

compression at the poles and the equatorial diameter; in order, however, to obtain a perfect representation of its form it is necessary to have measurements in two directions, perpendicular to one another.

Eleven measurements of degrees (or determinations of the curvature of the Earth's surface in different parts), of which nine only belong to the present century, have made us acquainted with the size of our globe, which Pliny named "a point in the immeasurable universe."* If these measurements do not always accord in the curvatures of different meridians under the same degree of latitude, this very circumstance speaks in favor of the exactness of the instruments and the methods employed, and of the accuracy and the fidelity to nature of these partial results. The conclusion to be drawn from the increase of forces of attraction (in the direction from the equator to the poles) with respect to the figure of a planet is dependent on the distribution of density in its interior. Newton, from theoretical principles, and perhaps likewise prompted by Cassini's discovery, previously to 1666, of the compression of Jupiter,† determined, in his immortal work, *Philosophiæ Naturalis Principia*, that the compression of the Earth, as a homogeneous mass, was $\frac{1}{230}$ th. Actual meas-

* Plin., ii., 68. Seneca, *Nat. Quæst., Præf.*, c. ii. "El mundo es poco" (the Earth is small and narrow), writes Columbus from Jamaica to Queen Isabella on the 7th of July, 1503; not because he entertained the philosophic views of the aforesaid Romans, but because it appeared advantageous to him to maintain that the journey from Spain was not long, if, as he observes, "we seek the east from the west." Compare my *Examen Crit. de l'Hist. de la Géogr. du 15me Siècle*, t. i., p. 83, and t. ii., p. 327, where I have shown that the opinion maintained by Delisle, Fréret, and Gosselin, that the excessive differences in the statements regarding the Earth's circumference, found in the writings of the Greeks, are only apparent, and dependent on different values being attached to the stadia, was put forward as early as 1495 by Jaime Ferrer, in a proposition regarding the determination of the line of demarcation of the papal dominions.

† Brewster, *Life of Sir Isaac Newton*, 1831, p. 162. "The discovery of the spheroidal form of Jupiter by Cassini had probably directed the attention of Newton to the determination of its cause, and, consequently, to the investigation of the true figure of the Earth." Although Cassini did not announce the amount of the compression of Jupiter ($\frac{1}{15}$ th) till 1691 (*Anciens Mémoires de l'Acad. des Sciences*, t. ii., p. 108), yet we know from Lalande (*Astron.*, 3me éd., t. iii., p. 335) that Moraldi possessed some printed sheets of a Latin work, "On the Spots of the Planets," commenced by Cassini, from which it was obvious that he was aware of the compression of Jupiter before the year 1666, and therefore at least twenty-one years before the publication of Newton's *Principia*.