

1600, under the title of "Physiology of Magnets and of the Earth as a great Magnet (*de magno magnete tellure*). "The property," says Gilbert, "of attracting light substances, when rubbed, be their nature what it may, is not peculiar to amber, which is a condensed earthy juice cast up by the waves of the sea, and in which flying insects, ants, and worms lie entombed as in eternal sepulchers (*æternis sepulchris*). The force of attraction belongs to a whole class of very different substances, as glass, sulphur, sealing wax, and all resinous substances, rock crystal, and all precious stones, alum, and rock salt." Gilbert measured the strength of the excited electricity by means of a small needle, not made of iron, which moved freely on a pivot (*versorium electricum*), and perfectly similar to the apparatus used by Hæuy and Brewster in testing the electricity excited in minerals by heat and friction. "Friction," says Gilbert further, "is productive of a stronger effect in dry than in humid air; and rubbing with silk cloths is most advantageous. The globe is held together as by an electric force (?) *Globus telluris per se electricæ congregatur et cohæret*; for the tendency of the electric action is to produce the cohesive accumulation of matter (*motus electricus est motus coacervationis materiæ*)." In these obscure axioms we trace the recognition of *terrestrial electricity*—the expression of a force—which, like magnetism, appertains as such to matter. As yet we meet with no allusions to repulsion, or the difference between insulators and conductors.

Otto von Guericke, the ingenious inventor of the air pump, was the first who observed any thing more than mere phenomena of attraction. In his experiments with a rubbed piece of sulphur, he recognized the phenomena of repulsion, which

*nostris motionibus corpora allicere videntur, Electrica et Magnetica; Electrica naturalibus ab humore effluviis; Magnetica formalibus efficientiis seu potius primariis vigoribus, incitationes faciunt. Facile est hominibus ingenio acutis, absque experimentis et usu rerum labi, et errare. Substantiæ proprietates aut familiaritates, sunt generales nimis, nec tamen veræ designatæ causæ, atque, ut ita dicam, verba quædam sonant, re ipsâ nihil in specie ostendunt. Neque ista succini credita attractio, a singulari aliquâ proprietate substantiæ, aut familiaritate assurgit; cum in pluribus aliis corporibus eundem effectum, majori industria invenimus, et omnia etiam corpora cujusmodicunque proprietatis, ab omnibus illiis alliciuntur.*" (*De Magnete*, p. 50, 51, 60, and 65.) Gilbert's principal labors appear to fall between the years from 1590 to 1600. Whewell justly assigns him an important place among those whom he terms "practical reformers of the physical sciences." Gilbert was surgeon to Queen Elizabeth and James I., and died in 1603. After his death there appeared a second work, entitled "*De Mundo nostro Sublunari Philosophia Nova*."