

ity of the air, which acts on combustion, on the oxydation of metals, and on respiration, constituted a most powerful impediment.

The inflammable or light-extinguishing gases occurring in caverns and mines (the *spiritus letales* of Pliny), and the escape of these gases in the form of vesicles in morasses and mineral springs, had already attracted the attention of Basilius Valentinus, a Benedictine monk of Erfurt (probably at the close of the fifteenth century), and of Libavius, an admirer of Paracelsus, in 1612. Men drew comparisons between that which was accidentally observed in alchemical laboratories, and that which was found prepared in the great laboratories of nature, especially in the interior of the Earth. The working of mines in strata, rich in ores (especially those containing iron pyrites, which become heated by oxydation and contact-electricity), led to conjectures of the chemical relation existing between metals, acids, and the external air having access to them. Even Paracelsus, whose visionary fancies belong to the period of the first discovery of America, had remarked the evolution of gas when iron was dissolved in sulphuric acid. Van Helmont, who first employed the term *gas*, distinguished it from atmospheric air, and also, by its non-condensibility, from vapors. According to him, the clouds are vapors, and become converted into gas, when the sky is very clear, "by means of cold and the influence of the stars." Gas can only become water after it has been again converted into vapor. Such were the views entertained in the first half of the seventeenth century regarding the meteorological process. Van Helmont was not acquainted with the simple method of taking up and separating his *gas sylvestre* (the name under which he comprehended all unflammable gases which do not maintain combustion and respiration, and differ from pure atmospheric air); but he caused a light to burn in a vessel under water, and observed that, when the flame was extinguished, the water entered, and the *volume of air* diminished. Van Helmont likewise endeavored to show by determinations of weight (which we find already given by Cardanus) that all the solid portions of plants are formed from water.

The alchemistic opinions of the Middle Ages regarding the composition of metals, and the loss of their brilliancy by combustion in the open air (incineration, calcination), led to a desire of investigating the conditions by which this process was attended, and the changes experienced by the calcined metals, and by the air in contact with them. Cardanus, as early as