

John Dee

1527-1609

For a biography of Dee, a discussion of his other works, and selections from some of his other works, see the print anthology, pp. 405-22.

EDITION: Euclid, *The elements of geometrie of the most auncient philosopher Euclide of Megara*. Trans. Henry Billingsley. London: Printed by John Day, 1570. STC 10560.



from *The Mathematical Preface to Euclid's
Elements of Geometry*¹

To the Unfeigned Lovers of Truth, and
Constant Students of Noble Sciences, John
Dee, of London, Heartily Wisheth Grace
from Heaven, and Most Prosperous Success
in All Their Honest Attempts and Exercises

[...]

All things which are and have being are found
under a triple diversity general. For, either, they are
deemed supernatural, natural, or of a third being.
Things supernatural are immaterial, simple, indi-
5 visible, incorruptible, and unchangeable. Things
natural are material, compounded, divisible, cor-
ruptible, and changeable. Things supernatural are
of the mind only comprehended; things natural of
the sense exterior are able to be perceived. In
10 things natural, probability and conjecture hath
place, but in things supernatural, chief demonstra-
tion and most sure science is to be had. By which
properties and comparisons of these two, more
easily may be described the state, condition, nature
15 and property of those things which we before

20 termed of a third being, which, by a peculiar name
also, are called *things mathematical*. For, these being
(in a manner) middle, between things supernatural
and natural, are not so absolute and excellent as
things supernatural, nor yet so base and gross as
things natural, but are things immaterial, and nev-
ertheless by material things able somewhat to be
signified. And though their particular images, by
art, are aggregable² and divisible, yet the general
25 forms, notwithstanding, are constant, unchange-
able, untransformable, and incorruptible. Neither
of the sense can they at any time be perceived and
judged; nor yet, for all that, in the royal mind of
man first conceived. But, surmounting the imper-
30 fection of conjecture, weening³ and opinion, and
coming short of high intellectual conception are
the mercurial fruit of dianoetical⁴ discourse, in
perfect imagination subsisting.

A marvellous neutrality have these things *math-*
35 *ematical*, and also a strange participation between
things supernatural—immortal, intellectual,
simple, and indivisible—and things natural—
mortal, sensible,⁵ compounded, and divisible.
Probability and sensible proof may well serve in
40 things natural and is commendable. In mathemat-
ical reasonings, a probable argument is nothing
regarded, nor yet the testimony of sense any whit⁶

¹ At the university of Paris (July 1550), Dee undertook a series of public lectures on Euclid, which were well-received and brought him to the attention of many of the city's scientists, mathematicians, and professors ("Compendious Rehearsal," In *Autobiographical Tracts of Dr. John Dee*, ed. J. Crossley, *Chetham Miscellanies*, vol. 1. [Manchester, 1851], pp. 7-8).

² *aggregable* capable of being collected into one mass.

³ *weening* mere opinion, surmise, or suspicion (as opposed to certain knowledge).

⁴ *dianoetical* (see also, dianoetic, *OED*), employing thought and reasoning; intellectual.

⁵ *sensible* perceived and experienced through the senses.

⁶ *any whit* in the least degree, at all.

credited. But only a perfect demonstration of
 45 truths certain, necessary, and invincible, univer-
 sally and necessarily concluded, is allowed as suffi-
 cient for an argument exactly and purely mathe-
 matical.

[...]

*All things which from the very first original being of things
 have been framed and made do appear to be formed by the
 50 reason of numbers. For this was the principal example or
 pattern in the mind of the Creator. O comfortable
 allurements! O ravishing persuasion! To deal with a
 science whose subject is so ancient, so pure, so
 excellent, so surmounting all creatures, so used of
 55 the almighty and incomprehensible wisdom of the
 Creator, in the distinct creation of all creatures! In
 all their distinct parts, properties, natures, and
 virtues, by order and most absolute number
 brought from nothing to the formality of their being
 60 and state. By numbers' property, therefore, of us by
 all possible means (to the perfection of the
 science) learned, we may both wind and draw our-
 selves into the inward and deep search and view of
 all creatures' distinct virtues, natures, properties,
 65 and forms; and also farther arise, climb, ascend and
 mount up (with speculative wings) in spirit to
 behold in the glass of creation the form of forms,
 the exemplar number of all things numerable, both
 visible and invisible, mortal and immortal, corpo-
 70 ral and spiritual.¹*

[...]

[...] This science of *magnitude*,² his properties, con-
 ditions, and appurtenances commonly now is—
 and from the beginning hath of all philosophers
 been—called geometry, but verily with a name too
 75 base and scant for a science of such dignity and

¹ *and also ... spiritual* That mathematics was a pathway to the understanding of the universe and the divine was increasingly a commonplace in Renaissance works of natural philosophy. See Christopher Whitby, Introduction, *John Dee's Actions with Spirits, 22 Dec 1581 to 23 May 1583*, 2 vols. (New York, 1988), 1.72-75.

² <*> *Geometry* [Dee's note].

ampleness. And, perchance, that name by
 common and secret consent of all wise men hith-
 80 erto hath been suffered³ to remain that it might
 carry with it a perpetual memory of the first and
 notabest benefit by that science to common
 people showed: which was, when the bounds and
 meres⁴ of land and ground were lost and con-
 founded (as in *Egypt* yearly with the overflowing of
 85 *Nilus*, the greatest and longest river in the world);
 or that ground bequeathed were to be assigned,⁵
 or ground sold were to be laid out,⁶ or—when dis-
 order prevailed—that commons were distributed
 into severalties.⁷ For, where, upon these and such
 like occasions, some by ignorance, some by negli-
 90 gence, some by fraud, and some by violence did
 wrongfully limit, measure, encroach or challenge
 (by pretence of just content and measure) those
 lands and grounds, great loss, disquietness,
 murder, and war did full oft ensue; till, by God's
 95 mercy and man's industry, the perfect science of
 lines, planes, and solids—like a divine justiciar⁸—
 gave unto every man, his own. The people, then,
 by this art pleased and greatly relieved in their
 lands' just measuring, and other philosophers
 100 writing rules for land measuring, between them
 both thus confirmed the name of *geometria*, that
 is—according to the very etymology of the
 word—"Land measuring."

