in all directions with the earth's surface, at which they appear as thermal springs. Kircher follows Aristotle's view of the origin of springs, lakes, and rivers. Books VI., VII., and VIII. treat of the earth's composition, but offer no description of the different rocks such as one might expect; they describe in diffuse style the salts that occur in the earth, and the constitution and uses of sand, clay, cultivated soil, etc. The consolidation of loose material into rock is ascribed to a petrifying force (*vis lapidifica*) inherent in the earth, while a form-giving force (*Spiritus architectonicus* or *plasticus*) is said to produce all kinds of shapes and figures, for example, crystals, precious stones, stalactites, and fossils.

Book X. is devoted to mines and minerals. Kircher relates that through the medium of Jesuit priests, he put several questions to the miners at Neusohl in Hungary. Some of these referred to the conditions of temperature in the mines—whether the heat increased as greater depths were reached below the surface, and if there were any signs of subterranean fire. The answer from Schemnitz was that in a well-ventilated mine the heat was scarcely perceptible, but that with poor ventilation the mines were always warm. Johann Schapelmann, an official of the mines in Herrngrund, reported as follows:—"In dry mines the temperature steadily increases in proportion to the depth below the surface; where water lies, the heat is less; it is greatest in the parts of the mines where marcasite occurs." This is the first observation of the steady increase of temperature with added depth.

In spite of its many weaknesses and inaccuracies, Kircher's *Mundus subterraneus* must always command a high place in the literature as the first effort to describe the earth from a physical standpoint. It was followed in 1672 by the publication of the *Geographia generalis* of Varenius, a work far exceeding that of Kircher in critical insight and methodical treatment. It is valued as the fundamental work in the domain of geophysics.

Nikolaus Steno[1] was one of the most enlightened geologists of

[1] Nikolaus Steno was born 1638 at Copenhagen, studied medicine and anatomy at Copenhagen and Paris, travelled in Holland, France, and Germany, and settled in Padua. He was called to Florence to be house-physician to the Grand Duke Ferdinand II., and was afterwards the tutor of the sons of Cosmo. Steno then accepted an invitation sent by Christian V. of Denmark, to return to Copenhagen as Professor of Anatomy; but