Gilbert, of Colchester : an Elizabethan magnetizer / by Bro. Silvanus P. Thompson.

Gilbert, of Colchester;

AN

ELIZABETHAN MAGNETIZER.

BY

BRO. SILVANUS P. THOMPSON, D.Sc., B.A.

MAGNETIZER.

Read at a Meeting of the Sette holden at Limmer's Hotel, on Friday, the 4th of July, 1890.

IMPRINTED AT

THE CHISWICK PRESS, TOOKS COURT,

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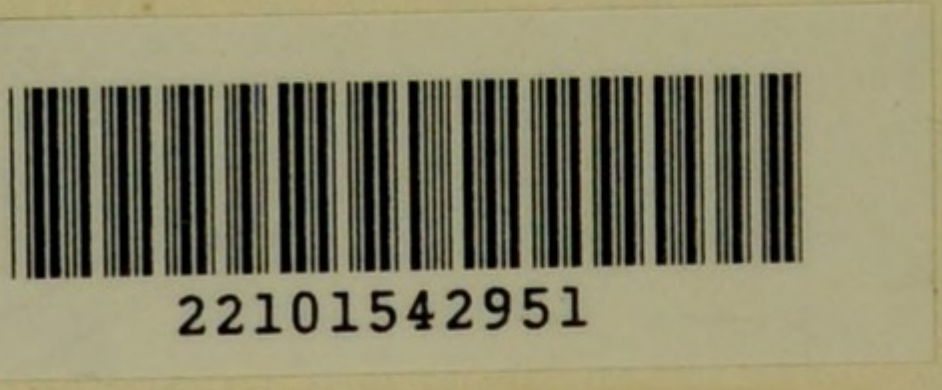

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DEDICATED TO

THE

Sette of Odd Volumes

BY

BRO. SILVANUS P. THOMPSON, D.Sc., B.A.

MAGNETIZER TO THE SETTE,

AN HONORARY SECRETARY OF THE GILBERT CLUB.

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No. 214

Presented unto

.....

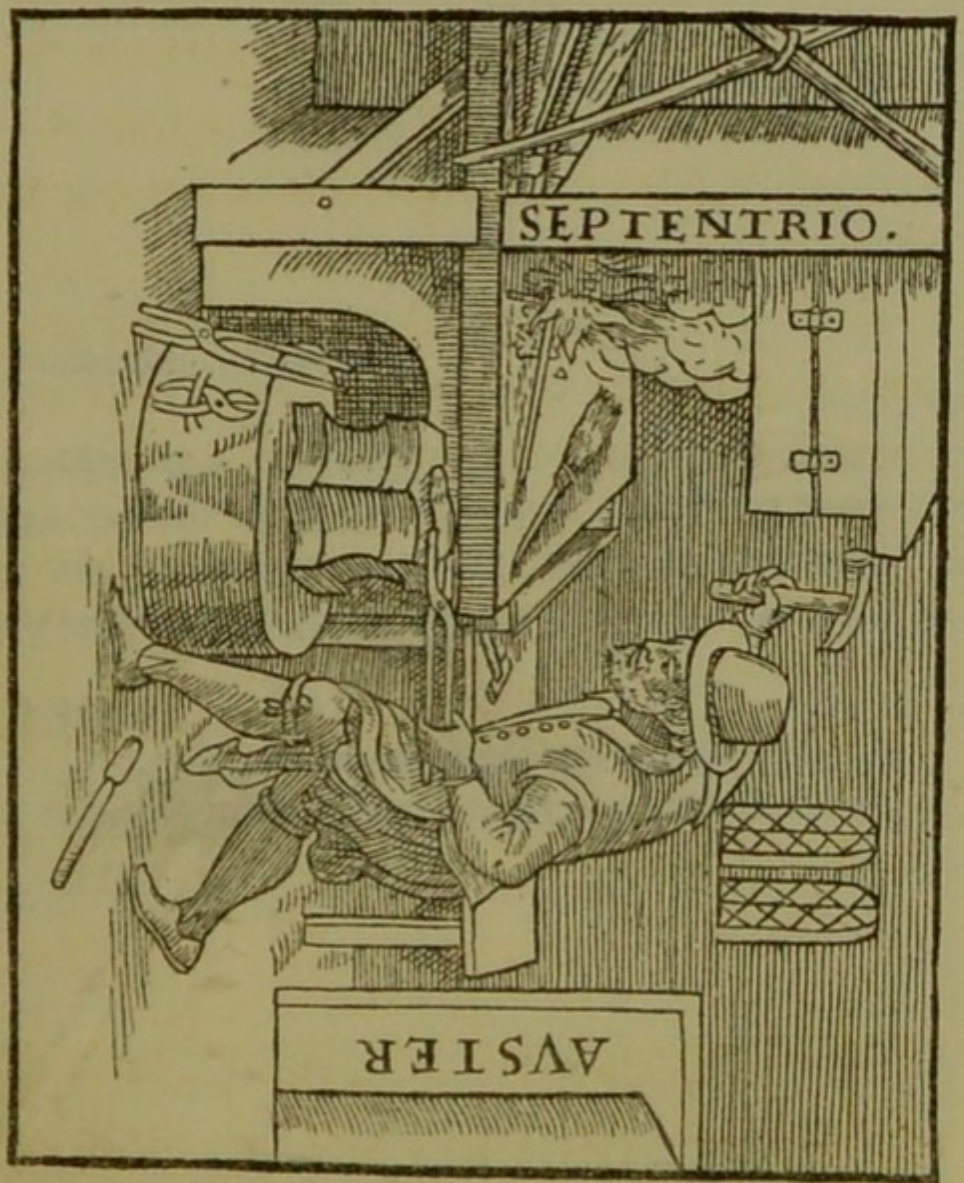
by .....

