

GASSENDI'S CRITIQUE OF ASTROLOGY¹

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Abstract

This paper focuses on Gassendi's anti-astrological writings in *Animadversiones* (1649) and *Syntagma philosophicum* (1658). It shows that, though his texts present several similarities with traditional anti-astrological writings, Gassendi puts greater stress on the issue of experience, and emphasises the impossibility of establishing astrology on such a basis. Invoked by both supporters and antagonists of astrology, the issue of experimentation was traditionally a contested field. However, I argue that, considering Gassendi's prominent role in the development of modern empiricism and, more generally, the attention paid to epistemological issues by early modern inquirers, the issue of experience acquires greater significance here. I offer further support to this claim by showing that Jean-Baptiste Morin, too, paid specific attention to the role of experience in his *Astrologia Gallica*. I conclude by suggesting that the increasing early modern emphasis on epistemological issues (of which Gassendi provides a good example), might have contributed to the marginalisation of astrology.

Keywords: Pierre Gassendi (1592-1655), Jean-Baptiste Morin (1583-1656), astrology, astrological criticism, experience and experiment

1. Introduction

Pierre Gassendi (1592-1655) occupies a prominent position in the history of early modern philosophy. He is often identified as one of the founders of Western empiricism, and stands out through his intellectual rivalry with Cartesian rationalism.² His thought combined elements of ancient Epicureism with a distinctive early modern interest in experiments and an inclination to corpuscularian mechanicism. Early in his career, he stood out as an advocate of Galileism and Copernicanism – a status which he might well have maintained in private after having publicly disavowed Copernicanism in favor of Tychonianism.³ He also enjoyed a high reputation among astronomers, especially owing to his observation

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² F. D. Norton, 'The Myth of "British Empiricism"', *History of European Ideas*, vol. 1, 1981, pp. 331-344.

³ See P. Galluzzi, 'Gassendi and l'Affaire Galilée of the Laws of Motion', *Science in Context*, vol. 13 issue 3-4, 2000, pp. 509-545.

of Mercury's solar transit in 1631.⁴ In addition, Gassendi was one of the most influential opponents of astrology of his time. Scholars have argued that his anti-astrological writings, and in particular his polemic with the astrologer Jean-Baptiste Morin (1583-1656), contributed to the marginalization of astrology from French learned circles. They are even considered to have concurred to a 'public execution' of astrology.⁵

According to Bougerel's 1737 biography, Gassendi studied astrology in the same years in which he began taking astronomical observations under the patronage of Peiresc in Aix-en-Provence (presumably in the late 1610s).⁶ But soon he discovered 'the illusion and vanity of this supposed science' and 'abandoned it rapidly and once and for all.'⁷ From that moment on, Gassendi became actively engaged in proving the inconsistency of astrology and in defending the autonomy of astronomy from astrology. Initially, his engagement appeared in private context. As Bougerel writes, in 1623 Gassendi sought to persuade his friend Valois that he should stop wasting his time with such a vain art:

The matter was not easy, since Valois expected this: attacking him head-on would not have been a good means of bringing him around. Gassendi employed an innocent artifice: he pretended to be enamoured with the subject as he was, even providing him with the precise time of his nativity, and Valois drew his horoscope. Not suspecting anything, the latter was less on guard against his attacks. Gassendi, taking advantage of the situation, gradually brought him around to his own opinion. His gentleness and his own experience achieved what the most solid reasoning would not have accomplished: he succeeded in making him reject his false prejudices, returning him entirely to Astronomy.⁸

⁴ P. Gassendi, *Mercurius in sole visus, et Venus invisâ Parisiis, anno 1631: pro voto, & admittione Keppleri*, Paris: Cramoisy, 1632.

⁵ This is the expression used by R. A. Hatch, 'Between Astrology and Copernicanism: Morin – Gassendi – Boulliau', *Early Science and Medicine*, vol. 22, 2017, pp. 487-516 (487). For a reconstruction of the polemic between Gassendi and Morin, see M. Martinet, 'Chronique des relations orageuses de Gassendi et de ses satellites avec Jean-Baptiste Morin,' *Corpus*, vol. 20-21, 1992, pp. 47-64. On Morin's intellectual biography and marginalization, see also W. L. Hine, 'J. B. Morin: The Last "Official" Court Astrologer', *Cahiers Du Dix-septième Siècle*, vol. 2, 1988, pp. 121-134; S. Vanden Broecke, 'An Astrologer in the World-Systems Debate. Jean-Baptiste Morin on Astrology and Copernicanism (1631-1634)', in: N. Fabri and F. Favino, eds, *Copernicus Banned. The Entangled Matter of the anti-Copernican Decree of 1616*, Florence, 2018, pp. 223-241.

⁶ As Jean Sanchez plausibly suggested me in a private communication, Gassendi was possibly introduced to astrology by Joseph Gaultier de la Vallette, who was in turn an astrologer.

⁷ J. Bougerel, *Vie de Pierre Gassendi*, Paris: Jacques Vincent, 1737, p. 10: 'Le desir de tout sçavoir l'avoit jetté dans l'astrologie judiciaire. Le sçavant Cassini donna dans le même écueil dans sa jeunesse. Ce deux grands genies avoient un esprit trop solide pour ne pas découvrir l'illusion & la vanité de cette prétendue science, aussi l'abandonnerent-ils bientôt & pour toujours.'

⁸ Bougerel, *Vie de Pierre Gassendi* (as in n. 7), p. 16: 'La chose n'étoit pas facile, Valois étoit trop prévenu: l'attaquer de front, n'eût pas été un bon moyen pour le ramener: Gassendi employa

With the publication of *Animadversiones in decimum librum Diogenis Laertii* in 1649, Gassendi's engagement gained a public dimension. The work consisted of a translation of Laertius' cryptic tenth book of the *Lives of Eminent Philosophers* (first half of the third century AD), devoted to Epicurus' life and doctrines, which Gassendi complemented with an apologetic discussion of Epicurus' philosophy and some minor writings. In the part devoted to the discussion of Epicurus' meteorology, Gassendi included an anti-astrological section of circa eighty pages – by far the longest of the entire book. He titled this section *De praesignificatione siderum*, and this paper will mainly focus on it.⁹

Interestingly, Gassendi's *Apologia in Jo. Bap. Morini librum* also appeared in 1649. The work was drafted in 1643, and manuscript copies had since circulated among Gassendi's friends. In 1649, the *Apologia* was published (apparently against Gassendi's will) in Lyon, and it is noteworthy that Galileo's famous letters to Castelli on the scriptural tenability of the Copernican system were also published in the same work. The *Apologia* was a response to Morin's *Alae telluris fractae* (1643),¹⁰ *The Broken Wings of the Earth*, a critique – indeed, a mockery – of Gassendi's Galilean letters *De motu impresso a motore translato* (1643).¹¹ Morin used arguments derived from astrology to support his criticism of Gassendi's implicit Copernicanism; in turn, Gassendi's *Apologia* in part

un innocent artifice, il feignit d'en être aussi épris que lui, il lui donna même le point précis de sa nativité, & Valois tira son horoscope: celui-ci ne se déifiant de rien, fut moins en garde contre ses attaques, & Gassendi profitant de tout, le ramena peu-à-peu à son sentiment. Sa douceur & sa propre expérience, firent ce que les raisonnements les plus solides n'auroient pas fait: il vint à bout de le faire revenir de ses faux préjugés, & le rendit tout entier à l'Astronomie.' Despite what Bougerel writes, Valois did not quit at all his engagement with astrology. A number letters of his to Ismael Boulliau – some of which even containing horoscopes – show his deep involvement with the discipline. See *Correspondance et papiers politiques et astronomiques d'Ismaël Boulliau (1605-1694). XII Lettres de M. de Valois, de Grenoble (1642-1654); avec différents horoscopes*, Paris, Bibliothèque nationale de France (hereafter: BNF), ms. Français 13030, fols 22, 79, 81, 84, <https://gallica.bnf.fr/ark:/12148/btv1b9061714q/f1.image>, accessed 20 September 2020. As Jean Sanchez pointed out in a private communication, Valois also continued his activity as an astrologer by drafting the horoscope of the Lesdiguières family, where he worked as a tutor (see C. Dufayard, *Le connétable de Lesdiguières*, Paris, 1892).

