

FLUIDITY OF THE ATMOSPHERE.

Air is possessed of all the physical characters of fluids, and differs in no respect from them, either in its motion, or the pressure it exerts upon bodies. Fluids press in all directions, and so does atmospheric air, upward as well as downward, and it is capable of supporting light bodies, as well as liquids. We shall best illustrate the fluidity of atmospheric air by an allusion to the theory of floating and sinking bodies.

There are many substances which, under particular circumstances, do not apparently obey the attraction of gravitation, but act in a manner contrary to that which the laws of gravity would lead us to expect. Wood and cork float upon water, and iron upon mercury; smoke rises into the air instead of falling to the ground; and the clouds float over our heads, without exhibiting any tendency to fall. The same phenomena are therefore observed in the atmosphere as on liquids, and they are sufficient to prove it a fluid.

A body immersed in a fluid displaces a certain amount of that fluid. If we plunge a cube of metal in a vessel of water, the level of the water will be raised, and the difference between the two levels will give the amount of fluid displaced. If a cube of marble of equal size, which is not so heavy as the metal, be plunged in the same vessel, the fluid will rise to the same height as in the former instance. From this simple experiment we learn that when a body is dropped into water and sinks, it displaces a certain amount of water equal to its bulk, and that entirely independent of its weight.

But a body immersed in a fluid loses part of its weight equal to the weight of the fluid displaced. It is well known, that the weight of a bucket in a well is much less when in the water than when in the air. And it is so, because it loses a much greater part of its weight in water than in air; for though they are both fluids, yet the weight of an equal magnitude of the former is much greater than that of the latter. For the same reason, men in a diving-bell may lift with ease bodies at the bottom of rivers, which on the surface of the earth they could scarcely move. A pleasing anecdote is connected with this subject. Hiero, king of Syracuse, applied to Archimedes to know whether his crown was really composed of pure gold, or whether the workman to whom he had delivered a certain weight of that metal had debased it