

The rise, during the fifteenth century, of Geology, which includes the oceanographical RISE OF GEOLOGICAL KNOWLEDGE changes of past ages, gave an impetus to many questions relative to the distribution of land and water in past times, and led to an investigation of many phenomena in existing oceans. Leonardo da Vinci, in the fifteenth century, wrote that the sea changes the VINCI equilibrium of the earth, that the shells accumulated in various layers have necessarily lived on a spot previously occupied by the sea; that the great rivers carry into the ocean the waste of the land, and the deposits thus formed have been successively covered by others of varying thickness, and finally that the bottom of the sea has become the tops of mountains.

Ever since that period researches have constantly been made by naturalists to discover the relationship between the marine animals of our own time and those discovered in a fossil state. The name of Steno, a Dane, is associated with the evolution of general ideas STENO as to the formation of the earth. In his famous work: *De solido intra solidum naturaliter contento dissertationis prodromus* (1669), he endeavours to show that the carapaces of Crustacea are formed of matter secreted by the animal's body; he establishes the connection existing between fossils and the sedimentary layers containing them, and the true origin of both. He was the first to distinguish the layers formed in the sea from those deposited in fresh water, and to notice the character of the shells in both instances. He concludes, from his observations on the nature of these deposits, that the layers now found perpendicular or inclined were horizontal at the time of their formation. These changes in the position of land strata, considered as the primary cause of the earth's inequalities, constitute the fundamental idea of Steno, and are now universally adopted.

Geology received another great stimulus in Italy towards the middle of the eighteenth century, through the theoretical ideas of Ant. Lazzaro Moro, and still more through the MORO observations of Arduino. In 1740 Moro developed a system in which he attributes to frequently recurring submarine explosions the formation of mountains, plains, and islands. The apparition of the small islands Mikra Kaŭmena and Nea Kaŭmena in the volcanic group of Santorin, and the phenomena which accompanied the formation of Monte Nuovo, seem to have given rise to this theory. According to Moro, the globe was primitively covered with water; on the third day of creation the crust which formed the bottom of the sea was raised, the mountains resulting from this upheaval being the primitive rocks devoid of fossils. At a later period lava and other substances arose from the interior of the earth, and accumulated on the bottom of the sea, being upheaved in their turn through the same agency. With the rocks of this second upheaval diverse substances, such as salt, sulphur, and bitumen, were associated, and as a natural consequence the water became salt; animals were developed in the sea; the earth became peopled about the same time, and, the eruptions continuing, an alternation of sedimentary and eruptive deposits was produced.