intersects the trabeculæ of group (*a*) which rise from the opposite side. The trabeculæ of this group evidently carry small stresses, as is shown by their slenderness.

"*d. The Principal Tensile Group.*—This group springs from the outer part of the shaft immediately below group *c*, and curves convexly upward and inward in nearly parallel lines across the neck of the femur and ends in the inferior portion of the head. These trabeculæ are somewhat thinner and more widely spaced than those of the principal compressive group (*b*). All the trabeculæ of this group cross those of groups (*a*) and (*b*) at right angles. This group is the most important of the lateral system (tensile) and, as will be shown later, the greatest tensile stresses of the upper femur are carried by the trabeculæ of this group.

"*e. The Secondary Tensile Group.*—This group consists of the trabeculæ which spring from the outer side of the shaft and lie below those of the preceding group. They curve upward and medially across the axis of the femur and end more or less irregularly after crossing the midline, but a number of these filaments end in the medial portion of the shaft and neck. They cross at right angles the trabeculæ of group (*a*).

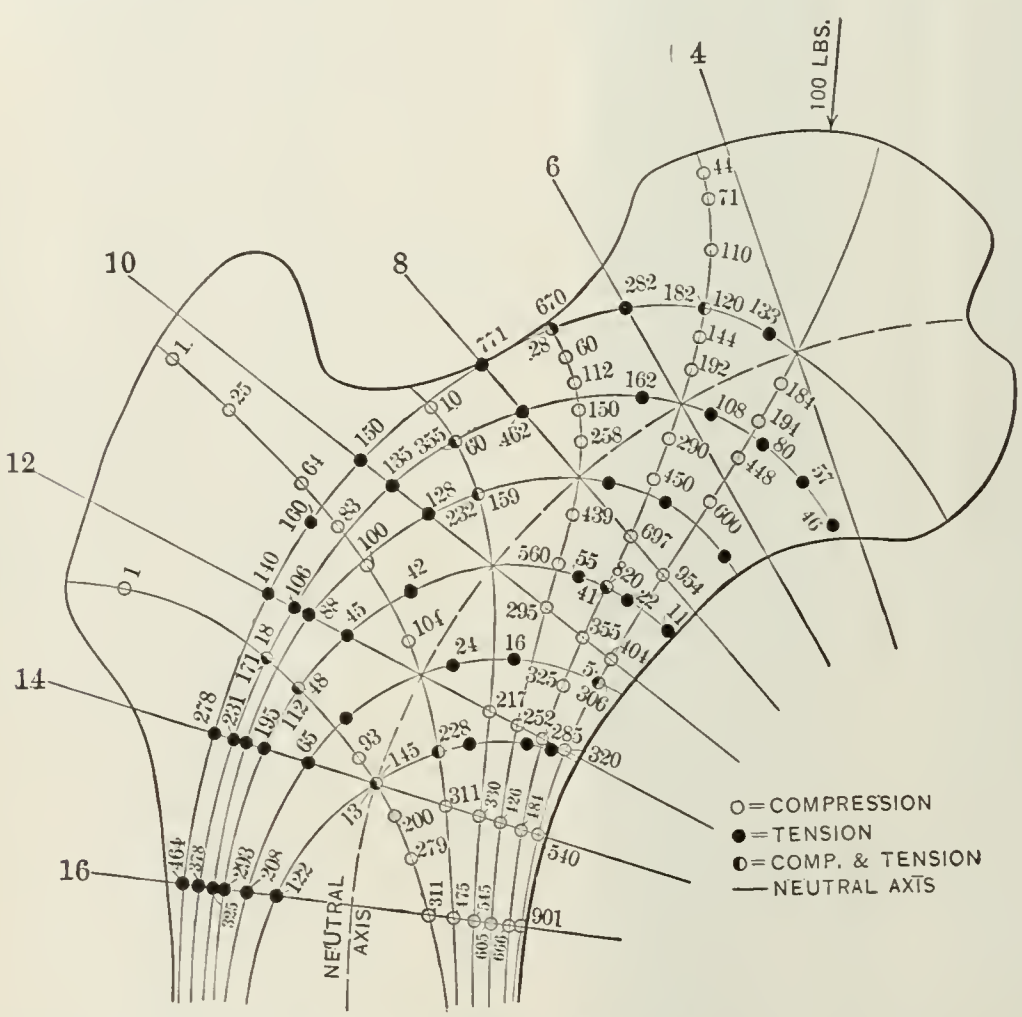

Fig. 251.—Intensity of the maximum tensile and compressive stresses in the upper femur. Computed for the load of 100 pounds on the right femur. Corresponds to the upper part of Fig. 250. (After Koch.)

"In general, the trabeculæ of the tensile system are lighter in structure than those of the compressive system in corresponding positions. The significance of the difference in thickness of these two systems is that the thickness of the trabeculæ varies with the intensity of the stresses at any given point. Comparison of Fig. 247 with Fig. 251 will show that the trabeculæ of the compressive system carry heavier stresses than those of the tensile system in corresponding positions. For example, the maximum tensile stress at section 8 (Fig. 251) in the outermost fiber is 771 pounds per square inch, and at the corresponding point on the compressive side the compressive stress is 954 pounds per square inch. Similar comparisons may be made at other points, which confirm the conclusion that the thickness and closeness of spacing of the trabeculæ varies in proportion to the intensity of the stresses carried by them.

"It will be seen that the trabeculæ lie exactly in the paths of the maximum tensile and compressive stresses (compare Figs. 247, 248 and 251), and hence these trabeculæ carry these stresses in the most economical manner. This is in accordance with the well-recognized principle of mechanics that the most direct manner of transmitting stress is in the direction in which the stress acts.