[...]

But well you may perceive by Euclid's *Elements* that
 105 more ample is our science than to measure planes,
 and nothing less therein is taught (of purpose)
 than how to measure land. Another name there-
 fore must needs be had for our mathematical

³ *suffered* permitted, allowed.

⁴ *mere* boundary; landmark indicating a boundary.

⁵ *assigned* transferred or formally made over to another.

⁶ *laid out* measured or apportioned.

⁷ *that commons were distributed into severalties* that common land (available to and "owned" by a entire community) was divided up and made into private, enclosed properties (severalties).

⁸ *justiciar* a judge presiding over, or belonging to, one of the King's superior courts, or exercising special judicial functions (see also justice, 9a., *OED*).

110 science of magnitudes, which regardeth neither
 clod nor turf, neither hill nor dale, neither earth
 nor heaven, but is absolute *megethologia*;¹ not creep-
 ing on ground and dazzling the eye with pole,
 perch, rod or line,² but lifting the heart above the
 115 Heavens by invisible lines and immortal beams
 meeteth with the reflections of the light incom-
 prehensible, and so procureth joy and perfection
 unspeakable.³

[...]

120 *But also we know that for the more easy learning of all arts
 it importeth much*⁴ *whether one have any knowledge in
 geometry or no, etc. Let us, therefore, make an ordinance or
 decree that this science of young men shall be learned in the
 second place.* This was *divine Plato* his judgement,
 both of the purposed, chief, and perfect use of
 125 *geometry*, and of his second, depending, derivative
 commodities.⁵ And for us Christian men, a thou-
 sand, thousand more occasions are⁶ to have need
 of the help of⁷ *megethological* contemplations;
 whereby, to train our imaginations and minds, by
 130 little and little, to forsake and abandon the gross
 and corruptible objects of our outward senses,

¹ *megethologia* from the Greek, meaning “magnitude”; the word is Dee’s invention.

² *perch* (also called a “pole” or “rod”) a rod of definite length used for measuring land, etc.; hence: a measure of length, especially for land, in Standard Measurement equal to 5½ yards, or 16½ feet, but varying greatly locally; *line* a cord used by builders and others for (among other things) taking measurements.

³ From “perch, rod, or line” to “and perfection unspeakable” is marked in the margin with ◀ and a set of open quotation marks [“]. As R.B. McKerrow notes, in early texts quotation marks were used to call special attention to a passage and did not necessary denote a quotation or quotations from other works (*Introduction to Bibliography for Literary Students* [Winchester, 1994], pp. 316-17).

⁴ *it importeth much* i.e., it is very important, it matters a great deal.

⁵ See Plato’s *Republic*, 7.526ff. Plato makes a distinction between the practical application of geometry to everyday affairs and its true aim, understanding of the eternal, those realms which are immortal and unchanging. What Dee refers to as geometry’s “second, depending derivative commodities” are those practical applications, such as the calculations involved in military manoeuvres.

⁶ *are* exist.

⁷ <*> J.D. * *Herein I would gladly shake off the earthly name of Geometry* [Dee’s note].

and to apprehend, by sure doctrine demonstrative,
things mathematical. And by them readily to be
 holpen⁸ and conducted to conceive, discourse,
 and conclude of things intellectual, spiritual,
 135 eternal, and such as concern our bliss everlasting,
 which otherwise—without special privilege of
 illumination or revelation from Heaven—no
 mortal man’s wit (naturally) is able to reach unto
 or to compass. And verily by my small talent (from
 140 above) I am able to prove and testify that the
 literal text and order of our divine law, oracles, and
 mysteries require more skill in numbers and mag-
 nitudes than (commonly) the expositors have
 uttered, but rather only (at the most) so warned;
 and showed their own want therein.

[...]

From henceforth in this my preface will I frame
 my talk to *Plato* his fugitive scholars,⁹ or rather to
 such who well can—and also will—use their
 outward senses to the glory of God, the benefit of
 150 their country, and their own secret contentation¹⁰
 or honest preferment on this earthly scaffold. To
 them, I will orderly recite, describe, and declare a
 great number of arts, from our two mathematical
 fountains derived into the fields of *Nature*.
 155 Whereby such seeds and roots as lie deep hid in
 the ground of *Nature* are refreshed, quickened,
 and provoked to grow, shoot up, flower and give
 fruit infinite and incredible. And these arts shall be
 such as upon magnitude’s properties do depend
 160 more than upon number. And by good reason we
 may call them arts,¹¹ and arts mathematical deriv-

⁸ *holpen* helped.

⁹ *From ... scholars* Dee begins the “Preface” by referring to a group of men who came to be instructed by Plato. However, having been lured only by Plato’s fame and by “the great commendation of his profound and profitable doctrine,” they turned away from his teachings. Aristotle, Dee says, believed that the men, expecting instruction on how to gain worldly wealth, dignity, and happiness, were not prepared to hear what Plato had to say. Aristotle took a lesson from this reaction and always warned his scholars about the gist of his teachings before he began to speak.

¹⁰ *contentation* contentment.

¹¹ <*> *An Art* [Dee’s note].

ative, for (at this time) I define *an art to be a methodical complete doctrine, having abundancy of sufficient and peculiar matter to deal with, by the allowance of the Metaphysical Philosopher*,¹ the knowledge whereof to human state is necessary. And that I account *an art mathematical derivative*² which by mathematical demonstrative method, in numbers or magnitudes, ordereth and confirmeth his doctrine, as much and as perfectly as the matter subject will admit.

[...]

