

The Calvinist Copernicans

The reception of the new astronomy
in the Dutch Republic, 1575-1750

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three in persons, as he clearly demonstrates in his writings.’²⁶¹ One should not attach too much value to such rather casual references to Hermes, although one should remember that Lansbergen does not often quote authorities.²⁶² However, there are other references. At another place, he referred to a ‘very true’ axiom of Hermetic philosophy, ‘that everything which is present within the circumference of a circle in a diffused state, is also contained potentially collected in the centre of this very circle.’²⁶³ This sounds very hermetic indeed. What it implies is that, as the light is in a diffused way present in the sphere of the fixed stars, it must also be present in the centre of this sphere. Hence the earth, which is not a luminous body, cannot be there; at the centre of the world should be the sun.²⁶⁴

Alchemy and the motion of the earth

Quite interestingly, Lansbergen also referred to alchemy: he called it ‘lower astronomy’, a name sometimes used at the time.²⁶⁵ He appears to have been well versed in alchemical literature. In the *Progymnasmatum*, he expresses amazement that such a diligent alchemist as Tycho Brahe thought the motion of the earth unacceptable: ‘from the writings by those who have practised this art, he could have learnt, that the daily rotation visible in the heavens, is in reality proper to the earth.’ He therefore refers to the medieval philosopher Roger Bacon, as well as to his compatriot, the ‘*summus philosophus*’ Cornelis Drebbel, who should have demonstrated this with his own hand.²⁶⁶

The reference to Bacon was second-hand; Lansbergen took it, as he explains, from the German chemist Libavius.²⁶⁷ The reference to Drebbel is more interesting. Drebbel was born in or around 1572 in Alkmaar and

²⁶¹ Lansbergen (1629) 59.

²⁶² Lansbergen’s Hermeticism is discussed by Donahue (1981) 128, 155, 243.

²⁶³ Lansbergen (1619) 110.

²⁶⁴ This explication is given by Polacco (1644) 110 (assertio 180). Note the resemblance to Beekman’s later speculation.

²⁶⁵ Telle (1992) 239. Crosland (1962) 6.

²⁶⁶ Lansbergen (1628) 105–106. The reference to Tycho concerns *Epist. Astr.* 1, [1596] 117: his letter to Rothmann, 17 August 1588. See Brahe (1919/1972) VI, 146.

²⁶⁷ According to Hooykaas, the reference is to Andreas Libavius, *Examen philosophiae novae, quae veteri abrogandae opponitur* (Frankfurt 1615) 58 footnote 16: *Coelestem familiam transferre in globum terrenum, et totam oeconomiam exacte repraesentare, quale quid fecisse dicitur Archimedes, Drebelius, et alii. (...) Arbitratur Rogerus materiam posse invenire, quid quaedam apud nos sic moveatur ut coelum, veluti Cometae, maris aestus esc. Verum haec opinio est. Drebelius aliud videtur excogitam, ad exemplum motus, qui sit in arcanis lapidis vitro inclusi, etc...* (Collection Hooykaas).

developed into a kind of technological wizard.²⁶⁸ Initially, he tried to make a living as a technician in the Republic. He obtained letters patent for several inventions and was engaged, in 1600 or 1601, in the construction of water pumps for the town of Middelburg.²⁶⁹ Still, he was no ordinary engineer. Drebbel posed as a kind of miracle-maker who, by his knowledge of the hidden mysteries of nature, could work great things. Thorndike described him as 'probably the most pretentious, secretive and magical figure of the early seventeenth century.'²⁷⁰ Drebbel's claims can only be understood in the framework of a magical and neo-Platonic worldview. He soon left the Republic for the Renaissance courts of London and Prague, where, probably, he found more scope for such an attitude than in the rather down-to-earth atmosphere of the Dutch Republic.²⁷¹