"Gilbert shall live till loadstones cease to draw,
Or British fleets the boundless ocean awe."

DRYDEN.

"*Mahomet's Tombe* at *Mecha*, is said strangely to *hang* up, attracted by some invisible *Loadstone*, but the memory of this *Doctor* will never fall to the ground, which his incomparable Book, 'De Magnete,' will *support* to Eternity."

FULLER'S "Worthies."


SEPTENTRIO.
AVSTER

GILBERT, OF COLCHESTER.

WILLIAM GILBERT, or Gilberd, of Colchester, (born 1540, died 1603) holds amongst Elizabethan worthies a rank in the eyes of electricians second to none of his famous contemporaries. In an age of empiricism and ignorance he rescued the study of the magnet from the atmosphere of occult mysticism with which it was surrounded, and placed it for ever on a scientific basis. He founded the theory of the mariner's compass by his brilliant discovery of the magnetism of the globe. Whilst the fantastic philosophies of the schoolmen still

prevailed, he calmly worked out the inductive method of reasoning from the known to the unknown, trying all his arguments by the touchstone of experiment. Nor is even this his greatest achievement. He stands forth pre-eminent as the founder of the science of electricity; the father, therefore, of all that host of inventions which are the crown of the scientific progress of the nineteenth century. His great work, "De Magnete," published in 1600, after many years of patient laborious and costly research, drew the attention of all the learned men of Europe, and won for him an undying fame.

"*I extremely admire and envy the author of 'De Magnete.' I think him worthy of the greatest praise for the many new and true observations which he has made.*"

said Galileo the famous astronomer.

"*Gilbert shall live, till loadstones cease to draw,*
Or British fleets the boundless ocean awe,"

sang Dryden, in his Epistle to Dr. Charlton.

Old Fuller, in enumerating the worthies who have adorned the county of Essex quaintly wrote of him as follows :—

"*Mahomet's Tombe* at *Mecha*, is said strangely to *hang* up, attracted by some invisible *Loadstone*, but the memory of this *Doctor* will never fall to the ground, which his incomparable Book, 'De Magnete', will *support* to Eternity."

What manner of man this was, and why he was held worthy of honours so unique, it is our present task to set forth.

Gilbert was the son of the recorder of Colchester Hierom Gilberd ; and from his use of

the appellation "Colcestrensis" on the title of his book, it is clear that he was proud of the old city where he was born, and where he died. The Gilberts were an old Suffolk family, but Hierom Gilberd had settled in Colchester in 1528. His family consisted of five sons, the eldest of whom was the famous Doctor. The Gilbert family still exists, scattered chiefly over the county of Norfolk.

Of his boyhood little or nothing is known; indeed it is surprising that there is little to chronicle about so great a man beyond the dates of a few salient events in his career. No Boswell dogged his steps, to note down his words of wisdom. No biographer hunted down his correspondence. His scientific works, and the impulse they gave to the spirit of research are his monument;—a monument more enduring than brass.

In May 1558, being then 18 years old,

he matriculated at St. John's College, Cambridge, at which University he remained for eleven years. At the end of 1560 he proceeded to his bachelor's degree, and on March 21st, 1561 he was admitted as a fellow on Symson's Foundation. In 1564 he "commenced" M.A. For the two following years he was mathematical examiner in his College, and appears to have turned his attention to medicine; for on May 13th 1569 he was admitted M.D., and on Dec. 29th of the same year was elected to a Senior Fellowship. After this he left England to travel in foreign countries. His precise course of travel is unknown; but he made the acquaintance of many persons of distinction in the great historic universities, with some of whom he is known to have been subsequently in correspondence. Passages in his published works show him to have resided in Mantua,

Venice, and other cities, and his knowledge of geography was very considerable. He returned to England in 1573 and was at once made a Fellow of the Royal College of Physicians. Henceforth his residence was in London, where he took up a regular medical practice. On Nov. 25th 1577 was granted to him the coat of arms which is figured at the back of the title-page of his book, and was subsequently emblazoned in carved stone upon his tomb. He rapidly rose in professional distinction. From 1581 till 1590 he was Censor of the Royal College of Physicians. He was its Treasurer from 1587 to 1591 and again from 1597 to 1599. In 1600 he was made President, an honour which he did not long retain, as he died on Nov. 3rd 1603, aged 63 years. He was never married, but the family name was carried down to posterity by his brothers, one of whom, by a

curious circumstance also named William, was a proctor in the Court of Arches.