*Thaumaturgic*³ is that art mathematical which giveth certain order to make strange works, of the sense to be perceived and of men greatly to be wondered at. By sundry means this *wonder-work* is wrought: some by *pneumatitheme*, as the works of *Ctesibius* and *Hero*;⁴ some by weight, whereof *Timaens*⁵ speaketh; some by strings strained or springs therewith imitating lively motions; some by other means, as the images of Mercury, and the brazen head made by *Albertus Magnus*, which did seem to speak.⁶ *Boethius* was excellent in these feats. To whom *Cassiodorus*,

writing, sayeth: “*Your purpose is to know profound things and to show marvels. By the disposition of your art, metals do low; Diomedes of brass doth blow a trumpet loud; a brazen serpent bisseth; birds made, sing sweetly. Small things we rehearse of you, who can imitate the Heaven, etc.*”⁷ Of the strange self-moving⁸ which, at St.

anity; author of numerous works on botany, biology, the physical sciences, psychology, and theology, he also brought a new emphasis on experimentation and empiricism to the study of the natural world (*Catholic Encycl.*). His reputation as a magician was closely tied to his scientific investigations. Legend has it that he created a talking brass head which was destroyed by a frightened Thomas Aquinas, a tale repeated in numerous contemporary texts on mathematics and natural philosophy, such as Agrippa’s *Vanity and Uncertainty of Arts and Sciences*, ff.55v-56r. On the origins of this legend, see Lynn White, *Medieval Technology and Social Change* (Oxford, 1962), pp. 89-92. Thanks to Michael Treschow (UBC-O, English) for assistance with this note.
⁷ Magnus Aurelius Cassiodorus (c. 490-c. 585 CE), Roman senator, consul and kinsman of Anicius Manlius Severinus Boethius (c. 480-524/25 CE), philosopher, logician, and mathematician, most famous for his *Consolation of Philosophy*. Cassiodorus’ *Variae* contains some 468 letters (those he wrote in his own name, as well as those he drafted for various monarchs and officials), one of which comments admiringly on his kinsman Boethius’ reputation as a translator and preserver of ancient Greek scientific writings (he has “drunk from the very spring of science”), as well as a scientific wonder-worker: “Waterlogged buildings are drained while still in the sea; hard objects are disintegrated by an ingenious device. Objects of metal give out sounds: a bronze statue of Diomedes blows a deep note on the trumpet; a bronze snake hisses; model birds chatter, and those that had no natural voice are found to sing sweetly.... The engineer, if it is proper to say so, is almost a partner of nature, unlocking her secrets, changing what she reveals, playing with wonders, and making such exquisite counterfeits that we take for truth what is certainly artificial.” (“King Theoderic to the Illustrious Patrician Boethius [c. 506],” *Cassiodorus: Variae*, trans. and ed., S.J.B. Barnish [Liverpool, 1992], I.45, pp. 20-23).

While Dee may have known the *Variae* directly (the first complete edition was published in 1533), Agrippa’s *De occulta philosophia* (“On Occult Philosophy”), “a synthesis of Hermetic Platonism and the cabala” as well as “a work Dee knew well” (French, p. 30), is probably the source for this list of wondrous automata produced through the knowledge and application of mathematics: “Also we read of the Statues of Mercury, which did speak, and the wooden Dove of Arthita, which did fly, and the miracles of Boethius, which Cassiodorus made mention of, *viz.* Diomedes in Brass, sounding a Trumpet, and a brazen Snake hissing, and pictures of birds singing most sweetly. Of this kind are those miracles of Images which proceed from Geometry, and Optics ...” (Book 2, ch. 1; <<http://www.esotericarchives.com/agrippa/agrippa2.htm>>).
⁸ *self-moving* Not identified, although clearly some kind of early automaton.

¹ *the Metaphysical Philosopher* given Dee’s anti-Aristotelianism, probably Plato.

² <*> *Art Mathematical Derivative* [Dee’s note].

³ *Thaumaturgic* from Greek and medieval Latin, meaning “wonder-working” and “conjurer”: here, the art of constructing marvellous or apparently magical devices, particularly simulacra and automata (this usage is Dee’s invention). Much of Dee’s discussion here is based upon Chapter 43 (“Of Mathematical Magic”) of Heinrich Cornelius Agrippa’s *Vanity and Uncertainty of Arts and Sciences*, trans. Ja[mes] San[ford] (London, 1569). See J.P. Zetterberg, “The Mistaking of ‘the Mathematicks’ for Magic in Tudor and Stuart England,” *Sixteenth Century Journal* 11.1 [1980]: p. 89. See p. 5, note 10.

⁴ *pneumatitheme* the science of manipulating air and air pressure, in modern parlance, “pneumatics” (the word is Dee’s invention); *Ctesibius* (fl. 270 BCE), inventor of a number of “devices employing ‘pneumatics,’ i.e. the action of air under pressure” (*OCD*, p. 412); *Hero* of Alexandria (fl. 62 CE), mathematician and inventor, author of works on geometry, “practical mensuration,” as well as the *Pneumatica*, “on the construction of devices worked by compressed air, steam, and water” (*OCD*, p. 698).

⁵ *Timaens* the chief speaker in Plato’s dialogue *Timaens*.

⁶ *images of Mercury* See p. 4, note 7; *brazen head made by Albertus Magnus* otherwise known as St Albert the Great (c. 1206-80), scientist, philosopher, and Dominican friar who attempted the first synthesis of Aristotelean and Platonic traditions with those of Christi-

Denis by Paris,¹ I saw once or twice (*Orontius*² being then with me, in company), it were too strange
 190 to tell, but some have written it. And yet, I hope, it
 is there of other to be seen. And by *perspective* also
 strange things are done, as partly before I gave you
 to understand in *perspective*:³ as, to see in the air aloft
 the lively image of another man, either walking to
 195 and fro or standing still; likewise, to come into a
 house and there to see the lively show of gold, silver,
 or precious stones, and coming to take them in your
 hand to find nought but air. Hereby have some
 men—in all other matters counted wise—foully
 200 overshot themselves, misdeeming⁴ of the means.
 Therefore said Claudius Coelestinus: *Hodie magnae literaturae viros et magnae reputationis videmus, opera quedam quasi miranda, supra Naturam putare: de quibus in perspectiva doctus causam facilliter reddidisset.*⁵ That is: “Nowa-
 205 days, we see some men, yea of great learning and reputation, to judge certain works as marvellous, above the power of Nature, of which works one that were skilful in perspective might easily have given the cause.”

[...]

¹ <*> * Anno. 1551 [Dee’s note].