Still, his compatriots did not forget him and probably felt some pride in his being appreciated by royalty. Some of them appear even to have sympathised with his esoteric ideas. Drebbel's most ardent supporter in the Dutch Republic was his fellow citizen from Alkmaar, Gerrit Schagen, a self-taught man celebrated for his learning. Regrettably, hardly anything is known about Schagen. He published several books to promote Drebbel's fame. The first of these was published in 1607. Its contents are summarised in the rather longish title: 'Miraculous discovery of the perpetual motion, which Cornelis Drebbel, philosopher from Alkmaar, has occasioned by a perpetual moving spirit contained in a sphere. Whose dedication (on the occasion of his offering it to the powerful King James of Great Britain) is rendered here verbatim [*naecktelijck*]. Equally the testimonies offered by Cicero, Claudianus and Lactantius of the perpetual motion allegedly found by Archimedes. Equally from Bartas on Ferdinand, who has sent a perpetual motion to the Turkish emperor at Byzantium. Equally is added a book Pymander, written by Mercurius Trismegistos, who allegedly has been a philosopher, priest and King in Egypt in Moses' time'.²⁷²

The references to earlier examples of perpetual motion clearly serve a purpose. Schagen's aim with the latter part, which represents the first full publication of the *Corpus Hermeticum* in Dutch,²⁷³ is more difficult to assess. Still, it is by far the most comprehensive: 60 pages as opposed to 10 for the other

²⁶⁸ The fundamental study is Jaeger (1922). For a recent overview, see Snelders (1980) 110-119. English works are Tierie (1932) and Harris (1961) 119-223.

²⁶⁹ Jaeger (1922) 14-15.

²⁷⁰ Thorndike, VII, 492.

²⁷¹ Cf. Evans (1973) 81, 189.

²⁷² Schagen (1607).

²⁷³ Cf. Janssen (1989) 233-235. The translation appears to have been made after the 1548 Italian edition by Benci.

parts taken together. Apparently, Schagen thought there was some connection between the wisdom of Hermes and the inventions of Drebbel. The key part of the edition, however, was clearly the dedication by Drebbel to King James. This text is only preserved in the version offered by Schagen, which, however, turns out to be the original. Drebbel, unable to write in either English or Latin, had it translated before offering it to King James.²⁷⁴

Central to the publication is the announcement of Drebbel's discovery of perpetual motion. In the literature, one generally denotes as such Drebbel's instrument which could imitate the tides of the sea (modern authors consider it a kind of thermoscope or baroscope).²⁷⁵ This, however, seems to be based on a misunderstanding, which may have been partly intended by Drebbel. The said instrument was only one of the applications by which Drebbel wanted to demonstrate that he had penetrated to the cause of the *primum mobile*, and thus of all motion and order in the universe. Dedicating the instrument to King James of England, he explains how he has found this cause. But, 'if, My King, I could not prove this with actual [*levendige*, 'living'] instruments as well as with natural reason, I would not have dared to write as much... So, as a proof that I have found the cause of the *Primum mobile*: I make a globe which can be moved eternally after the course of the heavens, all round once in every 24 hours or so much more often as needed, so that it will not fail in a thousand years. Denoting us years, months, days and hours, as well as the course of the sun, the moon, and all planets and stars known to man...' There follows a long list of other instruments Drebbel claims he can produce, with in the end the instrument reproducing the tides, which is offered on the occasion.²⁷⁶

In fact, all these instruments should be seen as expressions of perpetual motion. More in particular, however, this name applies to the first-mentioned instrument, the globe continuously turning all round. So it was generally interpreted by Drebbel's contemporaries. Although the dedication does not state that Drebbel actually built this instrument, there exists a later description by William Boswell (who exposes it as a fraud), which presupposes a working

²⁷⁴ The letter was also printed (at least in later editions) in another book edited by Schagen, which contained a tract by Drebbel on the nature of the elements. The first edition of this book seems to have been lost, but there is a German translation from 1608 and a second Dutch edition from 1621, along with a further tract by Drebbel on the fifth essence. Most probably, the first edition was from 1607 as well. (I take as spurious an edition of 1604, which is sometimes mentioned in the literature, but which nobody has ever seen.) For a full list of all editions of Drebbel's works, see Jaeger (1922) 5-6.