It is stated that Gilbert expended upon his magnetic researches no less considerable a sum than five thousand pounds. His experiments with loadstones lasted for many years, and he possessed a remarkable collection of them. He also had many instruments, some of which are figured in his book. He himself devised some novel forms of instruments for navigation two of which are described in a subsequent work, "The Theoriques of the Seuen Planets," by Thomas Blundeville. His charts, globes, magnets, instruments, and manuscripts he bequeathed, together with his books to the possession of the Royal College of Physicians.

To estimate the magnitude of his achievements in science it is requisite briefly to review the state of knowledge with respect to magne-

tism and electricity before the appearance of his epoch-making work.

The property of the loadstone to attract pieces of iron or other loadstones was a fact known to antiquity, and explained as usual by the ascription of magical or occult powers. Pliny mentions that a ring of iron hung to a loadstone can attract a second ring, and the second a third until a chain of rings hangs from the stone; an experiment also described in hexameters by Lucretius in the *De Rerum Natura*. No other fact of importance appears to have been known concerning the magnet, until about the eleventh century, when the directive power of the loadstone became known. This discovery, so important in the history of navigation, is variously attributed to the Chinese, the Arabians, and to an Italian named Goia who lived at Amalfi in the thirteenth century.

The probability is that Goia devised the method of supporting the magnetic needle on a pivot, the earlier ones having been either floated on wood in a basin of water or else suspended by a thin thread. Gilbert himself states that the mariner's compass was first brought to Italy from China by the famous traveller Marco Polo. On the other hand in the Icelandic Chronicle of Are Frode, which was written about the end of the eleventh century, there is a succinct reference to the use of the loadstone for directing the seaman. Further, Cardinal de Vitri, who wrote a history of Jerusalem about the year 1200, also describes the magnetized needle as indispensable in navigation. An obscure author Peter Peregrinus, whose existence was for long considered mythical, and who wrote a letter upon magnetism reputed to be of a date at the end of the thirteenth century, describes the fact

that the north-pointing end or region of one loadstone will attract the south-pointing end or region of another loadstone. Peregrinus's letter was certainly published as a small book of 43 pages, small quarto, at Augsburg in 1558. Two other magnetic facts of cardinal importance had also been observed. On the 14th of September 1492, Columbus, when about 200 leagues west of the European shores, noticed for the first time the variation of the compass from the true north. According to Gilbert the same discovery was made in 1498 by Sebastian Cabot. It was not, however, until the middle of the sixteenth century that accurate measurements were made of the amount of the variation in Europe. Robert Norman, a compass maker in Limehouse, found that the compass pointed 11° 15′ to the east of the true north. William Borough, comptroller of the royal navy,

in 1580 found the variation to be 11° 19′. The second important fact was the tendency of the needle to dip. This was discovered by Norman in 1576, and the same fact was inde pendently observed in 1544 by Hartmann of Nürnberg. Norman indeed constructed a dipping needle, by the aid of which he ascertained the angle of dip at London to be 71° 50′ Yet another isolated fact was discovered in 1590 by a surgeon of Rimini named Julius Cæsar, namely that a vertical bar of iron, used as a support on the top of the tower of the church of St. Augustine had of itself acquired magnetic properties.

Of magnetic literature prior to Gilbert there was very little; at least of a reliable sort. The most important work was that of John Baptista Porta, the inventor of the magic lantern, published in 1558, on natural magic. The seventh

chapter of this work is devoted to the magnet and the tricks which may be played by its means. Porta mentions, for the purpose of refuting them, some of the mediæval fables about magnets, including a story handed down from Plutarch and Ptolemy that garlic rubbed over a magnet destroys its power, unless, according to Ruelius, it be restored by anointing it with the blood of a he-goat. Another fable, that a magnet is powerless in the presence of a diamond, is also condemned by Porta. The latest work on magnetism prior to the appearance of Gilbert's treatise was a small pamphlet which appeared in 1597 entitled "The Navigator's Supply," by William Barlowe, which gave for the use of seamen many facts about the variation of the compass at different seaports, and about the amount of the dip of the needle in different parts of the earth.

All these earlier publications dealing with magnetic subjects, consisted, as will have been noticed, in the announcement of isolated facts and properties, rather than in any systematic investigation or consistent explanation. The significance of the facts was not seen ; and they were in many cases mixed up with exaggeration and myth. Gilbert himself enumerates sundry of them in order to show how empty and ridiculous were the current explanations of the pointing of the compass. Serapio Mauritanus and others reported that there were in the Indies magnetic mountains which would attract passing ships and draw the iron nails out of them. Paracelsus and Cardan considered the magnet to be governed by some virtue proceeding from the constellation of the Great Bear ; and after the discovery that the needle did not point truly northward Cardan gravely suggested that the

star in the tip of the tail of the Great Bear was itself a magnet. Olaus Magnus, and after him Maurolycus, declared that there was a magnetic island, or loadstone rock in the north sea, toward which the compass turned its apex: Plancius even showed its position on a chart of the globe!

