

On the Magnetics by William Gilbert

Preface to the candid Reader, studious of the Magnetick Philosophy. (not in original TOC)

To the most Eminent and Learned Man Dr. William Gilbert (not in original TOC)

Interpretation of certain words. (not in original TOC)

Book I.

- CHAP. 1. Ancient and modern writings on the Loadstone, with certain matters of mention only, various opinions, & vanities.
- Chap. 2. Magnet Stone, of what kind it is, and its discovery.
- Chap. 3. The loadstone has parts distinct in their natural power, & poles conspicuous for their property.
- Chap. 4. Which pole of the stone is the Boreal: and how it is distinguished from the austral.
- Chap. 5. Loadstone seems to attract loadstone when in natural position: but repels it when in a contrary one, and brings it back to order.
- Chap. 6. Loadstone attracts the ore of iron, as well as iron proper, smelted & wrought.
- Chap. 7. What iron is, and of what substance, and its uses.
- Chap. 8. In what countries and districts iron originates.
- Chap. 9. Iron ore attracts iron ore.
- Chap. 10. Iron ore has poles, and acquires them, and settles itself toward the poles of the universe.
- Chap. 11. Wrought iron, not excited by a loadstone, draws iron.
- Chap. 12. A long piece of Iron (even though not excited by a loadstone) settles itself toward North & South.
- Chap. 13. Wrought iron has in itself certain parts Boreal & Austral: a magnetick vigour, verticity, and determinate vertices or poles.
- Chap. 14. Concerning other powers of loadstone, & its medicinal properties.
- Chap. 15. The medicinal virtue of iron.
- Chap. 16. That loadstone & iron ore are the same, but iron an extract from both, as other metals are from their own ores; & that all magnetick virtues, though weaker, exist in the ore itself & in smelted iron.
- Chap. 17. That the globe of the earth is magnetick, & a magnet; & how in our hands the magnet stone has all the primary forces of the earth, while the earth by the same powers remains constant in a fixed direction in the universe.

Book 2.

- Chap. 1. On Magnetick Motions.
- Chap. 2. On the Magnetick Coition, and first on the attraction of Amber, or more truly, on the attaching of bodies to Amber.
- Chap. 3. Opinions of others on Magnetick Coition, which they call Attraction.
- Chap. 4. On Magnetick Force & Form, what it is; and on the cause of the Coition.
- Chap. 5. How the Power dwells in the Loadstone.
- Chap. 6. How magnetick pieces of Iron and smaller loadstones conform themselves to a terrella & to the earth itself, and by them are disposed.
- Chap. 7. On the Potency of the Magnetick Virtue, and on its nature capable of spreading out into an orbe.
- Chap. 8. On the geography of the Earth, and of the Terrella.