²⁷⁵ Drebbel's perpetual movement is discussed by Jaeger (1922) 63-69; Harris (1961) 152-159; Michel (1971); Drake-Brockman (1994) *passim*.

²⁷⁶ Drebbel (1607) (n.p.) and (1621) 56.

prototype.²⁷⁷ In some cases, it was combined with the instrument which reproduced the tides, which at least partly accounts for the confusion. Probably, Drebbel conceived of his *perpetuum mobile* in Holland. It seems to be identical to an invention described in letters patent granted him in 1598 as ‘a watch or timepiece which can be used continuously during a time of 50, 60 or 100 years or more, without being winded up or treated in any way, as long as the wheels and the other clockwork are not worn out.’²⁷⁸ The instrument, or claim, must have been well known in the Dutch Republic. That talk of such a *perpetuum mobile* was common is attested by Mulerius: ‘Several artisans are trying with great diligence to invent an instrument [*automatum*], that moves with the heavens both eternally and equally, that is, without any intensifying or slackening of its motion. Given this, one could find geographical longitudes in the following way. (...)’²⁷⁹ (That is, by using it as a timekeeper.) Apparently, an esoteric world-view could well go with an eye for practical applications.

However, the instrument could also serve cosmological speculation. When Gerrit Schagen published Drebbel’s letter of dedication to King James, he dedicated it in his turn to the engineer Adriaen Anthonisz (note that all three – Drebbel, Schagen and Adriaen Anthonisz – came from Alkmaar). Schagen’s dedication is dated December 1607. He explains that astronomy cannot be perfectly known without Drebbel’s invention. ‘Were this science common among astronomers, one would not need so many hypotheses, and calculations of the planets and the other stars. Astronomy would be easy, and Copernicus would flourish: for he proves (by reason) that the earth moves all round every 24 hours. But this philosopher from Alkmaar is able to prove the same not just by reason, but also with actual [*levendighe*] instruments.’²⁸⁰ The allusion is rather cryptic, but as it seems, the turning globe should be seen as an image of the earth itself. The motion of the globe would therefore prove the motion of the earth.

This is indeed how Lansbergen took it. Lansbergen’s reference to Drebbel as substantiating the rotation of the earth clearly concerns the latter’s *perpetuum mobile*, the globe turning all round. Lansbergen appears not to doubt that Drebbel’s perpetual motion was a reality. As authorities to substantiate this he refers to Libavius, Fanianus and John Dee. Libavius has been mentioned already. Johannes Chrysippus Fanianus was an alchemist from Basel. His work had been included in a collection of alchemical tracts originally pub-

²⁷⁷ Jaeger (1922) 66-67.

²⁷⁸ Full text of the letters patent: Jaeger (1922) 119-120.

²⁷⁹ Mulerius (1616) 113.

²⁸⁰ Schagen (1607).

lished in 1602 and re-edited at Strasbourg in 1613 by Lazarus Zetzner.²⁸¹ The English mathematician John Dee was deeply involved in the study of Renaissance magic. The reference is to the dedication to the emperor Maximilian of his *Monas hieroglyphica*, originally published at Antwerp in 1564, but also included in Zetzner's collection.²⁸²

In fact, although these authors do mention Drebbel's claims, it is hard to take them as saying that Drebbel actually carried out the experiment. Moreover, none of these authors was a Copernican and none of them interpreted the experiment as supporting the theory of a moving earth. Drebbel spoke of it as representing the motion of the *heavens* and that is how most authors appear to have looked at it. It seems probable that Lansbergen knew of Drebbel's machine from other sources, and simply looked up some learned references to substantiate his claim. Considering Drebbel spent some time in Zealand in 1600/1601, it is even possible that the two met. It is striking that Gerrit Schagen, who had publicised Drebbel's text (equally in a Hermetic context) and indeed had represented the *perpetuum mobile* as proof that the earth is turning on its axis, is not mentioned by Lansbergen. Yet, Lansbergen holds the same view: 'Those who nowadays exercise this art [alchemy], know that the *terra physica* not only moves all around in a day, but, what is in particular remarkable, that it is moved continuously from west to east. I do not have any doubt that the great earth (*Tellus*) too is moved in a day in the same way, according to the saying by Hermes Trismegistus, '*Sic mundus creatus est*', which I earnestly approve.'²⁸³