⁹ P. Gassendi, *Animadversiones in decimum librum Diogenis Laertii, qui est de vita, moribus, placitisque Epicuri*, 3 vols, Lyon: Guillelmum Barbier, 1649, vol. 2, pp. 910-980.

¹⁰ P. Gassendi, *Petri Gassendi apologia in Jo. Bap. Morini librum, cui titulus 'Alae Telluris Fractae'...*, Lyon: Barbier, 1649. Morin had previously attacked Gassendi's defence of Galileanism in J. B. Morin, *Alae telluris fractae: cum physica demonstratione quod opinio Copernicana de telluris motu sit falsa: et novo conceptu de oceani fluxu atque refluxu: adversus Pt. Gassendi libellum de motu impresso, a motore translato*, Paris: Apud Authorem, iuxta Pontem novum, in platea Delphina, domi cui nomen l'Escu de France, 1643.

¹¹ P. Gassendi, *Petri Gassendi De motu impresso a motore translato. Epistolae duae. In quibus aliquot praecipuae tum de motu vniuersè, tum speciatim de motu terrae attributo difficultates explicantur*, Paris: apud Ludovicum de Hequeuille, 1642.

targeted Morin's astrological beliefs. The publication of *Apologia* triggered a polemic that involved, beside Morin and Gassendi, some friends of the latter.¹² In these exchanges, Morin was ridiculed for his engagement with astrology, and in turn criticized Gassendi's alleged Copernicanism and Epicureanism. Finally, *Syntagma philosophicum* (published posthumously in 1658 in the first two volumes of *Opera omnia*) reprinted, with some minor additions, the long anti-astrological section from the *Animadversiones* in a book entitled *De effectibus siderum*, which concluded the section of the *Syntagma* devoted to general physics.¹³

¹² See *Recueil de Lettres Des Sieurs Morin, de La Roche, de Neuré et Gassend...*, Paris: Courbé, 1650; P. Gassendi, *Anatomia ridiculi muris: hoc est dissertatiunculae J. B. Morini, astrologi, adversus expositam a P. Gassendo Epicuri philosophiam; Itemque obiter, prophetiae falsae a Morino ter evulgatae de morte ejusdem Gassendi / per Franciscum Bernerium. ... Accessit ode et palinodia de eodem Morino / per Bellilocum iterato edita*. Paris: Michel Soly, 1651; J. B. Morin, *Jo. Bapt. Morini ... Defensio Suae Dissertationis de Atomis et Vacuo; Adversus Petri Gassendi Philosophiam Epicuream. Contra Francisci Bernerii Andegani Anatomiam Ridiculi Muris, ...*, Paris: published by the author, 1651; Jean-Baptiste Morin, *Vincentii Panurgi Epistola de tribus impostoribus ad ... Joan. Baptistam Morinum ...*, Paris: Apud Macaeum Bovillette et Joannem Guignard, 1654.

¹³ P. Gassendi, *Opera omnia*, 4 vols, Stuttgart, 1964, vol. 1, pp. 713-752. More precisely, the differences between the anti-astrological texts in the *Animadversiones* and in *Syntagma* are the following. The text of the *Syntagma* begins with a chapter entitled 'Quos, & quomodo Sidera producunt effectus in hisce inferioribus' (p. 713), whose first part represents an addition compared to the text in *Animadversiones* (see Gassendi, *Animadversiones* (as in n. 9), p. 910). The second paragraph of page 714 ('Caeterum, quia statim dubitari potest...') coincides with the second paragraph of the text of the *Animadversiones* (p. 910), which on the contrary begins with a small introduction to Epicurus' metereology (*ibid.*). The two texts run then mostly in parallel, although the *Syntagma* version has chapter headings and the one of *Animadversiones* mere spacings between different paragraphs (which, however, rarely correspond to the chapter breaks of *Syntagma*). One can note the following exceptions to this parallelism. At page 733 of the *Syntagma*, Gassendi adds a long quotation from Lucian, *Astrology* ('*Lycurgus.. omnem Reipublicae administrationem ex Caelo instituit...*'), which is not present in *Animadversiones* (see p. 947). The text corresponds to Lucian, *Astrology*, 25-29 (see Lucian, *The Passing of Peregrinus. The Runaways. Toxaris or Friendship. The Dance. Lexiphanes. The Eunuch. Astrology. The Mistaken Critic. The Parliament of the Gods. The Tyrannicide. Disowned*, A. M. Harmon tr., Cambridge, MA, 1936, pp. 366-369). At page 742 of *Syntagma*, Gassendi quotes two authorities to deny Ptolemy's authorship of the *Tetrabiblos* (on which I return below), which are missing at the corresponding place of *Animadversiones*, p. 963 (see Ptolemy, *Tetrabiblos*, F. E. Robbins, tr., Cambridge, 1940). At page 744 of *Syntagma*, Gassendi adds an historical example of the fallacy of horoscopes by quoting a passage from Seneca's *Apocolocyntosis* ('*Quid, foemina crudelissima...*'), which is missing in *Animadversiones* (see p. 969. See Seneca, *Apocolocyntosis* pp. 440-441, in Petronius, Seneca. *Satyricon. Apocolocyntosis*, M. Heseltine and W. H. D. Rouse, trs., E. H. Warmington rev., Cambridge, MA, 1913, pp. 437-484). At page 746 of *Animadversiones*, after having called out Nostradamus' supposed prophecies, Gassendi adds an attack against Morin. This attack runs almost until the end of page 747 ("Caeterum..."), and is missing in *Animadversiones* (see p. 971). The two texts do not present further differences.