² *Orontius* Oronce Fine (Orontius Finaeus Delphinatus [1494-1555]), astronomer, mathematician, and cosmographer. By the time he and Dee met, Fine had been chair of mathematics at the Collège Royal in Paris for twenty years. He edited and augmented Bartholomaeus Zambertus’s Latin edition of *Euclid’s Elements* (Paris, 1532), produced treatises on astronomical instruments, popularized theoretical astronomy, and wrote elementary expositions of geometry (largely based on Euclid) and arithmetic (E. Pouille, “Oronce Fine,” *Dict. Scientific Biography*, vol. 15/16, pp. 153-57). Dee includes Orontius among an illustrious group of learned men, who became “desirous of [his] acquaintance and conference” after his public lectures in Paris, and with whom he later corresponded (“Compendious Rehearsal,” p. 8).

³ I.e., in the earlier section on the science of “Perspective” (b.i^r“).

⁴ *misdeeming* misunderstanding; in this case, “thinking evil of.”

⁵ <*> *De his quae Mundo mirabiliter eveniunt. cap. 8* [Dee’s note]. The complete title is: *De his quae mundo mirabiliter eveniunt: ubi de sensum erroribus, et potentiis animae, ac de influentiis caelorum* (“Concerning those things which happen marvellously on earth: treating of the errors of perception, and the power of the soul, as well as the influence of the heavens”). Written by Claude Rapine (Le père Claudius; also known as Claudius Caelestinus; Celestinus; Célestin [d. 1493]), it was published in Paris in 1542 (French trans., Lyons, 1557; La Bibliothèque Nationale de France, online catalogue).

Marvellous was the workmanship of late days performed by good skill of *trochilic*,⁶ etc., for in Nuremberg, a fly of iron, being let out of the artificer’s hand, did (as it were) fly about by the guests at the table, and at length, as though it were weary, return to his master’s hand again. Moreover, an artificial eagle was ordered to fly out of the same town a mighty way, and that aloft in the air, toward the Emperor coming thither, and followed him being come to the gate of the town.⁷
 *⁸Thus, you see what *art mathematical* can perform when skill, will, industry, and ability are duly applied to proof.

⁹And for these, and such like marvellous arts and feats naturally, mathematically, and mechanically wrought and contrived, ought any honest student and modest Christian philosopher be counted and called a *conjurer*?¹⁰ Shall the folly of idiots and the malice of the scornful so much prevail that he who seeketh no worldly gain or glory at their hands, but only of God the treasure of heavenly wisdom and knowledge of pure verity; shall he (I say) in the mean space be robbed and spoiled of his honest name and fame? He that seeketh (by St. Paul’s advertisement) in the creature’s properties and wonderful virtues to find just cause to glorify the eternal and almighty Creator

⁶ *trochilic* the science or art of rotary motion; elsewhere in the “Preface,” Dee defines this practical application of mathematics as “wheel art” (c.iv.“).

⁷ Regiomontanus (Johannes Müller von Königsberg [1436-76]), astronomer and mathematician, was reportedly responsible for these mechanical inventions, the latter of which welcomed the Emperor Maximilian I (1459-1519) on a visit to Nuremberg (*Catholic Encycl.*).

⁸ <*> * [Dee’s note].

⁹ <*> *A Digression. Apologetical* [Dee’s note]. “Apologetical” means “in defence.”

¹⁰ Dee’s problems in this regard are well-known and partly motivated both *Compendious Rehearsal*, “A Letter ... Containing a Most Brief Discourse Apologetical,” as well as the justifications scattered throughout many of his published works (such as in the preface to *The Perfect Art of Navigation*). Dee recounts his own experience of performing feats of “mathematical magic,” when he constructed a flying scarabaeus [beetle] for a Cambridge university dramatic performance of Aristophanes’ comedy *Peace* (“Compendious Rehearsal,” pp. 5-6).

by:¹ shall that man be in hugger mugger² condemned as a companion of the hell-hounds and a caller and conjurer of wicked and damned spirits? He that bewaileth his great want of time sufficient (to his contentation³) for learning of godly wisdom and godly verities in, and only therein setteth all his delight: will that man lose and abuse his time in dealing with the chief enemy of Christ our Redeemer, the deadly foe of all mankind, the subtle and impudent perverter of godly verity, the hypocritical crocodile, the envious basilisk,⁴ continually desirous, in the twink of an eye, to destroy all mankind both in body and soul eternally?

Surely—for my part, somewhat to say herein—I have not learned to make so brutish and so wicked a bargain. Should I, for my twenty or twenty-five years' study; for two or three thousand marks' spending; seven or eight thousand miles' going and travelling only for good learning's sake—and that in all manner of weathers; in all manner of ways and passages (both early and late); in danger of violence by man; in danger of destruction by wild beasts; in hunger; in thirst; in perilous heats by day, with toil on foot; in dangerous damps of cold by night, almost bereaving life (as God knoweth); with lodgings oft times to small ease, and sometime to less security—and for much more than all this done and suffered for learning and attaining of wisdom: should I (I pray you) for all this, no otherwise nor more warily, or (by God's mercifulness) no more luckily, have fished with so large and costly a net, so long time in drawing (and

that with the help and advice of Lady Philosophy and Queen Theology), but at length to have caught and drawn up*⁵ a frog? Nay, a devil? For, so doth the common, peevish prattler imagine and jangle, and so doth the malicious scorner secretly wish and bravely and boldly face down, behind my back.

Ah, what a miserable thing is this kind of men? How great is the blindness and boldness of the multitude in things above their capacity? What a land, what a people, what manners, what times are these?⁶ Are they become devils themselves, and by false witness bearing against their neighbour would they also become murderers?⁷ Doth God so long give them respite to reclaim themselves in from this horrible slandering of the guiltless, contrary to their own consciences, and yet will they not cease? Doth the innocent forbear the calling of them juridically to answer him, according to the rigor of the laws, and will they despise his charitable patience? As they, against him, by name do forge, fable, rage, and raise slander by word and print, will they provoke him by word and print likewise to note their names to the world, with their particular devices, fables, beastly imaginations, and unChristianlike slanders?

