

chemistry, a science for which this race created a new era. It must be admitted that alchemistic and new Platonic fancies were as much blended with chemistry as astrology with astronomy. The requirements of pharmacy, and the equally urgent demands of the technical arts, led to discoveries which were promoted, sometimes designedly, and sometimes by a happy accident depending upon alchemistical investigation into the study of metallurgy. The labors of Geber, or rather Djaber (Abu-Mussah-Dschafar-al-Kufi), and the much more recent ones of Razes (Abu-Bekr Arrasi), have been attended by the most important results. This period is characterized by the preparation of sulphuric and nitric acids,\* aqua regia, preparations of mercury, and of the oxyds of other metals, and by the knowledge of the alcoholic process of fermentation.† The first scientific foundation, and the subsequent advances of chemistry, are so much the more important, as they imparted a knowledge of the heterogeneous character of matter, and the nature of forces not made manifest by motion, but which now led to the recognition of the importance of *composition*, no less than to that of the perfectibility of form assumed in accordance with the doctrines of Pythagoras and Plato. Differences of form and of composition are, however, the elements of all our knowledge of matter—the abstractions which we believe capable, by means of measurement and analysis, of enabling us to comprehend the whole universe.

It is difficult, at present, to decide what the Arabian chemists may have acquired through their acquaintance with Indian literature (the writings on the *Rasayana*);‡ from the

\* The preparation of nitric acid and aqua regia by Djaber (more properly Abu-Mussah-Dschafar) dates back more than five hundred years before Albertus Magnus and Raymond Lully, and almost seven hundred years before the Erfurt monk, Basilius Valentinus. The discovery of these decomposing (dissolving) acids, which constitutes an epoch in the history of science, was, however, long ascribed to the three last-named experimentalists.

† For the rules given by Razes for the vinous fermentation of amyllum and sugar, and for the distillation of alcohol, see Höfer, *Hist. de la Chimie*, t. i., p. 325. Although Alexander of Aphrodisias (*Joannis Philoponi Grammatici*, in *libr. de Generatione et Interitu Comm.*, Venet., 1527, p. 97), properly speaking, only gives a circumstantial description of distillation from sea water, he also draws attention to the fact that wine may likewise be distilled. This statement is the more remarkable, because Aristotle (*Meteorol.*, ii., 3, p. 358, Bekker) had advanced the erroneous opinion that in natural evaporation fresh water only rose from wine, as from the salt water of the sea.

‡ The chemistry of the Indians, embracing alchemistic arts, is called *rasayana* (*rasa*, juice or fluid, also quicksilver; and *ayana*, course or