

Accounts of the Indian and Arabian trading places on the eastern shores of Africa, and of the configuration of the southern extremity of the continent, may, indeed, early in the Middle Ages, have been transmitted to Venice through Egypt, Abyssinia, and Arabia. The triangular form of Africa is indeed distinctly delineated as early as 1306, on the planisphere of Sanuto, in the Genoese *Portulano della Mediceo-Laurenziana* of 1351, discovered by Count Baldelli, and on the map of the world by Fra Mauro. I have briefly alluded to these facts, since the history of the contemplation of the universe should indicate the epochs at which the principal details of the configuration of great continental masses were first recognized.

While the gradually developed knowledge of relations in space incited men to think of shorter sea routes, the means for perfecting practical navigation were likewise gradually increased by the application of mathematics and astronomy, the invention of new instruments of measurement, and by a more skillful employment of magnetic forces. It is extremely probable that Europe owes the knowledge of the northern and southern directing powers of the magnetic needle—the use of the mariner's compass—to the Arabs, and that these people were in turn indebted for it to the Chinese. In a Chinese work (the historical Szuki of Szumathsian, a writer who lived in the earlier half of the second century before our era) we meet with an allusion to the "magnetic cars," which the Emperor Tsing-wang, of the ancient dynasty of the Tscheu, had given more than nine hundred years earlier to the ambassadors from Tunkin and Cochin China, that they might not miss their way on their return home. In the third century of our era, under the dynasty of Han, there is a description given in Hiutschin's dictionary Schuewen of the manner in which the property of pointing with one end toward the south may be imparted to an iron rod by a series of methodical blows. Owing to the ordinary southern direction of navigation at that period, the south pointing of the magnet is always the one especially mentioned. A century later, under the dynasty of Tsin, Chinese ships employed the magnet to guide their course safely across the open sea; and it was by means of these vessels that the knowledge of the compass was carried to India, and from thence to the eastern coasts of Africa. The Arabic designations *Zohron* and *Aphron* (south and north),\* which Vincen-

\* *Avron*, or *avr* (*aur*), is a more rarely employed term for north, used instead of the ordinary "*schemâl*;" the Arabic *Zohron*, or *Zohr*, from