The expression *terra physica* is not quite clear, but seems to denote the element of earth as it allegedly can be procured by alchemical operations. Drebbel's experiment reminds one of the *terrella* of William Gilbert. Froidmont already identified Lansbergen's argument with the more familiar (though hardly less esoteric) argument from magnetism and rejected it as such. However, Lansbergen's son Jacob, in his reply to Froidmont, denied such identification and pointed out that the question was about the 'physical earth' of the chemists, which appeared in chemical processes. After this explanation, Froidmont not unsurprisingly despised the argument still more and joined

²⁸¹ *Theatrum chemicum* (1613), I, 25-62. (I found this reference in the Hooykaas collection.) Cf. Ferguson (1954) II, 439. See on Zetzner: Pagnoni-Sturlese (1995), for the *Theatrum* in particular 363-366.

²⁸² *Theatrum chemicum* (1613), II, 191-230 (*Monas*); 191-204 (dedication). An English translation of the full work is offered by Josten (Dee 1964). The best study on Dee is Clulee (1988), see pp. 77-124 for the *Monas*.

²⁸³ Lansbergen (1619) 106.

Mersenne, who had written earlier that he would leave the argument of the 'physical earth' to melancholics, Paracelsists and Fluddists.²⁸⁴

It may well be that Lansbergen himself in some way conflated magnetism and the occult qualities of the alchemists. At another place in the same work, he attributes a magnetic nature to the earth in order to account for the constant position of its axis.²⁸⁵ However, Lansbergen's *terra physica* takes on quite a different character than Gilbert's *terrella* or Stevin's ideas on magnetic force. With Lansbergen it becomes a mystical alchemical concept. The phrase *Sic mundus creatus est* (Such the world has been created) is the tenth (or, according to another division, the twelfth) section of the *Tabula smaragdina* (Emerald Table), an obscure text of rather unclear provenance, which was generally ascribed to Hermes and had a lot of prestige among alchemists. The authoritative commentary on the *Tabula* by Hortulanus explained *Sic mundus creatus est* as: just as the philosopher's stone has been formed, so the world has been created.²⁸⁶ Drebbel's apparatus thus is thought to mirror the universe as such. The conclusive point seems to be that the *terra physica* turns from west to east, like the earth in the system of Copernicus. The heavens, according to Ptolemy, move from east to west. Taken as an analogy between the philosopher's stone or *terra physica* and the outer world, one should conclude to a motion from west to east in the world, which could be in the earth only.

None of this seems really incompatible with humanist scholarship. Yet, there is a difference of emphasis. To Lansbergen, the opinions of the ancients are still the yardstick for measuring truth and reality, but he feels less bound to established scholarly tradition as to what these opinions really were. In the end, his world is not shaped by the study of ancient authors but by religious notions. Hence his readiness to engage in controversial ideas – Paracelsian medicine, Copernican astronomy, and so on. Lansbergen is certainly aware of the ideas of the humanist scholars, but he uses them much more freely. The results of humanist scholarship are used only in so far as they fit in. It is exactly in this way that the humanist notions could be given a more radical use and turned into arguments for Copernicanism.

²⁸⁴ Jacob Lansbergen (1633) 15; cf. Monchamp (1892), 102-104. Mersenne (1623) 915, cf. 891.

²⁸⁵ Lansbergen (1619) 114.

²⁸⁶ Ruska (1926), offers on p. 2 the text of the table, on p. 185 the relevant commentary by Hortulanus, and on pp. 206-224 an overview of the work's authority in the sixteenth and seventeenth centuries.