Well, well, O (you such) my unkind countrymen! O unnatural countrymen! O unthankful countrymen! O brainsick, rash, spiteful, and disdainful countrymen! Why oppress you me thus violently with your slandering of me, contrary to verity and contrary to your own consciences? And I, to this hour, neither by word, deed, or thought have been any way hurtful, damageable, or injurious to you or yours? Have I so long, so dearly, so far, so carefully, so painfully, so dangerously sought and travailed⁸ for the learning of wisdom

¹ *He that seeketh ... St Paul's advertisement ... Creator by* Although Paul does not say anything exactly like this in any of his epistles, it is close in spirit to Romans 1:20-21 and Romans 8:21. Thanks to Michael Treschow (UBC-O, English) for assistance with this note.

² *in hugger mugger* in secret, secretly, clandestinely.

³ *contentation* contentment.

⁴ The crocodile was so-called because it was believed to weep, either to allure a man for the purpose of devouring him, or while (or after) devouring him; hence figuratively, a person who weeps or makes a show of sorrow hypocritically or with a malicious purpose. The basilisk was a fabled reptile, also called a cockatrice, alleged to be hatched by a serpent from a cock's egg; ancient authors stated that its hissing drove away all other serpents, and that its breath, and its look, was fatal.

⁵ <*> ** A proverb, Fair fished, and caught a frog* [Dee's note]. See Tilley F767: "You fish fair and catch a frog," meaning a person has accomplished little after a great deal of effort.

⁶ *what manners ... these* A variant on the common Latin proverb, *O tempora! O mores!* ("What times! What customs!").

⁷ *become murderers* because witchcraft or sorcery was a crime punishable by death.

⁸ *travailed* laboured, worked.

305 and attaining of virtue, and in the end (in your
judgement) am I become worse than when I
began? Worse than a madman? A dangerous
member in the commonwealth, and no member of
the Church of Christ? Call you this, to be learned?
310 Call you this, to be a philosopher and a lover of
wisdom? To forsake the straight heavenly way, and
to wallow in the broad way of damnation? To
forsake the light of heavenly wisdom, and to lurk
in the dungeon of the Prince of Darkness? To
315 forsake the verity of God and his creatures, and to
fawn upon the impudent, crafty, obstinate liar and
continual disgracer of God's verity, to the utter-
most of his power? To forsake the life and bliss
eternal, and to cleave unto the author of death
320 everlasting, that murderous tyrant, most greedily
awaiting the prey of man's soul?

Well, I thank God and our Lord Jesus Christ for
the comfort which I have by the examples of
other men before my time, to whom neither in
325 godliness of life nor in perfection of learning I am
worthy to be compared; and yet, they sustained
the very like injuries that I do, or rather greater.
Patient *Socrates* his *Apology* will testify;¹ *Apuleius* his
*Apologies*² will declare the brutishness of the mul-
titude; *Joannes Picus*, earl of Mirandula, his *Apology*
330 will teach you of the raging slander of the mali-
cious ignorant against him;³ *Joannes Trithemius* his

¹ In Plato's *Apology*, Socrates defends himself against the charge that he "is an evil-doer, and a curious person, who searches into things under the earth and in heaven, and he makes the worse appear the better cause" (*Dialogues of Plato*, trans. B. Jowett, vol. 1. [New York, 1920], p. 402). He was also accused of teaching atheism and thus corrupting the piety and religious convictions of Athenian youth (p. 409). "Apology" meant "defence" in early modern English.

² *Apuleius his Apologies* Apuleius (c. 125 CE-after 170 CE), writer and orator, was accused and tried on charges of sorcery. The accusation (of which he was finally acquitted) that he had used magic to win the hand of a wealthy widow in marriage was grounded in the jealousy and vengefulness of her defeated suitor and the greed of some of her relations. See *The Apologia and Florida of Apuleius of Madaura*, trans. H.E. Butler (Oxford, 1909), especially, pp. 24-26, 30, 39-43, 56-60, 153-58.

³ *Jo[h]annes Picus, earl of Mirandula, his Apology* Giovanni Pico della Mirandola (1463-94), theologian and philosopher, whose work combines Christianity, the Kabala, and natural magic. His *Apologia* (or *Defence*; Naples, 1487) was prompted by the Church's refusal to sanction thirteen of the nine hundred theses which he had recently pub-

*Apology*⁴ will specify how he had occasion to make
public protestation, as well by reason of the rude
335 simple, as also in respect of such as were counted
to be of the wisest sort of men. Many could I
recite, but I defer the precise and determined han-
dling of this matter, being loath to detect the folly
and malice of my native countrymen;*⁵ who so
hardly can digest or like any extraordinary course
340 of philosophical studies, not falling within the
compass of their capacity, or where they are not
made privy of the true and secret cause of such
wonderful philosophical feats.

[...]

345 Thus, I require you, my assured friends and coun-
trymen (you mathematicians, mechanics,⁶ and

lished in *Conclusiones sive theses DCCCC* (1486). After the publication of Pico's *Apologia*, however, Pope Innocent VII was persuaded to condemn all the theses, and Pico was soon after imprisoned. Those which the authorities found most objectionable appeared to question Christ's descent into Hell after his resurrection, the eternity of Hell itself, the adoration due to the Cross and other religious images, as well as God's rationality. The statements on the miracles of Christ, however, and "the one concerned with proving his divinity with the aid of magic and Kabbalah" (p. 57) may be uppermost in Dee's mind here (W.G. Craven, *Giovanni Pico della Mirandola: Symbol of His Age* [Genève, 1981], especially pp. 47-75).

⁴ *Joannes Trithemius his Apology* Johannes Trithemius (1462-1516), abbot of Sponheim, alchemist and author of *Steganographia* (published 1606), a combination of cryptographic manual and "cabalist angel-magic" (French, p. 36). Dee made a copy of the manuscript for his library, and he also had copies of Trithemius' *Polygraphia* and *De septem secundadeis*, "a work on cabalist angel-magic" (French, p. 52). Trithemius does not appear to have published an official defence of his work, but Dee may be referring to Trithemius' letter to Johannes Capellerius, 16 Aug 1507, wherein the abbot "publicly denied that he had any such abilities as to raise the dead, tell the future, or jinx thieves and scoundrels with incantations" (F.L. Borchardt, "The *Magus* as Renaissance Man," *Sixteenth Century Journal* 21.1 [1990]: p. 64, especially n37).

