

Attached to twelve vertebræ in the middle of the back are the ribs, or bony stretchers of the cavity of the chest, constituting a structure which solves, in the most perfect manner, the difficult mechanical problem of making a cavity, with solid exterior, which shall yet be capable of dilating and contracting itself. Each pair of corresponding ribs may be considered as forming a hoop, which hangs obliquely down from the place of attachment behind: so that, when the fore part of all the hoop is lifted up by the muscles, the cavity of the chest is enlarged.

The SHOULDER JOINT is remarkable for combining great extent of motion, with great strength. The round head of the shoulder bone rests upon a shallow cavity in the shoulder blade, that it may turn in always; and the danger of dislocation from this shallowness is guarded against by two strong bony projections above and behind. To increase the range of motion to the greatest possible degree, the bone called the shoulder blade, which contains the socket of the arm, slides about itself upon the convex exterior of the chest, having its motion limited only by a connexion through the collar bone, or clavicle, with the sternum. The scapula, or blade bone is extraordinary as an illustration of the mechanical rules for combining lightness with strength. It has the strength of the arch from being a little concave, and its substance is chiefly collected in its borders and spines, with thin plates between, as the strength of a wheel is collected in its rim, and spokes, and nave. The bones of the arm, considered as levers, have the muscles which move them attached very near to the fulcra, and very obliquely; so that, from working through a short distance comparatively, with the resistance overcome at the extremities, the muscles require to be of great strength. It has been calculated that the muscles of the shoulder joint in the exertion of lifting a man upon the hand, pull with a force of two thousand pounds. The os humera, or bone of the upper arm; is not perfectly cylindrical; but, like most of the other bones which are called cylindrical, it has ridges to give strength.

The ELBOW JOINT is a correct hinge, and so strongly secured, that it is rarely dislocated without fracture. The fore arm consists of two bones, with a strong membrane between them. Its great breadth, from this structure, affords abundant space for the origin of the many muscles that go to move the hand and fingers; and the very peculiar mode of connexion of the two bones, gives man that most useful faculty of turning the hand round, into what are called the positions of pronation and supination, exemplified in the action of twisting, or of turning a gimblet. The many small bones which form the wrist have a signal effect of deadening, in regard to the parts above, the shocks or blows which the hand receives. The annular ligament is a strong band, passing round the joints and keeping all the tendons which pass from the muscles above to the fingers, close to the joint. It answers the purpose of so many fixed pulleys, for directing the tendons; without it, they would all, on action, start out like bow-strings, producing deformity and weakness. The human hand is so admirable, from its numerous mechanical and sensitive capabilities, that an opinion at one time commonly prevailed, that man's superior reason depended on his possessing such an instructor and such a servant. Now, although reason, with hoofs instead of fingers, could never have raised man much above the brutes, and probably could have not secured the continued existence of the species, still the hand is nothing more than a fit instrument of the god-like mind that directs it.

The PELVIS, or strong irregular ridge of bone, on the upper edge of which the spine rests, and from the sides of which the legs spring forms the centre of the skeleton. A broad bone was wanted here to connect the central column of the spine with the lateral column of the legs; and a circle was the lightest and strongest. If we attempt still further to conceive how the circle could be modified to fit it for the spine to rest on, for the thighs to roll in, for the muscles to hold by, both above and below, for the person to sit on, we shall find, on inspection, that all