





IV. *An Extraēt of a Letter from Bernard Connor, M. D. to Sir Charles Walgrave, Published in French at Paris: Giving an Account of an Extraordinary Humane Skeleton, whose Vertebrae of the Back, the Ribs, and several Bones down to the Os Sacrum, were all firmly united into one solid Bone, without Joynting or Cartilage.*

S I R,

HAVING lately seen part of an Human Skeleton, all the Bones whereof were so united as to make but one continued Bone without Articulation, I thought it might be acceptable to the Curious to be presented with some Account thereof.

This was not an entire Skeleton, consisting only of the *Os Ilium*, the *Os Sacrum*, the five *Vertebrae* of the Loyns, ten of the Back, five entire Ribs on the right side, and three on the left; the bottoms or ends of the other were closely united to the transverse *Apophyses* of their *Vertebrae*. The *Vertebrae* of the Neck, the *Claviculae* and *Sternum* were wanting. All these Bones, which Naturally are 38, each separate and distinct from another, were here so straightly and intimately joyned, their Ligaments perfectly Bony, and their Articulations so effaced, that they really made but one uniform continuous Bone; so that it was as easie to break one of the *Vertebrae* into two, as to disjoynt or separate it from the other *Vertebrae*, or the Ribs, or the *Os Sacrum* from those of the *Iliia*. Nor could I observe any greater distinction between all these Bones than is usually seen in Adult Persons between the *Os Pubis*, the *Ishion*, and

Ilium, which are but one entire Bony Substance. The Roots of all the Ribs made but one equal, smooth, and plain Superficies with the *Vertebræ* and their *Apophyses*. The Oblique *Apophyses* of all the *Vertebræ* were so confounded and lost, that it was not possible to observe any marks of them. The Cartilagineous edge of the *Vertebræ* themselves was turned to perfect Bone. In short, they were as entire as a *Skeleton* cut out of the same Piece of Wood by a Carver would be. Being willing to see if these *Vertebræ* were united throughout their whole Diameter, or at the edges only, I sawed two of them asunder at the Commissure, and found this uniting did not enter above two Lines deep, and that afterwards their middles were separated as they usually are, and touched each other only at the edges, which was raised up a little above the middle part. On the left side at half a fingers breadth from the *Vertebræ*, two Ribs were joyned together for the space of an Inch, and afterwards run separated and parallel like the rest, to the *Sternum*.

The Figure of this Trunk was crooked, making part of a Circle, the *Spina* making the Convex, and the inside of the *Vertebræ* the Concave part of this Segment. If the other *Vertebræ* of the Back and Neck had been preserved, and had bent in the same Curve, they would have made near the half of a Circle. The direction of the Ribs was unnatural, for instead of terminating at the *Sternum* in Parallel Semicircles nearly Horizontal, their Extremities where they reached the *Sternum*, dipp'd so much down toward the *Hypogastrium*, as to touch the sides of the *Ossa Ilium*.

This Trunk had been found in some Church-yard or Charnel-House, as appeared by its dark red Colour and dryness, and seem'd to be of a grown Person, the Bones being of a Proportion and Thickness equal to those of Old Men. The *Vertebræ* of the Loyns were larger than those

those of the Back, as they Naturally are; there was no unnatural bunching out, their joyning together very regular, no one *Vertebra* standing out beyond the other, either before, behind, or on the sides. The Cavity for the Spinal Marrow had no fault but its bending Figure. The Bones of the *Os Pubis* were separated as usually. The Socket or Cavity of the last Bastard Rib on the right side being smooth and polisht, seemed as if that Rib had not been so firmly united as the rest. In the extremity of the Ribs next the *Sternum*, the usual Cavities for the Cartilages to move in, were observable, which as it seems by this were not Bony, nor continuous with the Ribs.

It was a surprising sight to see the sport of Nature in the Fabrick and hardening of these Bones, which Naturally move upon one another, are separated by Cartilages, and held together only by Cords and Ligaments, and chiefly that the Ribs should be thus joyned with the rest, which are perpetually raised in Respiration, and whose Motion is upon the *Vertebræ* as its Centre; and we see motion hinders the lips of a Wound from closing, and a broken Bone from uniting. *Fontanus* reports it as a very strange thing, that he once happened to see three Ribs joyned together. And *Pausanias* makes mention of one *Protophanes*, in whose dead Body all the true Ribs were found to be united: But it is much more extraordinary to find all the Ribs and *Vertebræ* but one continued Bone, than to find the Ribs joyned, for they may be said to move all alike, and still parallel to each other; so that they being always kept at the same distance, need but increase and grow broader to meet and unite.

Thus far I have endeavoured to give our Author's sense almost Verbatim, it being mostly matter of Observation, but the remainder of the Letter being only deductions and Reasonings thereon, I shall only give a short extract thereof.

It is hard to give a Mechanical Reason of this so secret and hidden a matter ; though it is really as certain it must depend upon some Physical Cause ; and to offer at some reasonable Conjecture, the Author examines whether these Bones were thus united while the *Fœtus* was in the Mother's Womb while the Person was living, or after its Death in the Ground : Though the two last Opinions appear most likely to some Persons, yet he allows neither of them ; for as to the Earth, it is either pure and Elementary, or impregnated with some Principle capable to produce the Effect. Pure Earth being made up only of fryable, porous, irregular Particles, can but suck up the superficial Moisture of the Ligaments of this Trunk, otherwise by Evaporation in the Sun Ligaments and Cartilages would become Bony ; and the Earth is never so stiptique as to procure so intimate an Union. If you will say, the Earth was impregnated with some Principle, it must be either Water, Sulphur, or Salt ; neither of which seem proper to cement Bones : All know that Water and Sulphur are so far from hardening Ligaments, that they rather soften and relax by their slippery and fluid Particles. Nor does he think *Alkali's* or *Acids* are capable to turn to Bone. First, *Alkali's* being bristly, stiff, and inflexible, are properer to separate than unite ; as is seen by putting a piece of a Ligament into any *Alkaline Salt*. And Secondly, *Acids* are most proper to break the Texture, and divide even the hardest Bodies, and upon Experiment Cartilages are dissolved in them ; besides, could this Effect have been produced in the Earth, why was not the whole Body turned to Bone ? Our Author gives several other Reasons for his rejecting this Opinion, touching upon the manner of Petrification, which he says, is by the little Acid *Aculei*, which being in a fluid state, insinuate themselves into and stop up the Pores of the petrified Bodies, rendering them more compact. He
 attempts