⁵ <> * [Dee's note]. Double quotation marks (") appear in the margin from "Many could I recite" to "wonderful Philosophical feats," below. See p. 3, note 3.

⁶ *mechanicians* Elsewhere in the "Preface," Dee defines a mechanician as one "whose skill is, without knowledge of mathematical demonstration, perfectly to work and finish any sensible work, by the mathematician principal or derivative, demonstrated or demonstrable" (a.iii). For Dee, mechanicians were those individuals who employed applied mathematics in their crafts, trades, and occupations, such as mechanics, builders, surveyors, navigators, and makers of optical glasses.

philosophers, charitable and discreet), to deal in my behalf with the light and untrue tongued, my envious adversaries or fond¹ friends. And farther
 350 I would wish that at leisure you would consider 385 how *Basilius Magnus* layeth *Moses* and *Daniel* before the eyes of those which count all such studies philosophical (as mine hath been) to be ungodly or unprofitable. Weigh well *St. Stephen*,
 355 his witness of *Moses*: *Eruditus est Moses omni sapientia Aegyptiorum: et erat potens in verbis et operibus suis*.² “*Moses was instructed in all manner of wisdom of the Egyptians: and he was of power both in his words and works.*” You see this philosophical power and
 360 wisdom which *Moses* had to be nothing disliked 395 of the Holy Ghost. Yet *Plinius* hath recorded *Moses* to be a wicked *magician*.³ And that (of force) must be either for this philosophical wisdom, learned before his calling to the leading
 365 of the children of *Israel*, or for those his wonders 400 wrought before King *Pharaoh*, after he had the conducting of the *Israelites*.⁴ As concerning the first, you perceive how *St. Stephen* at his martyrdom (being full of the Holy Ghost) in his recapitulation of the Old Testament hath made
 370 mention of *Moses*’ philosophy, with good liking of it. And *Basilius Magnus*⁵ also avoucheth it to have been to *Moses* profitable (and therefore, I
 405 say, to the Church of God necessary). But as concerning *Moses*’ wonders done before King *Pharaoh*, God himself said, *Vide ut omnia ostenta, quae posui in manu tua, facias coram Pharaone*: “*See that thou do all those wonders before Pharaoh, which I have put in thy hand.*”⁶ Thus, you evidently perceive
 375 how rashly *Plinius* hath slandered *Moses* of vain 410 fraudulent *magic*, saying, *Est et alia Magices Factio, a*

*Mose, Iamne, et Iotape, Iudaeis pendens: sed multis milibus annorum post Zoroastrem, etc.*⁷

Let all such, therefore, who in judgement and skill of philosophy are far inferior to *Pliny* take good heed, lest they overshoot themselves rashly in judging of *Philosophers*⁸ *strange Acts* and the means how they are done. But much more ought they to beware of forging, devising, and imagining monstrous feats and wonderful works, when and where no such were done; no, not any spark or likelihood of such as they without all shame do report. And (to conclude) most of all let them be ashamed of man and afraid of the dreadful and just judge, both foolishly or maliciously to devise and then devilishly to father their new, fond monsters on me—innocent in hand and heart for trespassing either against the law of God or man in any my studies or exercises, philosophical or mathematical, as in due time, I hope, will be more manifest.⁹

[...]

Here I must end thus abruptly (gentle friend and unfeigned lover of honest and necessary verities). For they who have (for your sake and virtue’s cause) requested me (an old forworn¹⁰ mathematician) to take pen in hand—through the confidence they reposed in my long experience and tried sincerity—for the declaring and reporting somewhat of the fruit and commodity by the *arts mathematical* to be attained unto; even they, sore against their wills, are forced for sundry causes to satisfy the workman’s request in ending forthwith: he so

¹ *fond* foolish, indiscreet.

² <*> *Act. 7. C.* [Dee’s note]. The quotation is from the Latin Vulgate Bible: Acts 7:22.

³ *Pliny, Natural History*, 2.373a.

⁴ *or for those his wonders ... Israelites* a reference to the various wonders and signs that *Moses* performed in order to persuade *Pharaoh* to release the *Israelites* from their bondage in Egypt. See Exodus 7:8-11:10.

⁵ *Basilius Magnus* *St Basil the Great* (c. 329-379 CE), bishop of Caesarea and Doctor of the Church.

⁶ Vulgate, Exodus 4:21.

⁷ <*> *Lib. 30. Cap. 1* [Dee’s note]. The quotation is from *Pliny’s Natural History*: “There is another magical group, deriving from *Moses*, *Jannes*, *Lotapes* and the *Jews*, but many thousands of years after *Zoroaster*.” See J.G. Gager, *Moses in Greco-Roman Paganism* (Nashville/New York, 1972), pp. 134-61.

⁸ <*> There are double quotation marks (”) in the margin beside the lines beginning “therefore who in judgement and skill” and ending “in judging of *Philosophers*.” See p. 3, note 3. In the margin beside the line beginning “good heed” and ending “judging of *Philosophers*” there is also a •.

⁹ The three major points in this paragraph are highlighted by marginal Arabic numerals: 1 [“Let all such ... how they are done.”], 2 [“But much more ... do report.”], 3 [“And to conclude ... manifest.”].

¹⁰ *forworn* worn out, exhausted.

feareth this so new an attempt and so costly, and in matter so slenderly (hitherto) among the common sort of students considered or esteemed.

415 And where I was willed somewhat to allege why in our vulgar speech this part of the principle science of *geometry*, called *Euclid's Geometrical Elements*, is published to your handling, being unlatined people and not university scholars:
420 verily, I think it needless.

¹For, the honour and estimation of the universities and graduates is hereby nothing diminished, seeing from and by their nurse-children² you receive all this benefit, how great soever it be.

425 ³Neither are their studies hereby any whit hindered, no more than the Italian *universities*—as *Academia Bononiensis, Ferrariensis, Florentina, Mediolanensis, Patavina, Papiensis, Perusina, Pisana, Romana, Senensis*,⁴ or any one of them—find themselves
430 any deal disgraced or their studies any thing hindered by *Frater Lucas de Burgo* or by *Nicolaus Tartalea*,⁵

¹ <*> 1 [Dee's note].