Gassendi's anti-astrological writings had considerable influence in France and abroad. Their reception was particularly strong in Britain. In 1659, an anonymous translation (or rather, an abridgement) of the 1649 *De praesignificatione siderum*, entitled *The Vanity of Judiciary Astrology or Divination by the Stars*.¹⁴ Its succinct preface shows the influence of Gassendi's *De praesignificatione siderum* in Britain:

[the] abuse [of astrology] being observed by diverse Learned Men in Forraigne Parts hath given some of them Occasion, by their writings to discover the Vanity of that pretended Science, and the imposture of such as (for Gain) makes a profession of it: amongst all who have taken Pains to disabuse the World, noone hath more rationally from the principles of Astronomy and Philosophy performed the same then the most Learned Gassendus, in that tract whereof this ensuing discourse is a Translation: which in it's original having so well satisfied persons of greatest Learning and Reason in this Nation, hath bin the occasion, and at their desire of putting it into the English Tongue, that it might be a means to un-deceive all Men here, as well as in other places of the World; which they are confident it may do to all such as will hearken to Reason, and are un-byassed.¹⁵

The preface also shows that the echo of the polemic between Gassendi and Morin had crossed the Channel:

The discourse it self is written without passion or rayling, speaking only to the purpose, and not against any mans Person, by which it commends it self sufficiently to the Reader: As for what Morinus hath written (not with the like Calmness, but full of Canting terms and Choller) in vindication of Astrology; we shall say nothing; but leave the same (if it happen to be published) to be Ballanced, with this treatise, in point of Reason, by the Ingenious and impartiall Reader.¹⁶

¹⁴ P. Gassendi, *The Vanity of Judiciary Astrology, or Divination by the Stars. Lately Written in Latin, by ... Petrus Gassendus ... Translated into English by a Person of Quality ...*, London: Printed for Humphrey Moseley, 1659.

¹⁵ Gassendi, *The Vanity of Judiciary Astrology* (as in n. 14). From the preface to the reader, pages unnumbered.

¹⁶ Gassendi, *The Vanity of Judiciary Astrology*. The author of the translation appears to be acquainted with *Astrologia Gallica*, which was only published in 1661 (see J. B. Morin, *Astrologia gallica principiis & rationibus propriis stabilita, atque in XXVI. libros distributa. Non solum astrologiae judicariae studiosis, sed etiam philosophis, medicis, & theologis omnibus per-necessaria: quippe multa complectens eximia ad scientias illas spectantia. Opera & studio Joannis Baptistae Morini*. Den Haag: Ex typ. A. Vlacq, 1661). Though it is uncertain whether such acquaintance was just nominal, S. Vanden Broecke ('An Astrologer in the World-Systems Debate (as in n. 5), p. 229) has pointed out that *Astrologia Gallica* was possibly finished as early as 1648 (as indicated by the preface of the work), though additions were made in the final version, including references to Gassendi's *Animadversiones* (published in 1649) as well as to the eclipse of 1652. The existence, and perhaps content, of the text was likely known to Gassendi, who refers to it in

The publication of the text triggered a debate. An anonymous response appeared in London in 1660.¹⁷ The text (entitled *Gassendi's Arguments against Astrologie, which the silly Antagonists so much boast of, Retorted and Refuted: Proving the Worth & Truth of Astrology from his own Nativity, which himself gave to the learned Morinus, late of France*) was published as an appendix to a work of the Cambridge mathematician and astrologer George Atwell, titled *An Apologie, or Defence of the Divine Art of Natural Astrology*.¹⁸ It included Morin's horoscope of Gassendi, followed by a series of vicious personal attacks portraying Gassendi as 'the Scribbler of those voluminous atoms', and questioning his reputation as an astronomer:

Is this that famous Astronomer, that pretends to have made so many Observations? [...] he is but a meer Impostor, who goes about to delude the world with the opinion of his general learning, and great skill in Astronomy; when it is more clear than the light of those glorious bodies [...] that he understand nothing in that Divine Study, but that by some chance he stumbled upon those Observations he hath published to the world as his own.¹⁹

Despite their influence, the content of Gassendi's anti-astrological writings has been generally overlooked by scholars, who generally focused mainly on the social and intellectual relevance of his polemic with Morin instead.²⁰ But if it is true that Gassendi's anti-astrological advocacy had an impact on the process of marginalization of astrology in early modern learned circles, it is important to understand on what arguments it was based.

the *Animadversiones* (see *Animadversiones*, p. 934). Considering the length of Morin's work, it is unlikely, though not impossible, that manuscript copies of it circulated in England between 1648 and 1659. So it would not be surprising if the identity of the translator has to be sought among the many British intellectuals who spent time in France (particularly in Paris) in that period.

¹⁷ R. H. Popkin attributes the polemical writing to Vincent Wing, a friend of Atwell's who curated the publication of his writings after his death. Cfr. 'Gassendi et Les Sceptiques Anglais', in: S. Murr, ed., *Gassendi et l'Europe*, Paris, 1997, pp. 203-211 (224).

¹⁸ G. Atwell, *An Apology, or, Defence of the Divine Art of Natural Astrologie: Being an Answer to a Sermon Preached in Cambridge, July 25, 1652: Wherein All the Chief Objections against Astrology Are Fully Answered, and the Validity of the Art (in Its Purity) Held Forth and Maintain'd, against Picus, Chambers, Geere, Vicars, Gattaker, Holmes, and Others*, London: Printed for Samuel Speed at the Sign of the Printing-press in Paul's Church-yard, 1660.

¹⁹ Atwell, *An Apology* (as in n. 18), p. 122-123; see also Popkin, 'Gassendi et Les Sceptiques Anglais' (as in n. 17), p. 206n.

²⁰ Some elements of Gassendi's criticism of astrology were abridged by Sarasohn (See L. T. Sarasohn, *Gassendi's Ethics. Freedom in a Mechanistic Universe*, Ithaca and London, 1996, pp. 98-117). Sarasohn emphasizes Gassendi's systematization of human freedom within an Epicurean system, and argues that Gassendi's main concern with astrology is ethical, for he believed that judiciary astrology threatened the very concept of human freedom.

This question is relevant in light of the fact that, as scholars have argued, some of the most characteristic early modern intellectual and scientific trends – specially mechanism and Copernicanism – made an ambiguous contribution, if any at all, to such a process of marginalization. Not only did astrology initially cohabit with Copernicanism, it was also practiced by prominent theorists of heliocentrism such as Galilei and Kepler,²¹ to the extent that it might have served as a stimulus, rather than a hindrance, in the exploration of new conceptions of planetary order.²² Similarly, it has been difficult to establish a univocal relation between early modern mechanism and astrology. On the one hand, scholars have claimed that the indifference, or hostility, towards astrology of major figures of mechanical philosophy (such as Descartes, Newton, and Hobbes) played a role in such a process of marginalization. On the other hand, they highlight that some of their followers (especially Cartesians, as in the case of Claude Gadyrois in France and Johannes Placentinus in Brandenburg) attempted to expound the principles of astrology in mechanistic terms.²³ Considering that Gassendi was both a mechanical philosopher and (at least initially, and possibly even later) a follower of Copernicanism, it is relevant to ask whether these elements played a role in Gassendi's influential refutation of astrology, and – more generally – what constituted the core of his rejection.

From another perspective, scholars have shown that astrology underwent crucial transformations in the transition from Renaissance to early modernity. This happened especially in reaction to Giovanni Pico della Mirandola's influential *Disputationes adversus astrologiam divinatricem* (composed in 1493-1494,

²¹ G. Simon, *Kepler, astronome, astrologue*, Paris, 1992; S. J. Tester, *The History of Western Astrology* Woodbridge, Suffolk, 1999; R. Vermij, *The Calvinist Copernicans: The Reception of the New Astronomy in the Dutch Republic, 1575-1750*, Amsterdam, 2002; D. H. Rutkin, 'Galileo Astrologer: Astrology and Mathematical Practice in the Late-Sixteenth and Early-Seventeenth Centuries', *Galileana*, vol. 2, 2005, pp. 107-143; P. D. Omodeo, *Copernicus in the Cultural Debates of the Renaissance: Reception, Legacy, Transformation*, Leiden, 2014; S. Vanden Broecke, 'An Astrologer in the World-Systems Debate.'

