

which the vertical diameters in front and behind were usually equal, whilst the 1st lumbar had the anterior diameter 0·4 mm. less than the posterior, and the 5th lumbar had the anterior diameter 6·2 mm. greater than the posterior. Aeby regards, therefore, the change from the concavity of the thoracic part of the spine to the convexity of the lumbar to take place at a point between the 2nd and 3rd vertebræ, which opinion is substantially corroborated by my observations. It is, therefore, at the two ends of the lumbar series of vertebræ that the wedge-shaped form of the bodies is most distinct, the 4th and 5th vertebræ having the narrower part of the wedge directed backwards to the spinal canal, whilst in the 1st it is directed forwards to the front of the spine. This statement applies to the individual vertebræ, both in the black and white races; but, as in the Australians, for example, the upper three lumbar were more constantly deeper behind than in front, and the lower two lumbar were proportionally less thick in front than behind than in Europeans, the general effect was to produce, so far as the depth of the vertebral bodies themselves and without the intermediate discs can influence the curvature, a lumbar spine, in the one race concave forwards, and in the other convex forwards.

The question now arises, at what period of life do the bodies of the lumbar vertebræ assume the wedge-shaped form? From the measurements, both of Aeby¹ and Ravenel,² it would appear that in the new-born child neither the vertebral bodies nor the discs are wedge-shaped, and that in all the regions of the spine the anterior and posterior vertical diameters are equal, so that the spine, the sacral region being excepted, is almost straight. In a boy of three months, measured by Ravenel,³ the lumbar region, including apparently both bodies and discs, was 6 mm. higher anteriorly than posteriorly, and in one of two years 1 cm. higher. In the spine of a child, apparently in its second year, measured by myself, the bodies of the lumbar vertebræ were collectively 4 mm. thicker in front than behind, and the half of the increase was in the body of the 5th lumbar. It is obvious, therefore, that the anterior vertical diameter of the lumbar region increases with the assumption of the erect posture, and with the formation of the convex forward curve in the lumbar spine. Some years ago Ravenel measured in Bern the spine in twenty-two adult Europeans, eleven of either sex. The mean proportions of the lumbar part of the column—the anterior surface of the entire column being estimated as = 100—was in men 30·5 for the anterior surface of the lumbar spine, and 26·4 for the posterior surface; whilst in women it was 31·9 for the anterior, and only 22·2 for the posterior surface. The difference, therefore, for the two sexes was 4·1 in favour of the anterior surface in the men, and 9·7 in the women, so that the lumbar spine was considerably more convex in the latter sex. Ravenel also stated that in women the posterior surface of the whole spinal column was 6 per cent. shorter than in men, which, for the most part,

¹ Der Bau des menschlichen Körpers, Leipzig, 1871, p. 159. Die Altersverschiedenheiten der menschlichen Wirbelsäule, *Archiv für Anatomie*, p. 77, 1879.

² Die Maaßverhältnisse der Wirbelsäule, *Zeitschr. für Anat. und Entwicklungsgeschichte*, Bd. ii., 1877.

³ *Op. cit.*