressed are correct with regard to caries generally, may they not be so with reference to caries of the vertebræ? My observations of cases that have come before me have led me to form the following conclusions.

1. Pott's disease very often occurs in patients who present the symptoms which are supposed to indicate scrofula, whatever the true nature of that disease may be. 2. It often occurs in patients who,

although delicate, and in a condition which has been denominated pre-tubercular, have no decided symptoms of constitutional disease, and who have no family history of disease of any kind. 3. It occurs in patients who have been debilitated by fever, or some other disease calculated to impair nutrition, such as syphilis. 4. It sometimes occurs in patients who present no apparent signs of other illness of any kind except the pain following an injury.

In the cases where the disease occurs after an injury in apparently robust individuals, I imagine it may arise in the manner I will now describe.

I have already, at one of the Branch meetings of this Association, shown that fractures of the vertebræ *almost always* present the same kind of displacement of the fragments of bone; that, in consequence of a violent bending forwards of part of the spinal column, the anterior portion of a vertebra is crushed or broken off by the vertebra above it, and that the posterior portions of the bodies of the vertebræ are not injured. This common result will probably be recognised in the accompanying illustration. The crushing of the anterior upper edge of

a vertebra seems to be the general tendency of the majority of accidents which injure the bones of the spinal column; and it seems to me probable that an injury, especially to the bones of young children, may, although insufficient to cause absolute fracture, be sufficient to injure the anterior part of a vertebra to such an extent that inflammation is set up. Such inflammation would speedily get well, were not the parts subjected every day to an almost constant movement. Now, it is quite in accordance with the pathology of the disease to suspect such frequent irritation capable of ultimately giving rise to caries of the injured vertebra. If it is possible for caries to be set up thus in a healthy child, much more readily will it occur in one whose powers of repair are weak, either in consequence of constitutional delicacy, or as the result of some fever or other disease. Therefore, I would assume that local injury is the exciting cause in the majority of, or in all, the cases; that a slight local injury may cause caries in an unhealthy subject; and that a less slight injury (repair being interfered with as above described) may produce caries in an otherwise healthy subject.

INTERNATIONAL MEDICAL AND SANITARY EXHIBITION.—The committee are sparing no pains to promote the success of this exhibition; and, to judge from the admirable plans which have been issued to exhibitors, the collection of medical and sanitary appliances, to be opened under the auspices of the Parkes Museum of Hygiene at South Kensington, on July 16th, will be of national importance. In connection with the exhibition, the Board of Trade issued the following certificate on June 21st:—"The Board of Trade, by virtue and in exercise of the powers conferred upon them by the Protection of Inventors' Act, 1870, do hereby certify that the International Medical and Sanitary Exhibition, which it is proposed shall be held from July 16th to August 13th, 1881, both days inclusive, at South Kensington, London, in certain rooms, buildings, and galleries at the Royal Horticultural Society's Gardens, and at the Royal Albert Hall, South Kensington, in the county of Middlesex, is, in their judgment, calculated to promote British industry, and to prove beneficial to the industrious classes of Her Majesty's subjects.—Signed by order of the Board of Trade, this twenty-first day of June, 1881, HENRY C. CALCRAFT, Assistant-Secretary to the Board of Trade."