²² R. S. Westman, *The Copernican Question: Prognostication, Skepticism, and Celestial Order*, Berkeley, 2011.

²³ M. E. Bowden, *The Scientific Revolution in Astrology: The English Reformers, 1558-1686*, Phd thesis, Yale University, 1974; S. Vanden Broecke, *The Limits of Influence: Pico, Louvain, and the Crisis of Renaissance Astrology*, Leiden, Boston, 2003; S. Vanden Broecke, 'Astrological Reform, Calvinism, and Cartesianism: Copernican Astronomy in the Low Countries, 1550-1650', *Studies in History and Philosophy of Science Part A*, vol. 35:2, 2004, pp. 363-381; D. H. Rutkin, 'Astrology', in: K. Park and L. Daston, eds, *The Cambridge History of Science*, Cambridge, 2006, pp. 541-561; P. D. Omodeo, 'Central European Polemics over Descartes: Johannes Placentinus and His Academic Opponents at Frankfurt on Oder (1653-1656)', *History of Universities*, vol. 19:1, 2016, pp. 29-64; A. Spink, 'Claude Gadyrois and a Cartesian Astrology', *Journal of Early Modern Studies*, vol. 7:1, 2018, pp. 151-171.

published in 1496), which inspired a wave of critiques of astrology (called ‘new Piconianism’ by Westman) that began with Savonarola and continued with Calvin and the Sbradellati Circle in Breslau.²⁴ Still, it is uncertain whether such transformations in astrological practice were mirrored by changes in anti-astrological treatises – a literary genre that is in general underinvestigated. Can the content of Gassendi’s writings reveal some specific features of the widespread scepticism towards astrology that characterised the second half of the seventeenth century?

In this paper, I focus on Gassendi’s anti-astrological writings in *Animadversiones* and *Syntagma philosophicum*. I shall show that, although these texts mobilise many *loci classici* of the (anti-)astrological tradition, they also have a distinct character. That is, much of the polemical materials which Gassendi collects here are ultimately based on epistemological and empirical considerations. More precisely, I argue that Gassendi’s main critical target is the impossibility of a genuine astrological experiment, both in relation to its theoretical and epistemological bases and to its practices. I suggest that such a distinctively “experimentalist” critique, though not completely new, might explain the influence of Gassendi’s anti-astrological writings, and might also display a trait of the growing critical attitude towards astrology in the early modern period.

This bears significance for two main reasons. First, although anti-astrological arguments based on the critique of its supposed empirical foundations were also present in earlier anti-astrological treatises (from Pico to Degli Angeli),²⁵ the issue of experiment – as well as of the method of inquiry – gained new significance and strength in the seventeenth century. One of Gassendi’s main preoccupations as a philosopher was precisely that of establishing and defining the role of experience in the production of knowledge.²⁶ A number of early modern inquirers drew inspiration from Gassendi’s epistemological reflections.²⁷ As Gassendi’s epistemology exerted a crucial influence on the development of Western

²⁴ Westman, *The Copernican Question* (as in n. 22), pp. 226-228; G. Pico della Mirandola, *Disputationes adversus astrologiam divinatricem*, Firenze, 1946; Vanden Broecke, *The Limits of Influence* (as in n. 23); B. Mahlmann-Bauer, ‘Attacks on Judicial Astrology, Religious Dissent and the Rise of Skepticism’, in: P. D. Omodeo, V. Wels, eds, *Natural Knowledge and Aristotelianism at Early Modern Protestant Universities*, Wiesbaden, 2019, pp. 123-186.

²⁵ A. degli Angeli, *In Astrologos Coniectores: Libri Quinque; Secundo prodeunt ab auctore multis Amanvensium erroribus liberati, novisque exemplis illustrati*, Rome: Zannetti, 1615; Pico della Mirandola, *Disputationes adversus astrologiam divinatricem* (as in n. 24).

²⁶ On Gassendi’s empiricism, see for instance S. Fisher, *Pierre Gassendi’s Philosophy And Science: Atomism for Empiricist*, Leiden, 2005.

²⁷ See for instance T. M. Lennon, *The Battle of the Gods and Giants: The Legacies of Descartes and Gassendi, 1655-1715*, New York, 1993; R. W. Puster, *Britische Gassendi-Rezeption am Beispiel John Lockes*, Stuttgart, 1991.

empiricism, his 'experimental' approach to astrology – and if not its letter, perhaps its spirit – might also cast some light on the marginalisation of the art in the seventeenth century.

Secondly, this is also significant because experience was an important element of astrological self-narratives. Astrologers appealed to experience in at least two senses. First, they claimed that their forecasts were based on the actual experience of the effects of heavenly bodies on a number of terrestrial events. In this respect, the visible effects casted by the sun and moon on the earth (e.g., seasonal changes and sea tides) provided paradigmatic examples of such experience. Second, astrologers argued that one could directly experience the correctness of astrological predictions; to this end, they provided relevant examples of successful forecasts.

2. The appeal to experience: a contested field

One example can be had from Morin's *Astrologia Gallica* (1661), whose content was likely known to Gassendi at the time he published *Animadversiones*.²⁸ Book X of the work is devoted to the issue of 'astrological experiment'. Here, Morin not only discussed various arguments against the possibility of astrological experience ('its adversaries argue that no astrological experiment is given: the contrary shall be proven by this book. Their arguments will be turned into their embarrassment'²⁹). Morin also went as far as to lay down a refined theory of knowledge to support his view of astrological experiment. Experience, he writes,

...is the comprehension and memory of what is observed frequently in the same way. Indeed two elements concur in the formation of experience: one is material, the other is formal. The material one consists of the species of individual experiences retained in the sensitive memory. The formal, on the other hand, is the actual memory of those species, and the mutual conjunction of their identity, which in particular engenders the experience. It is easy to prove that this is a peculiar intellectual habit. Indeed, it agrees with the definition of intellectual habit, for it is hardly a mutable quality.³⁰

²⁸ See note 13 above.

²⁹ J. B. Morin, *Astrologia Gallica* (as in n. 16), p. 194: 'Volunt enim hi adversarii, nullas dari experientias astrologicas: cujus contrarium hoc libro a nobis probando est; eorumque rationes in eorum confusionem evertendae.'

