

# ATMOLOGY.

---

## CHAPTER III.

### THE RELATION OF VAPOR AND AIR.

---

#### *Sect. I.—The Boylean Law of the Air's Elasticity.*

IN the Sixth Book (Chap. iv. Sect. 1.) we have already seen how the conception on the laws of fluid equilibrium was, by Pascal and others, extended to air, as well as water. But though air presses and is pressed as water presses and is pressed, pressure produces upon air an effect which it does not, in any obvious degree, produce upon water. Air which is pressed is also *compressed*, or made to occupy a smaller space; and is consequently also made more dense, or *condensed*; and on the other hand, when the pressure upon a portion of air is diminished, the air expands or is rarefied. These broad facts are evident. They are expressed in a general way by saying that air is an *elastic* fluid, yielding in a certain degree to pressure, and recovering its previous dimensions when the pressure is removed.

But when men had reached this point, the questions obviously offered themselves, in what degree and according to what law air yields to pressure; when it is compressed, what relation does the density bear to the pressure? The use which had been made of tubes containing columns of mercury, by which the pressure of portions of air was varied and measured, suggested obvious modes of devising experiments by which this question might be answered. Such experiments accordingly were made by Boyle about 1650; and the result at which he arrived was, that when air is thus compressed, the density is *as* the pressure. Thus if the pressure of the atmosphere in its common state be equivalent to 30 inches of mercury, as shown by the barometer; if air included in a tube be pressed by 30 additional inches of