Such was the state of the science when "De Magnete" appeared. The full title of the book, in the folio edition of 1600 is:—

"*Guilielmi Gilberti Colcestrensis, medici Londinensis, De Magnete, magneticisque corporibus et de magno magnete tellure; Physiologia nova, plurimis et argumentis, et experimentis demonstrata. Londini. Excudebat Petrus Short. Anno M D C.*"

A brief analysis of the contents of the book may not be unacceptable. It is divided into

six sections, all except the first being copiously illustrated with simple woodcuts and diagrams. The preface, addressed to the candid reader, opens by announcing that the earth, our common mother, is itself a great magnet; and explaining how, the better to understand the conspicuous forces of the globe, we are to begin by understanding the ordinary or common magnetic bodies and so proceed by experiment to the more abstruse facts. Comparing the study of terrestrial phenomena with celestial, he points out how geometry, ascending from simple fundamental conceptions to those which are more difficult, aids the wit of man to climb above the firmament; and how likewise magnetic study must proceed from the simple to the complex. He discards all arguments drawn from older Greek authors, regarding them as mere verbiage. His aversion from Aristotelian

methods is strongly marked; an aversion which is emphasized in the very first page of his later work (the "De mundo nostro") which he describes as a *Philosophia nova contra Aristotelem.*

Book I. opens with a review of the older writers and their various opinions and vanities, which he scornfully dismisses by remarking that only plebeian philosophers delight themselves in such nonsense; and he names the following as the men who have really added to magnetic knowledge:—Thomas Hariot, Robert Hues, Edward Wright, Abraham Kendall, William Borough, William Barlowe, and Robert Norman, all Englishmen. He then deals with the etymology of the word magnet, and the discovery and geographical distribution of the loadstone. He then enters upon the experimental methods of investigation, using loadstones of various shapes, the properties and mutual actions of

which are carefully observed and recorded. A loadstone, ground down by the lapidary to a spherical shape, furnished him with the means of drawing a magnificent generalization. For he

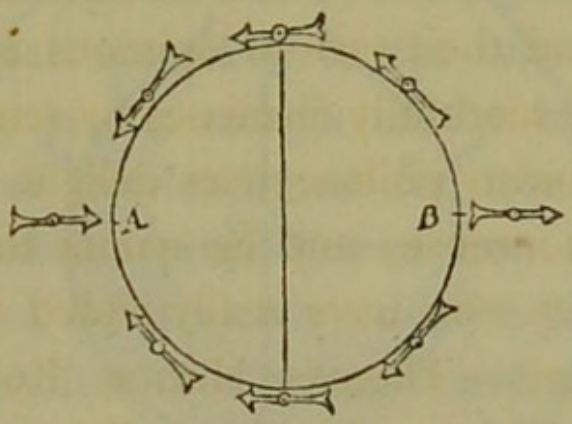


Fig. 1. GILBERT'S TERRELLA.

found that a globular loadstone is in miniature a precise counterpart, magnetically, of the globe of the earth : small compass needles placed near it being directed, and caused to dip, by its magnetic forces precisely as our mariners' compasses are affected by the earth. Such a globular mag-

net he styled a *Terrella.* In one woodcut, here reproduced in facsimile (Fig. 1), compass needles are shown pointing variously over

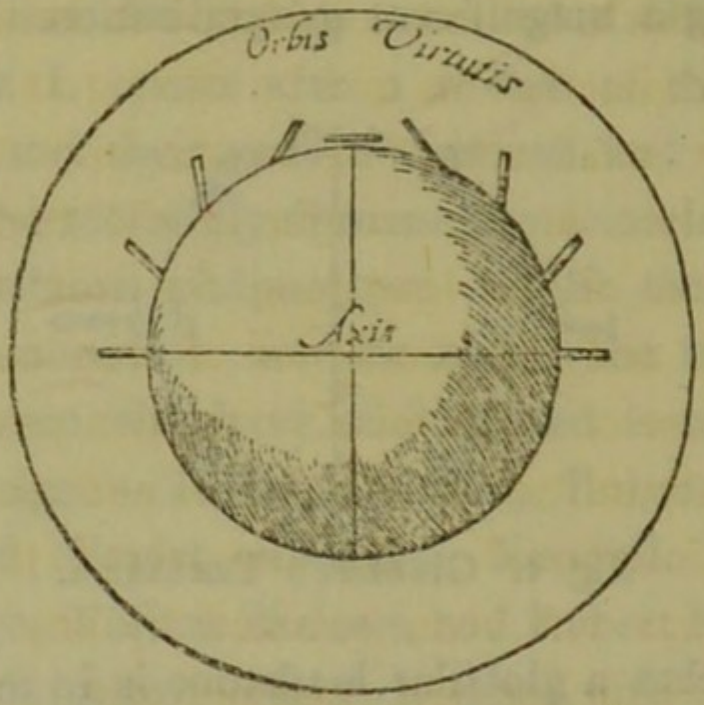


Fig. 2. NEEDLES DIPPING TO THE TERRELLA.