³⁰ Morin, *Astrologia Gallica*, p. 195: 'Experientia est ejus quod frequenter & eodem modo visum est, comprehensio & memoria. Siquidem ad experientiam duo concurrunt, unum ut materiale, alterum ut formale. Materiale sunt species experimentorum singulorum retentae in memoria sensitiva: Formale vero est earum specierum actualis memoria, & identitatis ipsarum mutua collatio, quae praecipue experientiam gignit. Quod autem haec sit etiam peculiaris habitus intellectus, facile probantur. Etenim ipsi convenit definitio habitus intellectualis: nempe quod sit qualitas difficile

As man is endowed with different faculties – notably, sense and intellect – so experience too can be of different kinds: sensorial, intellectual, or mixed. Intellectual experience stems from man’s pure power of operating through the abstract intellect, and is common to men and angels.³¹ Sensitive experience ‘originates from the repeated and continuous experience of a certain thing. It stems from the sensitive power, which is common to men and animals.’³² Further, there is a third form of experience, which Morin names ‘mixed’ or ‘rational’, pertaining to intellect and sense together, and specific to human beings.³³ This is indeed the element that allows Morin to provide a basis for astrological experiments, and which in turn brings astrology to the same level as arts such as medicine, for ‘... if indeed one admits astrological experience, it is necessary to rank it among the sciences or true arts no less than medicine [...].’³⁴ According to Morin, rational experience is close to what medicine dubbed a ‘sign’ (‘signum’), that is, a symptom. It consists of the sensible element that allows one to infer the existence or presence of what cannot be sensed, as for instance the physician infers the presence of worms in the body of the patient – something he cannot observe – from some observable signs.³⁵ Similarly, rational experience allows us to infer the presence of the magnetic force from the observation of the phenomenon of magnetic attraction: ‘...it results from experience that in the magnet there is a force to attract iron: and this force cannot be detected per se by any sense, but only by the intellect through a sensible effect. It is therefore a rational experience.’³⁶ Astrological experience, Morin claims, is of this kind; as he puts it, ‘rational experience is concerned with the lasting effects [produced] by the tangible qualities which sense alone cannot grasp, or the specific properties of the celestial bodies, as for instance that Mars in the horoscope makes those who are born

mobilis.’ Similarly, in *Syntagma philosophicum* Gassendi argued that knowledge derived from the accumulation of individual experiences into ‘aggeries’, ‘piles’, through a process of aggregation or abstraction. See Gassendi, *Opera Omnia* (as in n. 13), vol. 1, p. 93.

³¹ Morin, *Astrologia Gallica*, p. 196: ‘...sibi inesse vim quamdam verum a falso discernendi, naturas ab individuis abstrahendi, easque universali forma induendi, dividendi, definendi [...].’

³² Morin, *Astrologia Gallica*, p. 197.

³³ Morin, *Astrologia Gallica*, p. 197: ‘Experientia media est rei partim sensibilis, partimque intelligibilis cognitio, ad quam utraque potentia, sensitiva, scilicet, & intellectiva per se concurrunt: etque solius homini propria’

³⁴ Morin, *Astrologia Gallica*, p. 198: ‘...si enim Astrologiae experientia concedatur, sane quod inter scientias vel artes veras non minus saltem quam Medicina admittatur necesse est.’

³⁵ On the notion of sign in early modern medicine, see I. Maclean, *Logic, Signs and Nature in the Renaissance: The Case of Learned Medicine*, Cambridge, 2007, pp. 276-332.

³⁶ Morin, *Astrologia Gallica*, p. 198: ‘...experientia constat in magnete inesse virtutem attrahendi ferrum: atqui virtus haec per se nullo sensu attingitur, sed solo intellectu per effectum sensibilem; est igitur haec etiam experientia rationalis.’

[under that sky] audacious, irascible, and greedy for revenge [...].³⁷ In particular, rational experience allows one to distinguish the effect of a specific celestial body from the others. Each celestial body was indeed thought to act in conjunction with others, and not alone: this represented one of the traditional arguments against the possibility of astrological experience. So Morin pays particular attention to its refutation: 'thus, the sense detects, either in the heavens or in the nativity, Mars as a sign, while the intellect detects the absent meaning, that is, violent death [...]. Thus this is truly a rational or mixed experience, and the same goes for all other experiences of the specific properties of celestial bodies.'³⁸ Indeed, the experience of isolating the effect of one planet is no different from that of singling out the scent of one flower among others, or the flavour of a spice in a dish:

...Is it not the case that the sense of smell, when a garland of roses, jasmine, and other flowers is offered to the nostrils, distinguishes the individual scent of each, despite their combination? And that the wolf can see a sheep even if surrounding visible things diffuse its visible species in the air, and even in the eye at the same time? Cannot the pharmacist and the cook discern the individual ingredients of a mixture through their taste? Cannot the physician distinguish individual causes in multiple effects through their proper symptoms? In all of these cases, something simple has a peculiar effect, in which the others do not concur, according to its proper nature. Would we deny to the intellect, in the case of the concurrence of the celestial bodies, what we concede to the senses in the aforementioned cases?³⁹

Morin's preoccupation to ground astrological experience on an epistemological basis and to justify the possibility of astrological experiments, shows that he understood how the attainment of knowledge through experience had become a

³⁷ Morin, *Astrologia Gallica*, p. 205: '...rationalis experientia versatur circa effectus manentes tum a tactilibus illis qualitibus, quas solus sensus attingere nequit: tum a specificis proprietatibus astrorum; quod exempli gratia Mars in horoscopo natos faciat audaces, iracundos, vindictae cupidos [...].'

³⁸ Morin, *Astrologia Gallica*, p. 206: 'Sensus ergo vel in Coelo, vel in figura natalitia attingit Martem ut signum, intellectus vero attingit significatum absens, quippe mortem violentam [...]. Est ergo experientia haec omnino rationalis sive media: atque sic de caeteris omnibus experientiis a proprietate specifica corporum Coelestium.'

³⁹ Morin, *Astrologia Gallica*, p. 199: '...an non oblato naribus serto ex rosis, jasmينو, & aliis floribus, olfactus non obstante concursu discernit odores singulorum? Nunquid lupus videre poterit ovem etiamsi visibilia circumstantia suas species in medium aerem, imo etiam oculum simul effunderent? nonne pharmacopola & coquus sapore discernunt simplicia compositionem ingredientia? An non Medicus in complicatis affectibus singulas causas per propria signa dignoscit? In his igitur quodlibet simplex aliquid peculiare ex propria natura operatur, per quod operandum caetera mixta non concurrunt: & idem in concursu stellarum denegabitur intellectui, quod in supradictis conceditur sensui?'

matter of concern and debate among scholars. He also grasped the possible repercussions that such growing concerns about the mechanisms of knowledge production could have for a discipline such as astrology.

3. Gassendi's critique of astrology

3.1. *Framework and argumentative strategies*

Gassendi's insistence on the lack of empirical and methodological foundations of astrology mirrors Morin's epistemological preoccupations. The framework of Gassendi's criticism consists of three main elements. First, he provides an analytical account of the actions of the stars and their effects on earthly bodies. Rooted in a form of corpuscular mechanism, such an analysis is present in *Syntagma philosophicum*, while it is absent in *Animadversiones*.⁴⁰ As Gassendi explains, the action of the stars is primarily that of illumination, and secondarily, by reason of the agitation of the corpuscles of light, of heating.⁴¹ All influences which celestial bodies exert on earth – including those of the planets, which merely reflect the light of the stars – consist of illumination. The effects which these influences provoke do not only depend on the action of the stars, but also on the material constitution of the affected bodies. As a consequence, solar rays can simultaneously solidify one body and mollify another. From this it follows that the influence of celestial bodies is a general rather than a particular cause of earthly phenomena.⁴² This in turn implies that, provided that planets or faraway

⁴⁰ See note 13 above.

