so constructed that, when placed together, they fit, and are air-tight. These are furnished with handles, one of which may be unscrewed and the cup attached to the air-pump. This being done, let the two cups be placed together, and the air contained by them be abstracted. If the stop-cock be then closed, and the apparatus removed from the pump, the handle may be replaced, and two strong persons will scarcely be able to separate the hemispheres. This experiment, invented by Otto Guericke, demonstrates the existence of atmospheric pressure in every direction; for as soon as air is admitted into the interior, the external pressure is neutralized, and the hemispheres may be separated by a child.

The ancients were quite ignorant of the facts to which we have just alluded, and attributed all the phenomena now known to be the results of atmospheric pressure, to nature's abhorrence of a vacuum, or empty space. This dogma was universally received as the reason why water rose in a pump, till it was accidentally discovered, in the early part of the seventeenth century, that water could not be raised in a pump, when the sucker, falsely so called, was more than thirty-two feet from the surface of the water. Unable to look beyond the dogma they had received from the ancient masters, the philosophers of the day decided, after a consideration of this fact, that nature did not abhor a vacuum to a height greater than thirty-two feet. Torricelli, however, was not satisfied with the explanation, and a single experiment assured him that the air had weight, and that water could not rise to a greater height than thirty-two feet, because it then exactly balanced a column of atmospheric air with a base of the same dimensions. As soon as he had formed this opinion, he conceived the happy idea of testing its truth by using mercury instead of water; and the practical results of the experiment have been as important as the theoretical. Mercury being about thirteen and a half times heavier than water, a column of about thirty inches long ought to counterpoise a column of atmospheric air, if water be really sustained at a height of thirty-two feet above its level by atmospheric pressure. Torricelli made the experiment, and the result proved the truth of the supposition.

This discovery soon excited the attention of all the philosophers in Europe, and a variety of opinions were formed, and unhesitatingly expressed, by those who preferred preju-