divers regions of the terrella. In another (Fig. 2), the terrella is shown inclosed within a certain orbit of magnetic virtue, as by a surrounding atmosphere. In further experiments load-

stones were cut into two parts, the parts being floated on water in little vessels to observe their mutual attractions and repulsions. All experiments which Gilbert considered as being original he claimed as his own by affixing an asterisk, large or small according to the importance of the matter, in the margin of the text. The attraction of the loadstone for iron was examined, and the properties of iron compared with those of other metals; many a passing hit at the absurdities of astrologers and alchemists being interposed. He discovered that iron which has not been touched by any magnet can nevertheless act magnetically. Toward the close of Book I. he discusses, only to dismiss with scorn, the alleged medicinal powers of the magnet, beginning with its use as prescribed by Dioscorides and Galen, as a purge for melancholy, and ending with Paracelsus, who

recommended poultices containing powdered loadstones. Short shrift would our modern magneto-pathic quacks have got, with their magnetic belts and magnetic rings, at the hands of the outspoken Doctor! The observations with the Terrella are continued in Book II. and Book III., ending with some experiments made to illustrate observations of the compass in distant lands which had been communicated to him by Sir Francis Drake—experiments which fully confirmed his theory—and the results of which he sums up by saying that magnetic bodies behave towards the globe of the earth precisely as his magnets behave toward the terrella; the laws of their action being alike. Amongst other matters which helped him to this conclusion was his discovery that if a rod of iron is hammered whilst lying in a north-and-south position it becomes magnetized by the

influence of the earth's magnetism. This observation is illustrated by a quaint woodcut, which is reproduced on a smaller scale as the frontispiece of this opusculum. Books IV. and V. go into some geographical and astronomical matters; being intended chiefly as a contribution to the nautical applications of his studies. He describes sundry instruments, one of them, for ascertaining the variation of the compass in different regions being that shown in the accompanying reduced woodcut (Fig. 3). Several others are depicted in his book. He particularly discusses the effects of masses of iron ore in mountains and continents in producing local perturbations or variations of the compass; a matter which has quite lately received fresh attention from the recent magnetic surveys of Professors Rücker and Thorpe in which they have measured the perturbing effects of moun-

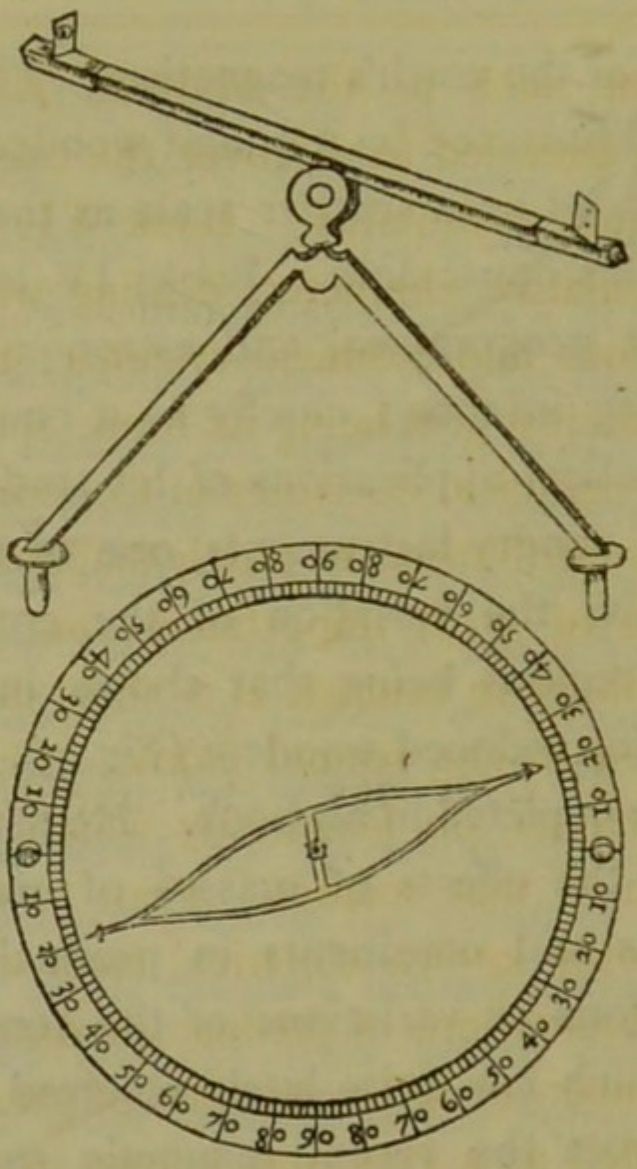


Fig. 3. GILBERT'S INSTRUMENT FOR OBSERVING THE VARIATION OF THE COMPASS.

tain chains such as the Malvern Hills, and have even been led to discover the existence of underground mountains. Book VI. is of a more speculative character, dealing with magnetic motions and cosmical systems; the main point of interest in it being its frank acceptance of the astronomical doctrines of Copernicus.

These contributions to purely magnetic knowledge were of great importance: but far transcending them in interest is a short digression interpolated in the second Book. This is the famous Chapter on Electricity which laid the foundation of that science. Prior to Gilbert's time the only known electrical facts were two isolated observations of pre-historic date. The mineral amber, or ἤλέκτρον, then of great rarity and regarded as a gem, was known to acquire, when rubbed, the magical property of attracting straws and other light objects. A similar pro-

perty had been recognized to exist in jet. Amber was a substance about which there was something uncanny. It was clear like glass, when of good quality, but was often found to contain flies and other insects inclosed within itself; "shining," says Gilbert, "in eternal sepulchres." Much had the ancients, including Theophrastus and Pliny written about it and the magical properties which it exhibited after being rubbed. This peculiar phenomenon was submitted to examination by Gilbert with an industry and experimental sagacity thoroughly characteristic of the man. He devised for facilitating the observation of feeble attractions a simple instrument, consisting of a light stiff arm of metal (see Fig. 4), resembling in shape a compass needle, pivotted like a compass upon a pin. This apparatus, termed by him a *versorium*, constituted the electroscope by the aid of which he

disproved the idea that the alleged magical property was possessed only by amber or by jet. He poured out the vials of his wrath upon the empty-headed and inert philosophers who merely copy from one another and invent high sounding Greek words wherewith to cloak their