attempts the cause of the crooked and bending shape of his *Skeleton*; and having rejected several, as a Hurt or Blow, the Rickets, Old Age, &c. he concludes it must proceed from the first Formation of the *Fœtus* in the Womb, from the Eggs not having sufficient room, or being accidentally prest by some abscess in the Womb or elsewhere, so that the *Carina* of the Back-bone instead of running strait was bent into a Circle, and kept the same Figure when at full growth that these Bones had taken when soft and tender. Having given this Reason for the crookedness of the Back-bone, he thence deduces the situation of the rest, as the drawing down of the Ribs and *Sternum* to the *Ossa Ilium*: And from these *Vertebræ* and other Bones being thus prest upon each other, and so rendred unmoved, he shews the cause of their being united into one Bone, the Pores of such tender Parts being easily stoppt, so that the Blood and other Humours could not pass, and upon that Account the Cartilages of the *Vertebræ* becoming dry, united into one piece. By the same Reason the Ribs being prest against the *Vertebræ* for several Months, and without Motion in the Womb, could receive and admit little or no Moisture between them, whence their Cartilages became hard and united, and in time Bony, as several other Bones of the Body do though they were but Gristles when in the Womb.

He proceeds to make some Remarks upon his *Skeleton*, as that necessarily the Body of this Person must have been immoveable, that he could neither bend nor stretch himself out, rise up nor lye down, nor turn upon his Side, having only the Head, Feet, and Hands moveable.

The great difficulty seeming to be in the Respiration, how that could be performed when the Ribs were thus immoveable: He endeavours to obviate this by observing, first, how little motion of the Breast is necessary

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to continue the motion of the Blood through the Lungs, as is visible in Hyſterick Fits, &c. Again, the Ribs of his *Skeleton*, though fixt at the centre, might yet be moved at the ends, and ſo the Thorax enlarged by a much leſs ſtrength than that of the Muſcles uſed for that purpoſe ; beſides the Diaphragm, the chief Organ of Reſpiration in this Subject, was free in its acting ; and it is likely this Perſon breathed very ſhort, the quickneſs of the Returns ſupplying the defect of a large draught of Air at once. He adds, that poſſibly the *Foramen Ovale* might continue open, and that by it and the Arterial *Canalis* the Blood might paſs from the *Cava* to the *Aorta*, but a part of it paſſing through the Lungs : He confirms this by an Obſervation he lately made in a Girl of four or five Years old, in whom the *Foramen Ovale* was but half cloſed up, and in the form of a *Creſcent*.

To this our Author adds another Obſervation of the Bones of the Thigh and Leg growing together in an Adult Perſon, the place of their joyning being much more ſolid than any other Part. Theſe Bones were ſo bent at the Knee, as to make an acute Angle, yet were they without any *Exoſtoſis*, Rotteneſs, Fracture, or unnatural Figure. It is more ſurprizing to find the Knee, whoſe motion is free and large, to be thus united, than that of the Ribs of the *Skeleton*, whoſe motion is obſcure, and ſcarce ſenſible. Some thought this might proceed from an Ulcer in the Knee, which our Author will no ways grant, an Ulcerous Matter being not fit for the joyning of Bones together ; and adds the Obſervation of a Perſon with an Ulcer in the Knee, which made ſuch havock, that the Thigh and Leg hung together but by the Skin. Theſe Bones ſeemed too ſound to ſuppoſe the Perſon had a Wooden Leg, which by continual Kneeling upon might make the Bones unite ; beſides, this Accident is no more likely to befall a Perſon uſing

using a Wooden Leg, than any other, since the *Musculi flexores & extensores Tibiæ* act alternately in each step, which is sufficient to hinder the growing together of the Joynt.

From this Observation our Author confirms what he had before advanced of the Bones being united in the Womb, concluding that this proceeded from the Knee of the *Fœtus* being too much bent and prest against the Thigh-bone, and so united as he had explained that of the Back-bone and Ribs. He concludes all with granting, that some Persons of an hot Temperament have their *Aorta* near the Heart Bony, the *Sinus's* of the Brain, or the like; that some Cartilages and Ligaments become Bony in very old Men, that some parts of the Body may have acquired some degree of Bonyness, which afterwards become more solid by drying in the Earth: Nevertheless he is not satisfied how his Subjects should become Bony in some and not in other Parts, except it be granted that the Fibres of some Parts were from their first formation in the Womb more united than others, which afterwards gave occasion to their Ossification.

Fig. I.

Represents the Sceleton with the Vertebræ of the Back and Ribs united.

aaa, bbbb, c c. The Vertebræ of the Neck, Back, and Ossa Illium, all joyned together.

dddd. Several of the Ribs united to the Back-bone.

Fig. II.

The Thigh and Leg-Bones united together at the Knee.

ggg. The place where the Os Femoris and Tibiæ were united.

