http://www.geology.19thcenturyscience.org/books/Bridgewater-Treatises/index.html

must be endowed. We have already had occasion to notice a remarkable instance of the force and permanence of muscular contraction in those caterpillars which frequently remain for hours together in a fixed attitude, with their bodies extended from a twig, to which they cling by their hind feet alone.* Ants will carry loads which are forty or fifty times heavier than their own bodies; and the distances to which many species, such as the *Elater*, the *Locust*, the *Lepisma*, and above all the *Pulex*, are capable of leaping, compared with the size of the insects themselves, appear still more astonishing. Linnæus has computed that the *Melolontha*, or chafler, is, in proportion to its bulk, more than six times stronger than the horse: and has asserted that if the same proportional strength as is possessed by the *Lucanus*, or stag-beetle, had been given to the elephant, that animal would have been capable of tearing up by the roots the largest trees, and of hurling huge rocks against his assailants, like the giants of ancient mythology.

But while we must admit that all these facts indicate a remarkable degree of energy in the contractile power of the muscular fibres of insects, we should at the same time recollect that the diminutive size of the beings which display those powers is itself the source of a mechanical advantage not possessed by larger animals. The efficacy of all mechanical arrangements must ultimately depend on a due proportion between the moving and the resisting forces: hence mechanism of every kind must be adjusted with reference not merely to the relative, but to the absolute dimensions of the structures themselves. This will be evident when we consider that the forces which are called into action are resisted by the cohesion of the particles composing the solid parts of the machine; and this cohesion being not a variable, but a constant and definite force, must necessarily limit the dimensions of every mechanical structure, whether intended for stability or for action. An edifice raised beyond a certain magnitude, will not support itself, because the weight

* See Fig. 148*, p. 224.