Central peaks were formed by the recoil. The rays emanating from some of the more prominent and fresher-appearing craters were splash features, consisting of material thrown out from the impact that formed them.

Gilbert's most elegant piece of work was his identification of what he called "sculpture"-a pattern of parallel grooves or furrows and smoothly contoured oval hills whose trend lines all converged on a point located near the middle of Mare Imbrium impact basin.

Gilbert's seminal 1892 paper "On the Face of the Moon" seems startlingly modern. Indeed, he deserves to be called the Champollion of the Moon-after Jean François Champollion, the French Egyptologist who completed the decryption of the famous Rosseta Stone. With the insight of genius, he had presented a unified view of the Moon's incredibly diverse and hitherto largely unintelligible detail. But Gilbert was too far ahead of his time; for decades his work was virtually ignored until it was validated and extended by ▶ **Ralph Baldwin** and Eugene Merle Shoemaker (1928–1997).

It must be noted that Gilbert's work on lunar cratering theory constituted an extremely small component of his scientific oeuvre. Gilbert was a powerful figure in late nineteenth-century American science, so important in fact that the National Academy of Sciences [NAS] chose to identify him as the most important American scientist in the first century of that organization's existence. His NAS biographical memoir is, accordingly, the longest such memoir ever published.

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Gilbert, William

Emmanuel Dormy
CNRS, Ecole Normale Supérieure, Paris, France

Alternate Name

▶ Gilberd, William

Born **Colchester, Essex, England, 1544**
Died **probably London, England, 1603**

William Gilbert is best known today for his study of magnets and magnetism, in which he discusses (among other things) the Earth's magnetic field.

Gilbert was the eldest son of Jerome [Hieron] Gilberd, recorder of Colchester. William entered Saint Johns College, Cambridge, and obtained a BA (1561), an MA (1564), and finally an MD (1569). He became a Junior Fellow of Saint Johns in 1561, and a Senior Fellow in 1569. Some authors suggest that he also studied in Oxford, but this is not established. On leaving Cambridge, Gilbert probably undertook a long journey on the continent (likely in Italy). He then settled in London in 1573 to practice medicine. He was elected that same year a fellow of the Royal College of Physicians and was in turn Censor (1581/1582, 1584–1587, and 1589/1590), Treasurer (1587–1591, 1597–1599),

Elector (1596/1597), Consilarius (1597–1599), and President (1600) of the College. Gilbert participated in the compilation of the College of Physicians' *Pharmacopoeia*. His medical career was very successful, and he was one of the prominent physicians in London. Near the end of his life, he became one of the personal physicians to Queen Elizabeth I (1600–1603). After the death of Queen Elizabeth (24 March 1603), he continued as royal physician to King James I and kept this position until his own death by plague 8 months later.

Gilbert's achievement as a doctor would have been enough to secure his fame, but he is best remembered today for his book *De Magnete* (written in Latin). In this book, published in London in 1600, he presents investigations on magnets. *De Magnete* provides a review of what was known about the nature of magnetism, as well as knowledge added by Gilbert through his own experiments. Gilbert is sometimes quoted as the father of experimental research and *De Magnete* described him as the first exemplar of modern science. Gilbert devoted long sections of his book to a critical examination of earlier ideas about the magnet and the compass. The distinction between earlier discoveries and his own input, however, is not always obvious in the text. Gilbert refuted many folk tales, including the medicinal properties of magnets to cure all sorts of headaches, the effect of garlic to weaken the magnetic properties of the compass needle, or even the possibility of a perpetual motion machine. Gilbert also described as "vain and silly" the idea of "magnetic mountains or a certain magnetic rock or a distant phantom pole of the world." Relying on many experiments, Gilbert drew analogies between the magnetic field of the Earth and that of a *terrella* (Gilbert's word for a spherical lodestone). He studied the magnetic dip (*declinatio* in Gilbert's word) near the *terrella*, and conjectured that "the Earth globe itself is a great magnet" (*Magnus magnes ipse est globus terrestris*); however, rigorous demonstration of the internal origin of the geomagnetic field was only given by ▶ **Carl Gauss** in 1838. Gilbert also proposed to determine longitude and latitude using magnetic dip and declination (*Variatio*).

De Magnete is divided into six "books." The progression is remarkable. In book III, Gilbert neglected declination to simplify his task. Then he started book IV by reintroducing this notion: "So far we have been treating direction as if there were no such thing as variation." This sort of simplification has now become a rather classical scientific approach, but it was not at that time. The final book (VI) concerned stellar and terrestrial motions. In this book, Gilbert departed somewhat from the scientific rigor that characterizes his work. Guided by the fact that magnetic North and astronomical North are so close, Gilbert suggested that the Earth's rotation was due to its magnetic nature. Gilbert described as "philosophers of the vulgar sort (. . .), with an absurdity unspeakable" those that believed the Earth to be stationary. He expected the dipole nature of the Earth's magnetic field to add support to the Copernican theory. Because of this book, Gilbert is sometimes considered as one of the earliest Copernicans; his ideas influenced ▶ **Johannes Kepler** also.

A second book, *De mundo nostro sublunari philosophia nova*, was published (and coauthored) posthumously in 1651, by one of Gilbert's brothers. This lesser-known text includes a map (or rather a sketch) of the Moon drawn by Gilbert (before the telescope).

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