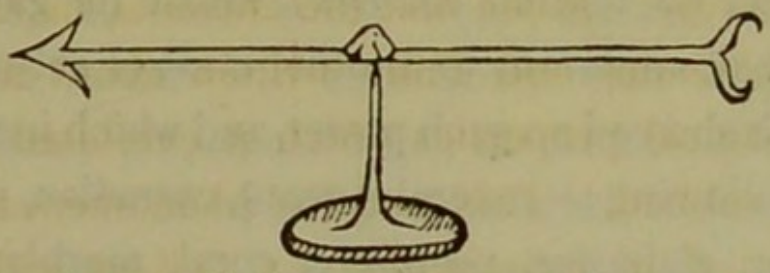


Fig. 4. GILBERT'S VERSORIUM, OR ELECTROSCOPE.

ignorance. "For not only do amber and jet, as they say, draw light bodies but diamond, sapphire, carbuncle, cat's eye, opal, amethyst, vincentina and bristolla (an English gem or spar) beryl and rock crystal do the same." And he went on enumerating a host of other substances possessing similar powers, following up the true

gems with false gems made from paste, glass of antimony, slags, belemnites, sulphur, mastic, hard wax, sealing wax variously coloured, resin and arsenic, and also, but less powerfully and only in dry weather, rock-salt, obsidian, and rock-alum. All these substances, because they resembled amber, he termed *electrics;* whilst he gave the name of *anelectrics* to another class of substances which showed no such power, and which included the following :—emerald, agate, carnelian, pearls, jasper, alabaster, porphyry, coral, marble, flint, haematite, emery, bone, ivory, ebony and other hard woods, cedar, gold, copper, iron and the other metals, and lastly the loadstone. The substance which above all others possesses the magnetic property of attracting iron shows no trace of electric action when rubbed in the hand. From the terms assigned by Gilbert the word *electricitas* (electricity) came into use to

denote the unseen agent operating in these actions. Gilbert further showed that the power of attraction exercised by the electric when rubbed was not limited to mere straws or chaff, but that all metals and woods, and also stones and earths were attracted. He even found that liquids, oil and water were drawn by the electric force. He ascertained that moisture exercises a prejudicial effect on electrical experiments. He observed that electrical effects can be screened off, in a way that magnetic effects cannot, by the interposition of a sheet of metal, or even by a piece of paper. He further ascertained the screening effect of a ring of flames. His observations stop short all too soon, leaving the infant science truly in a state of infancy. Nevertheless he was the pioneer whose first steps showed the path to be later trodden by Robert Boyle, by Francis Haukesbee, by Sir

Isaac Newton, and by Benjamin Franklin; and therefore is beyond dispute the father of electric science.

It remains to be told how Gilbert's work was received. Strange to say, it fell somewhat flat. The world was hardly prepared to accept a sober treatise based on simple facts in place of the wild and speculative treatises which had hitherto passed as philosophic. Scaliger in one of his epistles (ad Casaubon, 1604) speaks of a certain Englishman who three years previously had brought out a book on the magnet which was nothing worthy of the expectation which it had excited. Bacon, though he reproduced as his own, in his "Opuscula Philosophica" whole paragraphs almost verbatim from Gilbert, sneered at him in his "De Augmentis" as the man who had made a whole philosophy out of the observations of a loadstone; and in another

place refers to "De Magnete" as a "painfull and experimentall work." In another place in the "Novum Organon" he accuses Gilbert of having created so many fables about the electric operation; which, he adds is nothing else than the appetite of the body excited by gentle friction! Others there were indeed who better appreciated the magnitude of Gilbert's work. Galileo, as we have seen, spoke of him as of enviable greatness. Kepler warmly welcomed the new doctrine of the earth's magnetism, and devoted a long chapter in his treatise on Astronomy to the exposition of Gilbert's views. Barlowe, the learned Archdeacon of Salisbury, whose "Magneticall Aduertisements" was published in 1618, speaks of "De Magnete" as "the very true fountaine of all magneticall knowledge." Dr. Marke Ridley, who in 1613 published "A Short Treatise of Magneticall

Bodies and Motions" speaks of Gilbert's labours as "the greatest and best in Magneticall Philosophie." Sir Kenelm Digby classed Gilbert along with Harvey, the discoverer of the circulation of the blood, as men by whose means our nation may claim, even in this latter age, a crown for solid philosophical learning.

Gilbert further laid the foundations of future scientific progress by founding a sort of society or college which met monthly at his house in Peter's Hill, Knight Rider Street, for the discussion of philosophical subjects, and which, though it fell into abeyance at his death, must be regarded as the precursor of the Royal Society.