- Chap. 9. On the Æquinoctial Circle of the Earth and of a Terrella.
- Chap. 10. Magnetick Meridians of the Earth.
- Chap. 11. Parallels.
- Chap. 12. The Magnetick Horizon.
- Chap. 13. On the Axis and Magnetick Poles.
- Chap. 14. Why at the Pole itself the Coition is stronger than in the other parts intermediate between the æquator and the pole; and on the proportion of forces of the coition in various parts of the earth and of the terrella.
- Chap. 15. The Magnetick Virtue which is conceived in Iron is more apparent in an iron rod than in a piece of Iron that is round, square, or of other figure.
- Chap. 16. Showing that Movements take place by the Magnetical Vigour though solid bodies lie between; and on the interposition of iron plates.
- Chap. 17. On the Iron Cap of a Loadstone, with which it is armed at the pole (for the sake of the virtue), and on the efficacy of the same.
- Chap. 18. An armed Loadstone does not indue an excited piece of Iron with greater vigour than an unarmed.
- Chap. 19. Union with an armed Loadstone is stronger; hence greater weights are raised; but the coition is not stronger, but generally weaker.
- Chap. 20. An armed Loadstone raises an armed Loadstone, which also attracts a third; which likewise happens, though the virtue in the first be somewhat small.
- Chap. 21. If Paper or any other Medium be interposed, an armed loadstone raises no more than an unarmed one.
- Chap. 22. That an armed Loadstone draws Iron no more than an unarmed one: and that an armed one is more strongly united to iron is shown by means of an armed loadstone and a polished Cylinder of iron.
- Chap. 23. The Magnetick Force causes motion toward unity, and binds firmly together bodies which are united.
- Chap. 24. A piece of Iron placed within the Orbe of a Loadstone hangs suspended in the air, if on account of some impediment it cannot approach it.
- Chap. 25. Exaltation of the power of the magnet.
- Chap. 26. Why there should appear to be a greater love between iron & loadstone, than between loadstone & loadstone, or between iron & iron, when close to the loadstone, within its orbe of virtue.
- Chap. 27. The Centre of the Magnetick Virtues in the earth is the centre of the earth; and in a terrella is the centre of the stone.
- Chap. 28. A Loadstone attracts magneticks not only to a fixed point or pole, but to every part of a terrella save the æquinoctial zone.
- Chap. 29. On Variety of Strength due to Quantity or Mass.
- Chap. 30. The Shape and Mass of the Iron are of most importance in cases of coition.
- Chap. 31. On long and round stones.
- Chap. 32. Certain Problems and Magnetick Experiments about the Coition, and Separation, and regular Motion of Bodies magnetical.
- Chap. 33. On the Varying Ratio of Strength, and of the Motion of coition, within the orbe of virtue.
- Chap. 34. Why a Loadstone should be stronger in its poles in a different ratio; as well in the Northern regions as in the Southern.
- Chap. 35. On a Perpetual Motion Machine, mentioned by authors, by means of the attraction of a loadstone.
- Chap. 36. How a more robust Loadstone may be recognized.
- Chap. 37. Use of a Loadstone as it affects iron.

- Chap. 38. On Cases of Attraction in other Bodies.
- Chap. 39. On Bodies which mutually repel one another.

Book 3.

- Chap. 1. On Direction.
- Chap. 2. The Directive or Versorial Virtue (which we call verticity): what it is, how it exists in the loadstone; and in what way it is acquired when innate.
- Chap. 3. How Iron acquires Verticity through a loadstone, and how that verticity is lost and changed.
- Chap. 4. Why Iron touched by a Loadstone acquires an opposite verticity, and why iron touched by the true Northern side of a stone turns to the North of the earth, by the true Southern side to the South; and does not turn to the South when rubbed by the Northern point of the stone, and when by the Southern to the North, as all who have written on the Loadstone have falsely supposed.
- Chap. 5. On the Touching of pieces of Iron of divers shapes.
- Chap. 6. What seems an Opposing Motion in Magneticks is a proper motion toward unity.
- Chap. 7. A determined Verticity and a disponent Faculty are what arrange magneticks, not a force, attracting them or pulling them together, nor merely a strongish coition or union.
- Chap. 8. Of Discords between pieces of Iron upon the same pole of a Loadstone, and how they can agree and stand joined together.
- Chap. 9. Figures illustrating direction and showing varieties of rotations.
- Chap. 10. On Mutation of Verticity and of Magnetick Properties, or on alteration in the power excited by a loadstone.
- Chap. 11. On the Rubbing of a piece of Iron on a Loadstone in places midway between the poles, and upon the æquinoctial of a terrella.
- Chap. 12. In what way Verticity exists in any Iron that has been smelted though not excited by a loadstone.
- Chap. 13. Why no other Body, excepting a magnetick, is imbued with verticity by being rubbed on a loadstone, and why no body is able to instil and excite that virtue, unless it be a magnetick.
- Chap. 14. The Placing of a Loadstone above or below a magnetick body suspended in æquilibrio changes neither the power nor the verticity of the magnetick body.
- Chap. 15. The Poles, Æquator, Centre in an entire Loadstone remain and continue steady; by diminution and separation of some part they vary and acquire other positions.
- Chap. 16. If the Southern Portion of a Stone be lessened, something is also taken away from the power of the Northern Portion.
- Chap. 17. On the Use and Excellence of Versoria: and how iron versoria used as pointers in sundials, and the fine needles of the mariners' compass, are to be rubbed, that they may acquire stronger verticity.

Book 4.

