trates between the particles of the wood, by forcing them to make way for it; for not a single atom of the wood remains in the space which the nail occupies.

Extension.—A body which occupies a certain space, must necessarily have extension; that is to say, *length*, *breadth*, and *depth*: these are called the dimensions of extension, and they vary extremely, in different bodies. The length, breadth, and depth of a box, or of a thimble, are very different from those of a walking-stick or of a hair.

Height and depth are the same dimensions; if you measure a body, or a space, from the top to the bottom, it is called the depth, if from the bottom upwards, it is called height. Breadth and width are also the same dimensions.

The limits of extension constitute *figure* or shape; a body cannot be without form, either symmetrical or irregular.

Divisibility is a susceptibility of being divided into an indefinite number of parts. Take any small quantity of matter, a grain of sand, for instance, and cut it into two parts; these two parts might be again divided, had we instruments sufficiently fine for the purpose; and if, by pounding, grinding, or any other method, we carry this division to the greatest possible extent, yet not one of the particles will be destroyed, and the body will continue to exist, though in this altered state. A single pound of wool may be spun so fine as to extend to nearly a hundred miles in length.

The melting of a solid body in a liquid, also affords a very striking example of the extreme divisibility of matter; when you sweeten a cup of tea, for instance, with what minuteness the sugar must be divided to be diffused throughout the whole of the liquid. Odoriferous bodies afford an example of the same thing. The odour or smell of a body is part of the body itself, and is produced by very minute particles or exhalations, which escape from odoriferous bodies, and come in actual contact with the nose.

When a body is burnt to ashes, part of it *appears* to be destroyed; the residue of ashes, for instance, is very small compared to the coals which have been consumed. In this case, that part of the coals, which one would suppose to be destroyed, goes off in the form of smoke, which, when diffused in the air, becomes invisible. But we must not imagine that what we no longer see no longer exists. The particles of smoke continue still to be particles of matter, as much so as when more closely united in the form of coals. No particle of matter is ever destroyed; this is a fact which must constantly be remembered. Everything in nature decays and corrupts in the lapse of time. We die, and our bodies moulder to dust; but not a single atom of them is lost.

It should be observed, that when a body is divided, its surface or exterior part is augmented. If an apple be cut in two, in addition to the round surface, there will be two flat surfaces; divide the halves of the apple into quarters, and two more surfaces will be produced.

Though divisibility is very often included among the essential properties of matter, chemistry teaches us that the ultimate elements of bodies are incapable of further division; yet they are material substances.

Inertia expresses the resistance which inactive matter makes to a change of state. Bodies appear to be not only incapable of changing their actual state, whether it be of motion or rest; but to be endowed with a *power of resisting* such a change. It requires force to put a body which is at rest in motion; an exertion of strength is also requisite to stop a body which is already in motion. The resistance of a body to a change of state is, in either case, called its inertia. In playing at cricket, for instance, considerable strength is required to give a rapid motion to the ball; and in catching it we feel the resistance it makes to being stopped. Inert matter is as incapable of stopping of itself, as it is of putting itself in motion. When the ball ceases to move, therefore, it must be stopped by some other cause or power, which you will understand better after we have treated of the next and last general property of bodies.

Attraction is the general name under which we may include all the properties by which atoms of matter act on each other, so as to make them approach or continue near to one another. Bodies consist of infinitely small particles of matter, each of which possesses the power of attracting or drawing towards it, and uniting with any other particle sufficiently near to be within the influence of its attraction. This power cannot be recognized in minute particles, except when they are in contact, or at least appear to be so: it then makes them stick or adhere together, and is hence called the *attraction of cohesion.* Without this power solid bodies would fall to pieces, or rather crumble to atoms.

The attraction of cohesion exists also in liquids; it is this power which holds a drop of water suspended at the end of the finger, and keeps the minute watery particles, of which it is composed, united. But as this power *is stronger in proportion as the particles of bodies are* more closely united, the cohesive attractions of solid bodies is much greater than that of fluids. It is owing to the different degrees of attraction of different substances, that they are hard or soft; and that liquids are thick and thin. The term *density* denotes the degree of closeness and compactness of the particles of a body; the stronger the cohesive attraction, the greater is the density of the body, whether it be solid or liquid. In philosophical language, however, density is said to be that property of bodies, by which they contain a certain quantity of matter, under a certain bulk or magnitude. *Rarity* implies a diminution of density, thus we should say, that mercury or quicksilver was very dense fluid; ether, a very rare one. We judge of the density of a body, by the weight of it; thus we say, that metals are dense bodies, wood, comparatively a rare one.

Capillary attraction is an interesting variety of the attraction of cohesion. In tubes of small bore, liquids rise a certain height within them, from the cohesive attraction between the particles of the liquid and the interior surface of the tube. The smaller the bore, the higher will the liquid rise. All porous substances, such *as sponge, bread, linen, &c. may be considered* as collections of capillary tubes. If you dip one end of a lump of sugar into water, the water will rise in it, and wet it considerably above the surface of that into which you dip it. Capillary attraction probably contributes to the rise and circulation of the sap in the bark and wood of vegetables.

Attraction of gravitation differs from that of cohesion, inasmuch as the latter influences the *particles* of bodies at *imperceptible* distances, whereas the former acts upon *masses*, and at *any* distance, however great. Let us take for example, a very large body, and observe whether it does not attract other bodies. What is it that occasions the fall of a book when it is no longer supported? You will say that bodies have a natural tendency to fall. That is true; but that tendency is produced by the attraction of the earth. The earth being much larger than any body on its surface, draws to it every other, which is not supported.

Attraction being mutual between two bodies, when a stone falls to the earth, the earth should rise part of the way to meet it. But when, on the other hand, you consider that attraction is in proportion to the mass of *the attracted and attracting bodies, you will no longer* expect to see the earth rising to meet the stone. There are, however, some instances, in which the attraction of a large body has sensibly counteracted that of the earth. If a man, standing on the edge of a perpendicular side of a mountain, hold a plumb line in his hand, the weight