⁴¹ Gassendi, *Opera omnia*, vol. 1, p. 713: '...in fact illumination itself is for the most part a single Action, in which it [Illumination] consists so to say primarily. I say that illumination itself is for the most part a single Action, in which the light consists so to say primarily for this reason, that it consists also of certain other, which are not Primary, and independent from this [Illumination]. If there is no one who denies that Stars – and the Sun in particular – heat the things below; in fact heating is the companion of Illumination; and no heat reaches us from the Sun, or it is created by the Sun among us, if not by means of it [the Illumination], which being of igneous nature in reason of the corpuscles of which it consists, cannot avoid producing heat.' 'I. Primum igitur una fere Actio, de qua, tanquam Primaria constet, ipsa Illuminatio est, quae maxime advenit a Sole. [...] Quod dico autem Illuminationem unam fere Actionem esse de qua tanquam Primaria constet, ideo est, quoniam constat quidem de quibusdam aliis, verum non quae Primariae sint, & ab ista independentes. Quippe constat quidem, nemoque est, qui neget Sidera, & maxime Solem inferiora haec calefacere; verum Calefactio comes est Illuminationis; neque calor a Sole ad nos pervenit, aut apud nos a Sole creatur, nisi interventu ipsius, quae ignae naturae cum sit, ob corpuscula ex quibus contextitur, non esse caloris effectrix non possit.'

⁴² Gassendi, *Opera omnia*, vol. 1, p. 714: 'itaque ea esse videtur actionis Siderum conditio, ut generalis ac indifferens sit; nullatenus autem specialis, determinataque ex se ad unum potius, quam ad alium effectum: unde & sit illi quasi ex accidenti, ut ex adiunctione, concursuque specialis, ac determinatae causae hic potius effectus sequatur, quam alius.'

stars can exert any influence at all, this will be of the same kind as that exerted by the sun. Faraway stars, Gassendi argues, 'may contribute to the heating and drying &c. in proportion to the amount of their light.' However, this effect '...is so exiguous that it is unobservable, and so no proof can be given of it.'⁴³ This account is clearly reminiscent of book three of Giovanni Pico's *Disputationes adversus astrologiam divinatricem*, where Pico proposes to analyse the effects of the stars in terms of motion (following Aristotle's cosmology), light, and heat.⁴⁴ Gassendi rules out motion, and provides a corpuscularian account of the action of light and heat.

Secondly, the epistemological basis for Gassendi's critique of astrology is provided by his distinction between 'necessary causes', 'necessary signs', 'conjecture', and 'prophecy'.⁴⁵ As he explains, 'if something provides knowledge of something future, this must be either its necessary cause – that is, one that, if given, such effect always ensues – or a necessary sign – that is, one that, if given, such effect always follows.' For instance,

...every time the sun approaches the spring equinox, it makes the flowers on the plants grow; and every time the dawn is seen in the East, the sun follows soon after. For this reason, it is easy to foreknow, as we pass winter, that there will be flowers the next spring; and as we are assisting to the dawn, that the sun will soon rise. The former is in reason of the manifest necessity of the cause, the latter, of the [manifest necessity of the] sign.⁴⁶

⁴³ Gassendi, *Opera omnia*, vol. 1, p. 713: 'Dico vero semper Solis maxime quoniam reliqua Sidera conferre quidem aliquid ad calefaciendum, exsiccandum, &c. pro suae lucis modulo possunt verumtamen illud adeo exiguum est, ut inobservabile sit, nullumque haberi illius argumentum possit.'

⁴⁴ Pico della Mirandola, *Disputationes adversus astrologiam divinatricem*, pp. 195-209. On this see also D. H. Rutkin, *Astrology, Natural Philosophy and the History of Science, c. 1250-1700: Studies Toward an Interpretation of Giovanni Pico Della Mirandola's "Disputationes Adversus Astrologiam Divinatricem"*, PhD thesis, University of Michigan, 2003.

⁴⁵ This distinction is not wholly original, as it combines different sources, the first of which may be Cicero's *De divinatione*. See Cicero, *On Old Age. On Friendship. On Divination*, W. A. Falconer, tr., Cambridge 1923, pp. 364-365. On this see also A. A. Long, 'Astrology: Arguments pro and Contra', in: J. Barnes, J. Brunschwig, M. Burnyeat, with M. Schofield, eds, *Science and Speculation. Studies in Hellenistic Theory and Practice*, Cambridge, New York, 1982, pp. 165-192, especially p. 170n.

⁴⁶ Gassendi, *Animadversiones*, p. 911: '...si aliquid pariat notitiam effectus cuiuspiam futuri, id debere esse illius vel causam necessariam, seu qua posita talis effectus semper fiat; vel signum necessarium, seu quo posito, talis effectus semper sequatur. Sic quia quoties Sol accedit ad vernalium aequinoctium, flores in arboribus creat; & quoties aurora ad orientem conspicitur, succedentem mox Solem habet; ideo facile est praenoscere dum transigimus hyemem, proximo vere flores futuros; & dum versamur in aurora, exoriturum brevi Solem; illud ob causae, istud ob signi manifestam necessitatem.'

If a necessary connection between two events cannot be observed, then, there is no basis to foretell with certainty the occurrence of a certain event as a consequence of another. The knowledge that one can obtain of such a relation is at most a ‘conjecture’ – if one observes that the relationship between the two phenomena is frequent, though not necessary – or a ‘prophecy’ – when repeated observations are lacking and the concomitance of two events can therefore not be ascertained. As Gassendi puts it,

...if there is no such necessity, but either the cause or the sign appears sometimes without that given effect, or the effect sometimes appears without the cause or sign, it is clear that we cannot have a foreknowledge [*praenotionem*], but, at most, a conjecture [*coiectationem*]. I say at most because, if there are not many observations which make it clear that such a cause or sign appears more frequently with that effect than without, or that such an effect follows more frequently from this cause, or this sign, than from another, then we have pure prophecy, or fortuitous divination.⁴⁷

It is worth noting that here too, Gassendi draws on classical sources. In *Tetrabiblos*, Ptolemy uses the verb ‘ἐπισημαίνω’, ‘to indicate through a sign’ to describe the coincidence of planetary and starry positions on the one hand, and meteorological events on the other.⁴⁸

Thirdly, since he recognises that the ancients often used ambiguous terminology, Gassendi distinguishes between ‘astronomy’, a ‘science of the stars which is almost theoretical’⁴⁹ (which he elsewhere described as engaged in the ‘contemplation and measurement of the motion, distance, order, size, light, and similar adjuncts of the stars’),⁵⁰ and ‘astrology’, ‘which is almost active, as it strives to foreknow and predict the effects’ of the stars.⁵¹ In *Institutio astronomica*, Gassendi traces the distinction between ‘astronomy’ and ‘astrology’ back to Plato,⁵²

⁴⁷ Gassendi, *Opera omnia*, vol. 1, p. 715: ‘Quod si nulla talis necessitas sit; sed vel caussa, & signum aliquando sint absque huiusmodi effectui; vel effectus sit aliquando absque caussa, atque signo huiusmodi; perspicuum est non Praenotionem, sed coiectationem ad summum haberi. Ad summum, inquam, quoniam nisi plures sint observationes, quae perspectum faciant huiusmodi caussam, vel signum esse crebrius cum hoc effectui, quam sine illo; aut effectum eiusmodi consequi crebrius ex hac caussa, vel ex hoc signo, quam ex alio; tunc hariolatio mera est, sive fortuita divinatio.’