- Chap. 1. On Variation.
- Chap. 2. That the variation is caused by the inæquality of the projecting parts of the earth.
- Chap. 3. The variation in any one place is constant.
- Chap. 4. The arc of variation is not changed equally in proportion to the distance of places.
- Chap. 5. An island in Ocean does not change the variation, as neither do mines of loadstone.

- Chap. 6. The variation and direction arise from the disponent power of the earth, and from the natural magnetick tendency to rotation, not from attraction, or from coition, or from other occult cause.
- Chap. 7. Why the variation from that lateral cause is not greater than has hitherto been observed, having been rarely seen to reach two points of the mariners' compass, except near the pole.
- Chap. 8. On the construction of the common mariners' compass, and on the diversity of the compasses of different nations.
- Chap. 9. Whether the terrestrial longitude can be found from the variation.
- Chap. 10. Why in various places near the pole the variations are much more ample than in a lower latitude.
- Chap. 11. Cardan's error when he seeks the distance of the centre of the earth from the centre of the cosmos by the motion of the stone of Hercules; in his book 5, *On Proportions*.
- Chap. 12. On the finding of the amount of variation: how great is the arc of the Horizon from its arctick to its antarctick intersection of the meridian, to the point respective of the magnetick needle.
- Chap. 13. The observations of variation by seamen vary, for the most part, and are uncertain: partly from error and inexperience, and the imperfections of the instruments: and partly from the sea being seldom so calm that the shadows or lights can remain quite steady on the instruments.
- Chap. 14. On the variation under the æquinoctial line, and near it.
- Chap. 15. The variation of the magnetick needle in the great Æthiopick and American sea, beyond the æquator.
- Chap. 16. On the variation in Nova Zembla.
- Chap. 17. Variation in the Pacifick Ocean.
- Chap. 18. On the variation in the Mediterranean Sea.
- Chap. 19. The variation in the interior of large Continents.
- Chap. 20. Variation in the Eastern Ocean.
- Chap. 21. How the deviation of the versorium is augmented and diminished by reason of the distance of places.

Book 5.

- Chap. 1. On Declination.
- Chap. 2. Diagram of declinations of the magnetick needle, when excited, in the various positions of the sphere, and horizons of the earth, in which there is no variation of the declination.
- Chap. 3. An indicatory instrument, showing by the virtue of a stone the degrees of declination from the horizon of each several latitude.
- Chap. 4. Concerning the length of a versorium convenient for declination on a terrella.
- Chap. 5. That declination does not arise from the attraction of the loadstone, but from a disposing and rotating influence.
- Chap. 6. On the proportion of declination to latitude, and the cause of it.
- Chap. 7. Explanation of the diagram of the rotation of a magnetick needle.
- Chap. 8. Diagram of the rotation of a magnetick needle, indicating magnetical declination in all latitudes, and from the rotation and declination, the latitude itself.
- Chap. 9. Demonstration of direction, or of variation from the true direction, at the same time with declination, by means of only a single motion in water, due to the disposing and rotating virtue.

- Chap. 10. On the variation of the declination.
- Chap. 11. On the essential magnetick activity sphærically effused.
- Chap. 12. Magnetick force is animate, or imitates life; and in many things surpasses human life, while this is bound up in the organick body.

Book 6.

- Chap. 1. On the globe of the earth, the great magnet.
- Chap. 2. The Magnetick axis of the Earth persists invariable.
- Chap. 3. On the magnetick diurnal revolution of the Earth's globe, as a probable assertion against the time-honoured opinion of a Primum Mobile.
- Chap. 4. That the Earth moves circularly.
- Chap. 5. Arguments of those denying the Earth's motion, and their confutation.
- Chap. 6. On the cause of the definite time of an entire rotation of the Earth.
- Chap. 7. On the primary magnetick nature of the Earth, whereby its poles are parted from the poles of the Ecliptick.
- Chap. 8. On the Præcession of the Æquinoxes, from the magnetick motion of the poles of the Earth, in the Arctick & Antarctick circle of the Zodiack.
- Chap. 9. On the anomaly of the Præcession of the Æquinoxes, & of the obliquity of the Zodiack.