greater thickness in the middle of the shank or shaft of the column, and become thinner as we follow them towards either of the ends. This gradual diminution in the thickness of the walls arises from the continual separation of the plates, which bend inwards, and crossing each other, leave a multitude of irregular spaces or cells, which are termed *cancelli* The plates, proceeding from each side obliquely inwards, at length meet each other in the axis of the cylinder, so as to close the middle cavity near the extremities of the bone, where this spongy or cancellated structure is found to occupy its whole diameter.

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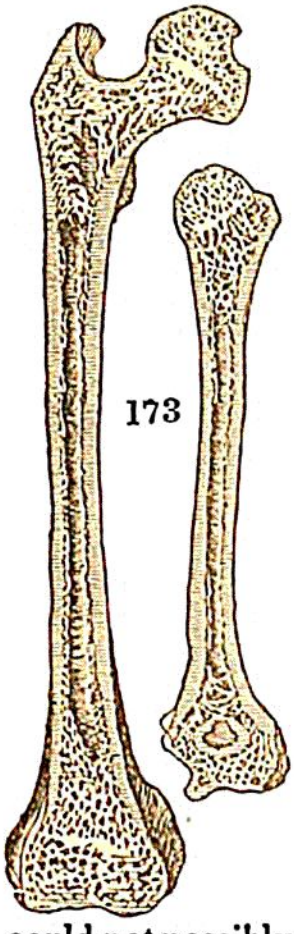

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Now if we consider that the principal mechanical property required in every cylindrical lever is rigidity, and more especially the power of resisting forces applied transversely, that is, tending to break the cylinder across, we shall soon perceive that a given quantity of materials could not possibly have been disposed in a manner better calculated for such resistance than when in the form of a tube, or hollow cylinder.* To this mechanical principle I have already had occasion to advert, when speaking of the hollow stems of vegetables, which derive their chief strength from their possessing this form;† and we now find it again applied in the structure of bones, which, by having been made hollow, are rendered considerably stronger than if the same materials had been collected into a solid cylinder of the same length. We may farther remark, that as it is in the middle of the shaft that the strain is greatest, so it is here that the cavity is largest, and the resistance most effectual.

* An elaborate mathematical demonstration of this proposition was long ago given by Dr. Porterfield, in a paper contained in the first volume of Medical Essays and Observations, published by a Society in Edinburgh, p. 95.

† P. 70.