⁴⁸ Ptolemy, *Tetrabiblos* (as in n. 13), for instance pp. 6 and 8.

⁴⁹ Gassendi, *Opera omnia*, vol. 1, p. 714: ‘...scientiae Siderae, quae est quasi speculativa...’

⁵⁰ See P. Gassendi, *Institutio astronomica, juxta hypotheseis tam veterum, quam Copernici, et Tychois*, Paris: Apud Ludovicum de Heuqueville, 1647, p. 1 ‘...quae in contemplandis dimetiendisque Astrorum motu, distantia, ordine, magnitudine, luce, adjunctisque caeteris consimilibus [...].’

⁵¹ Gassendi, *Institutio astronomica* (as in n. 50), p. 1: ‘quae veluti activa est, occupata nempe in effectibus praenoscendis, praedicendisque [...].’

⁵² Gassendi, *Institutio astronomica*, p. 1.

though he may have derived it from a number of other sources – from Ptolemy's *Tetrabiblos* to Pico's *Disputationes*. In particular, the characterisation of astrological practice as conjectural (and by contrast, of theoretical astronomy as 'scientific') figured at the very start of Ptolemy's *Tetrabiblos*.⁵³ Gassendi's choice of words also recalls that of Cardano's *Commentary* to Ptolemy's *Tetrabiblos* – a work that Gassendi knew well.⁵⁴ Although Cardano did not draw a difference between astronomy and astrology, he stressed the distinction between a 'contemplative' and 'theoretical' science on the one hand, and a 'practical' art on the other.⁵⁵

I add here that it is a particular feature of Gassendi's argumentation in his anti-astrological writings (which he might have borrowed from Pico) to take care to explain theoretical and practical aspects of astrology in great detail before proceeding to a refutation. His general attitude is therefore not (or at least not exclusively) one of aprioristic critique, mockery, or blame, but of a critique based on detailed knowledge and analysis. This may well be part of the 'method' that Bougerel recognised in Gassendi's successful attempt to 'convert' Valois to sounder studies.⁵⁶

3.2. *Astrology and 'meteorology': saving the phenomena*

The core of Gassendi's polemic against astrology consists of the denial of the observational and experimental bases of the discipline. The first part of Gassendi's treatment of astrology in *Animadversiones* and *Syntagma philosophicum* is devoted to the forecasting of atmospheric conditions. This perhaps represented the most difficult task in Gassendi's eyes: he certainly knew not only that practices of such kind were staples of arts as diverse as navigation, agriculture, and farming; he was also aware that they were rooted in observation and experimentation. Here Gassendi's strategy is that of distinguishing a (so to say) practical 'climatology' – conjectural but based on observation and, as such, 'experimental' in nature – from an astrological 'climatology' – prophetic and based on the consultation of ephemerides. The former, Gassendi claims, characterised Greek 'astrology', which was '...limited to the affections of the air and the mutations of the climate which they deduced only [...] from the different risings and settings

⁵³ Ptolemy, *Tetrabiblos*, pp. 4-5.

⁵⁴ Gassendi quotes it several times in his anti-astrological writings. See for instance *Animadversiones* pp. 938, 965.

⁵⁵ G. Cardano, 'Commentariorum in Ptolemaum de Astrorum iudiciis Libri IV', in *Opera Omnia. Faksimile-Neudruck der Ausgabe Lyon 1663*, vol. 5, Stuttgart-Bad Cannstatt, 1966, pp. 93-168 (95).

⁵⁶ See note 6 above.

De Prae-
finitibus
Siderum.

Quod spectat ad DOMOS, quas, ut mox inuimus, distinguunt in Figura Coelesti dicta, seu Natalitio Themate, quod Graecè *ἑσθηρονομία*, Ecce diuidunt totum Caelum, quacumque circa Terram patet, in duodecim parteis, seu Regiones, Domos vocatas; idque beneficio circuloꝝ sex, qui sese mutuo in duobus punctis oppositis interfecent, ac speciatim Zodiaci duodecim parteis intercipient. Curant verò imprimis, ut ea Zodiaci pars, ac proinde Domus appelletur. Prima, quæ sub Horizonte adhuc tota est, & exoriri incipit; secunda quæ consequitur sub Terra, & ita deinceps, ut dicitur mox; Verùm non perinde consentiente de punctis illis intersectionum, portionibusque Zodiaci: Alij enim interfecari volunt Circulos in polis Zodiaci, alij in polis æquatoris, seu Mundæ, alij in mutuis sectionibus Horizontis, & Meridiani. Qui delignant autem Zodiaci polos, illi aut Zodiacum diuidunt in duodecim parteis omninò æqualeis; Aut oppositos solum semidiurnos, seminocturnosque arcus in ternas parteis æqualeis distribuunt. Prior modus videtur esse antiquissimus, colligiturque ex Empirico probatus fuisse à Chaldeis: Ptolemæus illum insinuat, cum agit de Apheticis: Iulius Firmicus eundem sequitur: Arabes ab eo non discedunt: & ex recentioribus Schonorus presertim, Cardanusque ipsum tuentur. Dicitur vulgò modus æqualis. Posteriorem Porphyrio tribuunt, eumque Gauricus amplectitur; & Scaliger testatur Indos ipso eodem vii; verùm deminutis octo gradibus tam in Domorum initiis, quam in Planetarum locis. Qui polos mundi, seu Æquatoris; ij semidiurnos, seminocturnosque Zodiaci arcus ad æquatorem referunt, quem in duodecim parteis æqualeis distribuunt, singulis eius Quadrantibus, qui inter Meridianum, & Horizontem intercipiuntur, in ternas æqualeis parteis distributis. Hunc modum sequutus est author Alcabitij, & qui Commentaria in ipsum edidit, Ioannes à Saxonia. Qui denique Sectiones mutuas Horizontis, & Meridiani; aut æquatorem diuidunt in duodecim parteis æqualeis; sicque Zodiacum in terrecptum inæqualiter dirimunt (solæ enim oppositæ diurnæ, nocturnæque partes æquales inter se euadunt) Aut pro æquatore Vericalem primarium: ex quo etiam pari genere inæqualitatis Zodiacus dispescitur. Et posteriorem quidem hunc modum, seu per Vericalem, Campanus, & Gazulus probant: At Priorem illum, seu per æquatorem, Ptolemæo placuisse ex libro eius tertio, & ex Proeli paraphrasi in librum quartum colligitur. Memoratus à Saxonia cum tribuit Abrahamo Aben Ezræ: & Regionomantus ipsum amplexus, Rationalemque appellans, recepissimum omnium fecit.