² *nurse-children* foster children.

³ <*> 2 [Dee's note].

⁴ I.e., Bologna; Ferrara; Florence; Milan; Padova; Pavia; Perugia; Pisa; Rome; Siena.

⁵ *Frater Lucas de Burgo* Luca Pacioli (Lucas de Burgo [c. 1445-1517]), Italian mathematician and Franciscan friar, taught mathematics in Perugia, Rome, Naples, and Venice. In 1500, he took up an appointment to teach Euclid's *Elements* at the university of Pisa. He published his Latin edition of Euclid in 1509; however, his "Italian translation of [the work] ... [was] not published and there is no trace of the manuscript." His most influential work—the encyclopaedic *Summa de arithmetica, geometria, proportioni et proportionalita* (1494), which comprises "a general treatise on theoretical and practical arithmetic; the elements of algebra; a table of moneys, weights, and measures used in the various Italian states; a treatise on double-entry bookkeeping; and a summary of Euclid's geometry"—was written in Italian. His *Divina proportione*, a work on geometry and architecture, was also published in Italian (1509). See S.A. Jayawardene, "Luca Pacioli," *Dict. Scientific Biography*, vol. 9/10, pp. 269-72.

Nicolaus Tartalea Niccolò Tartaglia (also Tartalea or Tartafia [1499/1500-1557]), an Italian mathematician, wrote works on mechanics, topography, and military science. In addition to his original works, he also produced the first Italian translation of Euclid's *Elements* (with commentary; 1543), "the first printed translation of the work into any modern language," as well as edited and published a thirteenth-century Latin translation of Archimedes' works. In 1551, he published an Italian translation of part of this Latin Archimedes, along with a commentary. See A. Masotti, "Niccolò Tartaglia," *Dict. of Scientific Biography*, vol. 13/14, pp. 258-62.

who in vulgar⁶ Italian language have published not only *Euclid's Geometry*, but of *Archimedes* somewhat, and in arithmetic and practical geometry very large volumes, all in their vulgar speech. Nor in Germany have the famous *universities* any thing been discontent with *Albertus Durerus*,⁷ his *Geometrical Institutions* in Dutch; or with *Gulielmus Xylander*, his learned translation of the first six books of *Euclid* out of the Greek into the high Dutch;⁸ nor with *Gualterus H. Rissius*,⁹ his geometrical volume very diligently translated into the high Dutch tongue and published. Nor yet the *universi-*

⁶ *vulgar* common, ordinary; vernacular.

⁷ *Albertus Durerus* Albrecht Dürer (1471-1528), painter, engraver, and mathematician. Dee refers here to Dürer's *Underweysung der Messung mit Zirckel und Richtscheit in Linien, Ebenen und gantzen Corporen* ("Treatise on Mensuration with the Compass and Ruler in Lines, Planes, and Whole Bodies"; Nuremberg, 1525), translated into Latin in 1538 as *Institutionem geometricarum*. See M. Steck, "Albrecht Dürer," *Dict. Scientific Biography*, vols. 3/4, pp. 258-61. This work offers a geometrical and mathematical treatment of the problems of artistic perspective aimed at an audience of artists and artisans, not unlike Dee's audience of "mechanicians": "It is this skill [i.e., 'the art of measurement' or geometry] which is the foundation of all painting. For this reason, I have decided to provide to all those who are eager to become artists a starting point and a source for learning about measurement with ruler and compass... It is well meant and intended for everyone desirous of learning about art—not only for painters, but also for goldsmiths, sculptors, stonemasons, and carpenters. All those who use measurement will find it useful." See *The Painter's Manual*, trans. and comm., W.L. Strauss (New York, 1977), p. 37. "The *Underweysung der Messung* is the first mathematics book in German," and it gave Dürer "a place in the front ranks of Renaissance mathematicians." All of Dürer's works, including his important *Vier Bücher von menschlicher Proportion* ("Treatise on Proportion"; 1528), were published originally in German (Steck, *Dict. Scientific Biography*, p. 260).

⁸ *Gulielmus Xylander* (Wilhelm Holtzmann [1532-76]), professor at the University of Heidelberg from 1558. Holtzmann produced one of the first German translations of Euclid's *Elements* (books 1-6 only) in 1562. This edition contained a commentary which like that of Robert Recorde's English edition "attempt[ed] to reduce the *Elements* to practice," specifically aiming at the interests of "painters, goldsmiths, and builders." See J. Murdoch, "Euclid: Transmission of the *Elements*," *Dict. Scientific Biography*, vols. 3/4, p. 449, 451. Holtzmann was also responsible for the first Latin translation of the *Arithmetic* of Diophantus (1575). See K. Vogel, "Diophantus of Alexandria," *Dict. Scientific Biography*, vol. 3/4, p. 117.

⁹ *Gualterus H. Rissius* probably Gualterus Hermenius Rivius (Walther Hermann Ryff [ca. 1500-48]), physician, mathematician, and prolific author, responsible for the first German translation in 1548 of the ancient Roman writer Vitruvius' *On Architecture*.

445 *ties* of Spain or Portugal think their reputation to
 be decayed or suppose any their studies to be hin-
 dered by the excellent *P. Nonius*,¹ his mathematical
 works in vulgar speech by him put forth. Have you
 450 not likewise in the French tongue the whole math-
 ematical quadrivvy?² And yet neither Paris, Orleans,
 or any of the other universities of France at any
 time with the translators or publishers offended,
 or any man's study thereby hindered?

3And surely the common and vulgar scholar
 (much more, the grammarian) before his coming
 455 to the *university*⁴ shall (or may) be now (according
 to *Plato* his counsel) sufficiently instructed in *arith-*
metic and *geometry*, for the better and easier learning
 of all manner of *philosophy*, *academical* or *peripatetic*.⁵
 460 And by that means go more cheerfully, more skil-
 fully, and speedily forward in his studies, there to
 be learned. And so in less time, profit more than
 otherwise he should or could do.