He did not live to add, as he proposed, an appendix of six or eight sheets to "De Magnete;" no such addition appearing in either of the German editions published at Stettin in 1628

and 1633 respectively. He left behind him, however, the manuscript of another work of lesser merit, which was posthumously published in 1651 by the famous printing house of Elzevir, entitled "De Mundo nostro Sublunari Philosophia Nova." It is chiefly a meteorological and cosmical treatise, remarkable indeed for one speculative point, namely a suggestion that the reason why the moon always presents the same face towards the earth is because the moon, like the earth, is magnetic.

His fame as physician and physicist won him the favour of Queen Elizabeth by whom in February 1601 he was appointed chief physician. He even received from her at her death an annual pension; and was continued as chief physician to James I., an honour which he only enjoyed for seven months, as he died on Nov. 30th, 1603.

The partial oblivion into which Gilbert's fame has been allowed to fall is due probably mainly to the loss of all personal relics of him. With the exception of a single doubtful inscription "*ex dono auctoris*" in a single copy of "De Magnete," not a line of his handwriting is known to exist, unless his hand wrote the signature "*Ye President and Societie*" at the end of a petition preserved amongst the manuscripts in the British Museum, addressed by the Royal College of Physicians in 1596 to the Lords of the Privy Council, complaining of the exactions of the Lord Mayor and Aldermen of London. It is pretty certain that the MS. copy "De Mundo Nostro," in Latin in the British Museum is not in the author's handwriting; for in the Elzevir print there is a note which states that the author's original manuscript was partly in English. It is sad to relate that the manuscripts,

maps, letters, magnets and minerals which he bequeathed to the Royal College of Physicians, all perished in the Great Fire in 1666. Almost equally sad is it, that his portrait, painted in oils, which he himself presented to the Schools' Gallery of the University of Oxford has disappeared: it is believed to have been destroyed as rubbish forty years ago. Only a poor engraving, made in 1796, and not true to the original picture in several details, remains to witness to the scholarly features of the great Doctor.

His residence in Colchester, a quaint old house in Holy Trinity Street, called Tymperley's, still stands; and his tomb in the church of Holy Trinity still proclaims over his ashes the virtues which he practised whilst living. But his memorial remains in his magnetic and electrical discoveries. His reputation is en-

shrined in the science which he founded — "shining in an eternal sepulchre."

He takes his place amongst the great men of a great age, not unworthily, as one of those who, not by song in his case but by science, truly

> "fill
> The spacious times of great Elizabeth
> With sounds that echo still."

In re Guilielmi Gilberti, Colcestrensis.

ON THE OCCASION OF THE READING OF THIS PAPER THERE WERE EXHIBITED BY THE AUTHOR THE FOLLOWING WORKS.

1. Guilielmi Gilberti Colcestrensis, medici Londinensis, de magnete, magneticisque corporibus, et de magno magnete tellure; Physiologia nova, plurimis et argumentis, et experimentis demonstrata. Londini. Excudebat Petrus Short. Anno M D C. (Folio, pp. 240, *The original edition.*)
2. Tractatus sive Physiologia nova De Magnete, magneticisque corporibus et magno mag-

nete tellure Sex libris comprehensus â Guilielmo Gilberto Colcestrensi, medico Londinensi. Omnia nunc recognita & emendatius quam ante in lucem edita, aucta & figuris illustrata operâ & studio Wolfgangi Lochmans, I.U.D. & Mathematı. Excusus Sedini typis Götzianis Sumptibus Joh. Hallervordij. Anno M.DC.XXVIII. (4to., pp. 232, with etched Title-page and plates, and an Index. First edition published abroad.)

3. Tractatus, sive Physiologia Nova De Magnete, Magneticisq ; corporibus & magno Magnete tellure, sex libris comprehensus, a Guilielmo Gilberto Colcestrensi, Medico Londinensi. In quibus ea, quæ ad hanc materiam spectant, plurimis & Argumentis & experimentis exactissime absolutissimeq ; tractantur & explicantur. Omnia nunc diligenter recog-

nita, & emendatius quam ante in lucem edita, aucta & figuris illustrata, opera & studio D. Wolfgangi Lochmans, I.U.D. & Mathematici. Sedini, Typis Gotzianis. Anno M.DC.XXXIII. (4to., pp. 232, with etched plates inserted, and Index.)

4. Guilielmi Gilberti Colcestrensis, Medici Regii, De Mundo nostro Sublunari Philosophia Nova. Opus posthumum, Ab Authoris fratre collectum pridem et dispositum, nunc Ex duobus MSS. codicibus editum. Ex Museio viri perillustris Guilielmi Boswelli Equitis aurati &c. et Oratoris apud Fœderatos Belgas Angli. Amstelodami. Apud Ludovicum Elzevirium. CIↃ IↃ CLI. (4to. pp. 316, with Index; the rare posthumous work on Meteorology.)

