

right shoulder blade is displaced upward and outward, and is rotated about a transverse axis, so that its lower angle projects backward more than that of the left. Measured from the spinous processes between the scapulae, the lower angle of the right is farther away than that of the left. If the tips of the processes be followed downward and marked by a colored pencil, the parent's attention is, probably for the first time, called to the fact that there is a deviation from the perpendicular. In cases where there is but little deviation, no rotation of the vertebræ may be found; yet in comparatively slight cases careful examination will reveal a more pronounced roundness on that side of the spine next to the convexity. This is rendered more noticeable by having the patient curve the whole spine forward as much as possible, at the same time allowing the arms to hang loosely. Inspection in this attitude reveals even a very slight degree of rotation. The greater prominence on the side of the back next to the convexity of the curve is due to the vertebræ having rotated upon a vertical axis, so that the anterior portion of the body has made the greatest departure from the vertical. It follows from this that the actual curvature to the right or left in the bodies of the vertebræ is greater than is apparent by examination of the spinous processes, and that the transverse processes upon the side of the convexity are more posterior than those at the concavity of the curve. The first portion of each rib on the side of the convexity following the direction of the transverse processes is directed more backward than in the normal condition, while those on the side of the concavity, also following the direction indicated by the transverse processes, are less prominent than in the normal state. Following the ribs on the side of the convexity, their angles are found to be much more acute than the normal, and towards the anterior part the natural curve is lessened so that the front of the chest on that side is flattened. The ribs on the side of the concavity are correspondingly flattened behind and their curvature increased in front. The curve thus described is probably nearly always secondary to a curve in the opposite direction in the lumbar region, and is frequently accompanied by a third curve in the cervical vertebræ.

Many different causes have been assigned for

the deviations from the perpendicular.\* The normal spine of the infant is a right line, and is capable naturally of bending in all directions. At a very early date a natural curve forward is found in the lumbar region, probably caused by a traction of the psoas muscles in the use of the lower extremities; this is naturally accompanied by a compensatory curve backwards in the dorsal region. The normal spine, when bent to the right or left, will permit a certain amount of flexion without rotation of the vertebræ around their vertical axes. Beyond this limit, however, rotation occurs as described above. Some causes which certainly are productive of this deformity may be enumerated.

Rickets, and all conditions of malnutrition of the child, render not only the bones, but all the tissues which go to constitute the spine and to hold it erect, less capable of maintaining the erect attitude, and constitute the chief predisposing causes. The force of gravity, operating through the necessity that the spine should bear the superincumbent weight of the thorax and its organs, the shoulders, arms, and head, tends to overcome the power of the spine to maintain its erect position. Any cause which even temporarily draws the spine away from its normal position enables this superincumbent weight to act with increased force in causing further deviation.

So long as a column of bones, such as the vertebræ, remain in a vertical plane, a great pressure from above may be resisted. This ideal condition, however, never exists; in the first place, the natural antero-posterior curves interfere with this ideal; and, secondly, in development few, if any, persons would be found entirely symmetrical if a vertical plane were passed from behind forwards through the centre of the body. Thus certain predisposing causes are supplied.

It is interesting to note some of the causes why this affection is so much more common in girls than in boys. Other reasons probably assist in bringing this result about; but I am of the opinion that the chief causes are, first, that the girls are not allowed such freedom in exercise and outdoor life as boys are, and, second, that the clothing employed by girls produces an unnatural constriction of the lower part of

\* "The Spine in Infancy," Dwight & Rotch, *Archiv. Pediatr.*, March, 1891.