6Also many good and pregnant English wits—
 of young gentlemen and of other, who never
 465 intend to meddle with the profound search and
 study of philosophy (in the *universities* to be

¹ *P. Nonius* Pedro Salaciense Nuñez (1502-78), mathematician and royal cosmographer (appointed 1529), professor of mathematics (Lisbon and Coimbra, 1544-62), and chair of logic (Lisbon, appointed 1530). Widely regarded as “the greatest of Portuguese mathematicians,” Nuñez made significant original contributions to the fields of instrument design, navigation, physics, geometry, and astronomy. He published a number of works in Portuguese, including *Tratado da sphaera* (Lisbon, 1537; Latin trans., 1566; French trans., before 1562) and *Libro de álgebra en aritmética y geometría* (Antwerp, 1567). He also published, however, many works in Latin. See J.M. López de Azcona, “Pedro Salaciense Nuñez,” *Dict. Scientific Biography*, vol. 9/10, pp. 160-62.

² *mathematical quadrivvy* i.e., the four sciences which comprised the quadrivium of Renaissance learning: arithmetic, geometry, astronomy, and music.

³ <*> 3 [Dee's note].

⁴ The “common and vulgar scholar” is one who is self-educated or educated through apprenticeship as opposed to the “grammarian,” one who has had the benefit of a grammar-school education; the former would be unlikely to know Latin, the international language of scholarship, a subject much emphasized in Renaissance grammar schools.

⁵ *academical* of or pertaining to Platonic philosophy; *peripatetic* of or pertaining to Aristotelean philosophy. Dee's anti-Aristotelianism was well-known.

⁶ <*> 4 [Dee's note].

learned)—may nevertheless now with more ease
 and liberty have good occasion virtuously to
 occupy the sharpness of their wits; where else (per-
 470 chance) otherwise, they would in fond exercises
 spend (or rather lose) their time, neither serving
 God nor furthering the weal,⁷ common or private.

8And great comfort, with good hope, may the
universities have, by reason of this *English Geometry*
 and “Mathematical Preface,” that they hereafter
 shall be the more regarded, esteemed, and
 resorted unto. For when it shall be known and
 reported that of the *mathematical sciences* only⁹ such
 great commodities are ensuing (as I have speci-
 475 fied)—and that indeed some of you unlatined stu-
 dents can be good witness of such rare fruit by
 you enjoyed (thereby), as either before this was not
 heard of, or else not so fully credited—well may all
 men conjecture that far greater aid and better fur-
 480 niture¹⁰ to win to the perfection of all philosophy
 may in the *universities* be had, being the storehouses
 and treasury of all sciences and all arts necessary
 for the best and most noble state of common-
 wealths.¹¹

12Besides this, how many a common artificer¹³
 490 is there in these realms of England and Ireland that
 dealeth with numbers, rule, and compass, who,
 with their own skill and experience—already had—
 will be able (by these good helps and informations)
 495 to find out and devise new works, strange engines
 and instruments for sundry purposes in the com-
 monwealth? Or for private pleasure? And for the
 better maintaining of their own estate? I will not,
 therefore, fight against mine own shadow.¹⁴ For no

⁷ *the weal* the good.

⁸ <*> 5 [Dee's note].

⁹ *only* alone.

¹⁰ *furniture* knowledge.

¹¹ <*> From “well may all men conjecture” to the end of the paragraph is marked by double quotation marks [“]. There is also a ◀ beside “most noble state of commonwealths” and, above this, the word *universities*.

¹² <*> 6 [Dee's note].

¹³ *artificer* craftsman.

¹⁴ Proverb, “to fight with one's own shadow” (*Tilley* S262), meaning “to be afraid of [one's] own fancies, imagining danger or enemies, where there are none.”

500 man (I am sure) will open his mouth against this
 enterprise; no man, I say, who either hath charity
 toward his brother—and would be glad of his fur- 525
 therance in virtuous knowledge—or that hath any
 care and zeal for the bettering of the common
 505 state of this realm; neither any that make accompt¹
 what the wiser sort of men (sage and staid) do 530
 think of them. To none, therefore, will I make any
apology for a virtuous act doing and for commend-
 ing or setting forth profitable arts to Englishmen in
 510 the English tongue. But unto God our Creator let
 us all be thankful; for that, *As he of his goodness, by* 535
his power, and in his wisdom hath created all things, in
*number, weight, and measure,*² so to us of his great
 mercy he hath revealed means whereby to attain
 515 the sufficient and necessary knowledge of the fore-
 said his three principle instruments, which means I 540
 have abundantly proved unto you to be the *sciences*
 and *arts mathematical*.³

520 And though I have been pinched with strait-
 ness⁴ of time that no way I could so pen down the
 matter (in my mind) as I determined, hoping of 545
 convenient leisure, yet if virtuous zeal and honest
 intent provoke and bring you to the reading and

examining of this compendious treatise, I do not
 doubt but as the verity thereof (according to our
 purpose) will be evident unto you, so the pith and
 force thereof will persuade you, and the wonder-
 ful fruit thereof highly pleasure you. And that you
 may the easier perceive and better remember the
 principle points whereof my preface treateth, I
 will give you the groundplat of my whole dis-
 course in a table annexed,⁵ from the first to the
 last, somewhat methodically contrived.

If haste hath caused my poor pen anywhere to
 stumble, you will (I am sure), in part of recom-
 pense for my earnest and sincere good will to
 pleasure you, consider the rockish, huge moun-
 tains and the perilous, unbeaten ways, which (both
 night and day, for the while) it hath toiled and
 540 laboured through to bring you this good news and
 comfortable proof of virtue's fruit.

So I commit you unto God's merciful direction,
 and for the rest, heartily beseeching him to
 prosper your studies and honest intents to his
 glory and the commodity of our country. *Amen.*

—1570

¹ *acompt* account.

² In RSV, "The Wisdom of Solomon," 11:20; in the Vulgate, "The Book of Wisdom," 11:21.

³ <*> There are double quotations (") beside the lines beginning "But, unto God our Creator" and ending "arts mathematical." The italicized portion is additionally highlighted by a ● in the margin.

⁴ *straitness* restricted nature of; lack of (see "straits of time," in "strait," n. 2c., *OED*).

⁵ <*> The Groundplat of this Preface in a Table [Dee's note]. A ground-plat is a "ground plot" or "ground plan."