5. The Theoriques of the ſeuen Planets, shew-

ing all their diuerse motions, and all other Accidents, called Passions, thereunto belonging. Now more plainly set forth in our mother tongue by M. Blundeuile, than euer they haue been heretofore in any other tongue whatsoeuer, and that with such pleasant demonstratiue figures, as euery man that hath any skill in Arithmeticke, may easily vnderstand the same. A Booke most necessarie for all Gentlemen that are desirous to be skilfull in Astronomie and for all Pilots and Sea-men, or any others that loue to serue the Prince on the Sea, or by the Sea to travail into forraine Countries. . . . There is also hereto added, The making, description, and vse, of two most ingenious and necessarie Instruments for Sea-men, to find out thereby the latitude of any Place vpon the Sea or

Land, in the darkest night that is, without the helpe of Sunne, Moone, or Starres. First inuented by M. Doctor Gilbert, a most excellent Philosopher, and one of the ordinarie Physicians to her Maiestie : and now here plainely set downe in our mother tongue by Master Blundeuile. London. Printed by Adam Islip. 1602. (12mo. pp. 292, with A short Appendix annexed to the former Treatise by Edward Wright, at the motion of the right Worshipfull M. Doctor Gilbert.)

6. A copy (formerly in the possession of Descartes) of the Dialogus De Systemate Mundi of Galileo Galilaei, containing numerous references to Dr. Gilbert's work in magnetism. (Elzevir Edition, 1635.)
7. A copy of the Epitome Astronomiæ Copernicanæ of Johannes Kepler, in the fourth

book of which Gilbert's theory that the earth itself is a great magnet is accepted and propounded. (Frankfort, 1635.)

Other early works on Magnetism were exhibited by Bro. Conrad W. Cooke and by Latimer Clark, Esq., F.R.S.

O. V.

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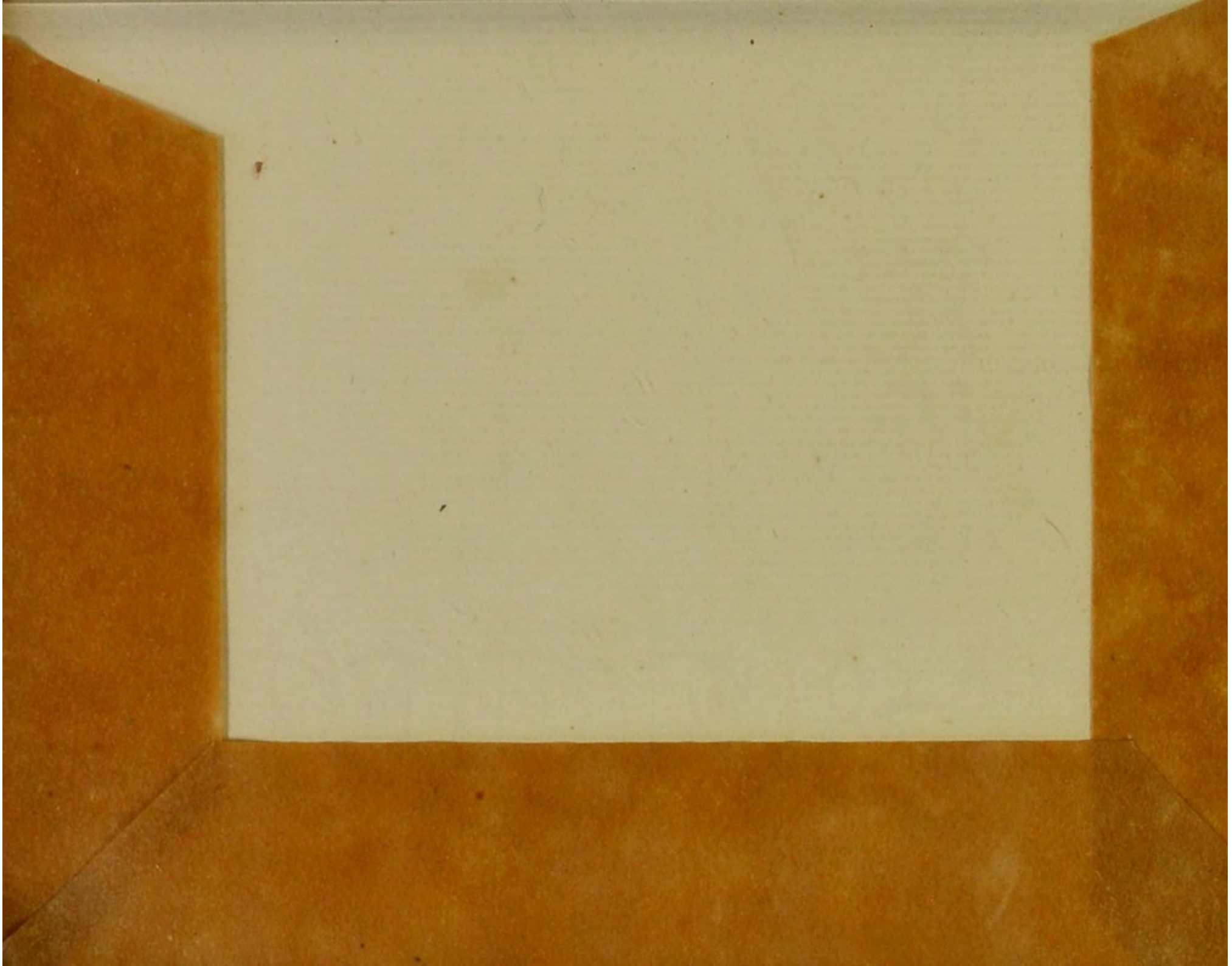


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