dipping-needle invented in England, in 1576, by Robert Norman, than Gilbert boasted that, by means of this instrument, he could determine a ship's place in dark, starless nights (*aëre caligoso*).* Immediately after my return to Europe, I showed from my own observations in the Pacific that, under certain local relations, as, for instance, during the season of the constant mist (*garua*) on the coasts of Peru, the latitude might be determined from the magnetic inclination with sufficient accuracy for the purposes of navigation. I have purposely dwelt at length on these individual points, in order to show, in our consideration of an important cosmical event, that, with the exception of measuring the intensity of magnetic force, and the horary variations of the declination, all those questions were broached in the sixteenth century, with which the physicists of the present day are still occupied. On the remarkable chart of America appended to the edition of the geography of Ptolemy, published at Rome in 1508, we find the magnetic pole marked as an insular mountain north of Gruentlant (Greenland), which is represented as a part of Asia. Martin Cortez in the *Breve Compendio de la Sphera* (1545), and Livio Sanuto in the *Geographia di Tolomeo* (1588), place it further to the south. The latter writer entertained a prejudice, which has unfortunately survived to the present time, that "if we were so fortunate as to reach the magnetic pole (*il calamitico*), we should there experience some miraculous effects (*alcun miraculoso stupendo effetto*").

Attention was directed at the close of the fifteenth and the beginning of the sixteenth century, in reference to the distribution of heat and meteorology, to the decrease of heat with the increase of western longitude† (the curvature of the isothermal lines); to the law of rotation of the winds, generalized by Lord

magnetic lines without variation led Halley, by the contests between Henry Bond and Beckborrow, to the theory of four magnetic poles.

* Gilbert, *De Magnete Physiologia nova*, lib. v., cap. 8, p. 200.

† In the temperate and cold zones, this inflection of the isothermal lines is general between the west coast of Europe and the east coast of North America, but within the tropical zone the isothermal lines run almost parallel to the equator; and in the hasty conclusions into which Columbus was led, no account was taken of the difference between sea and land climates, or between east and west coasts, or of the influence of latitudes and winds, as, for instance, those blowing over Africa. (Compare the remarkable considerations on climates which are brought together in the *Vida del Almirante*, cap. 66.) The early conjecture of Columbus regarding the curvature of the isothermal lines in the Atlantic Ocean was well founded, if limited to the extra-tropical (temperate and cold) zones.