Iam ipsi Domorum dispositio, licet ad prædicendum quoque mutationes aëris, cæteraque accommodetur: Quia tamen præcipua

est cura prædicendi ea, quæ hominibus accidunt, ideo in earum nomenclatura humanos euentus præsertim attendunt. Heic I. Domus (quæ & Ascendens, & Horoscopus dicitur) vocatur etiam Domus Vitæ, complexio- nis, & corporeorum accidentium. II. (quæ Porta Inferna) Domus diuitiarum propriâ parandarum industriâ. III.) quæ Dea) Domus Fratrum, & breuiorum itinerum. IV. (quæ Imum cæli, & Planetarum fouca) Domus Parentum, & patrimonij. V. (quæ Bona fortuna) Domus liberorum. VI. (quæ Mala fortuna) Domus Valetudinis, morborum, seruerum, minorum animalium. VII. (quæ Occasus) Domus Coniugij, emptionis, venditionis, conditionis Inimicorum. VIII. (quæ Mortis principium, & Animal pigrom) Domus Mortis laborum, & occultorum thesaurorum. IX. (quæ Deus, Monomercia) Domus Religionis, Somniorum, & longiorum itinerum. X. (quæ Medium cæli) Domus Dignitatum, conditionis vitæ. XI. (quæ Bonus Dæmon) Domus Amicorum, fructuum, que qui ex amicitia. XII. (quæ Malus Dæmon) Domus Inimicorum, carcerum, fidei seruorum, & maiorum animalium. Prætereo autem, ut Prima, Quarta, Septima, Decima domus dicantur vulgò Cardines, Anguli, Graecè *καρδιαι*; & alia quatuor, Succedentes, Graecè *επιερχομαι*, & quatuor residuae, Cadentes, Graecè *καταδυματα*. Prætereo item primas treis, dici Quartam Septentrionalem, hyemalem, senilem, phlegmaticam; treis sequentes, Quartam Occidentalem, autumnalem, virilem, melancholicam; treis alias, Quartam Meridionalem, æstiuam, iuuenilem, cholericam; treis postremas, Quartam Orientalem, vernam, puerilem, sanguineam. Prætereo colores, quos Domibus tribuunt; Primæ album, Secundæ vitidem, Tertiae croceum, Quartæ rubeum, & similia nunquam finienda.

Hac porrò visum est delibare, quòd sint generalia quaedam fundamenta, ac veluti prima principia, quibus præditiones Astrologicae innotunt. Non est verò quorsum in ipsis resellendis tempus teratur; cum satis incerta, sed etiam futilia manifestum fiat. Equis enim statim non videat esse omnia mera figmenta, vt pote ex mero arbitrio, & sorte; ac nullâ, aut vanissimâ occasione excogitata? Certè vel hoc vnum videtur arguere, quòd si apud nostros Antæcos, Antipodasve degerimus, tota hæc machinatio peruertenda penitus sit; iam enim prorsus opposita iis, quæ sunt allata, asserenda erunt. Et si ad Æquatorem, seu in medio Torridæ Zonæ constituerimus; tum cum aut vtraque, aut neutra, aut mixtim omnia sint accipienda; nihil fieri potest confusius. Et, si sub polis steterimus; qualisnam, amabò, erit Astrologia, vbi nulla pars oriens, nulla occidens; vbi Fixarum, & Zodiaci idem semper

In pag.
68.

Figure 1. From the last paragraph of the left column, an example of such attitude: Gassendi's explanation of the functioning and distribution of the houses of the horoscope. From Gassendi, *Animadversiones*, third edition (1675), 482. Courtesy of the Herzog August Bibliothek Wolfenbüttel (M: Lg 2° 30)

[...] of the stars; nor indeed did they deduce them from that artificial construction of the themes of the heavens, of which astrologers make use [...].⁵⁷ Consequently, (and here Gassendi probably draws from Ptolemy's *Tetrabiblos*, which he considered to be spurious),⁵⁸ the Greeks were issuing 'indications' ('significationes') instead of predictions ('praedictiones'), and they based them on the rising and setting of celestial bodies, and mainly aimed to foretell meteorological conditions and assist agricultural labour.⁵⁹ This was no different from what illiterate populations did: despite not having calendars, they marked the sowing and harvesting season with the help of the stars, but the Greeks were the first to compile tables in which they annotated the coincidence of climatological and astronomical phenomena.⁶⁰

His treatment of the Greek interest in weather forecasts offers Gassendi the possibility to reinterpret a classic astrological success story: Thales' famous prediction of an exceptional olive harvest. As Gassendi explains, Thales' successful prediction stemmed from his core philosophical tenets (and especially from his idea that water is the principle of everything) but is ultimately rooted in direct observation, and not in his supposed knowledge of astrology:

It is noteworthy what Aristotle writes, that [Thales] forecasted a future abundance before the end of winter [...]; that very clever man, being an expert in physics and understanding water as the principle of things, observed which fruits flourished more abundantly from much or little water, and whether it rained continuously only at the beginning, middle, or end of the winter. By observing that winter, he could foreknow the same things that we now know to be foreknown by the aforementioned peasants, who predict a future abundance of olives not only from winter or autumn, but even

⁵⁷ *Animadversiones*, p. 914: '...dumtaxat affectiones aëreis, mutationesque tempestatum, quas illi deducebant solum [...] ex ortibus variis, occasibusque Siderum; nequaquam vero deducebant ex illa Thematum caelestium artificiosa constructione, qua utuntur Astrologi [...].'

⁵⁸ The idea that the heavens can be 'indications' ('episēmasai') of climatological events is probably taken from Ptolemy's *Tetrabiblos*. See Ptolemy, *Tetrabiblos*, pp. 6-7. Ptolemy also stressed the origin of such indications from the observations performed by farmers and herdsmen (see *ibid.*, pp. 7-8). Interestingly, Gassendi questions the authorship of the *Tetrabiblos*. See Gassendi, *Animadversiones*, p. 963: 'Nemo certe serio attendens non desideret in hoc Opere illius Viri genium, a quo habemus *Almagestum* [...]. Nam cum in magni operis praefatione fuerit testatus, suscepisse se Mathematica explicanda, quod in ipsis rata, & indubitata sit scientia; neglexisse vero & Theologicam, & Physicam speculationem, quod utraque sit coniectura, potius, quam certa scientia appellanda: Prior, ob naturam rerum divinarum incomprehensibilem; posterior, ob instabilem conditionem materiae, ex qua fit, ut re incomperta Philosophi nunquam de ea consentiant. Cum ille, inquam sic senserit; illene quaeso, potuit sese ita deinceps deicere, ut incertiore longe artem, quam sit Theologica, aut Physica, censuerit esse complectendam?'

⁵⁹ Gassendi, *Animadversiones*, p. 91.

⁶⁰ Gassendi, *Animadversiones*, p. 915. This is also discussed by Ptolemy in *Tetrabiblos* 1,2, pp. 5-19.

from the preceding summer, having considered the frequency of rain during this season.⁶¹

Thales' forecasts of climatological phenomena were therefore rooted in his repeated observations of the sky rather than in the consultation of ephemerides or tables:

...because he practiced astronomy, Thales was derided not only by all the other people, but even by his own slave. And he committed himself to this study not so much by handling tables or consulting ephemerides, but rather by considering and observing the stars directly for himself, while the astrologers, when they prepare their predictions, do not observe the sky – which most of them do not know – but only the ephemerides, and the doctrines that are set down in the books.⁶²

These 'indications', Gassendi clarifies, were understood among the Greeks 'not as *causes*, but as *signs* of meteorological events, and of mutations happening in the air,' for 'they recognised the sun as the cause of meteorological events in general, and [as causes] of the various affections of the air, in part the sun, and in part the moon, and in part other sublunary causes,' while 'the other celestial bodies were nothing other than signs of singular circumstances, with which the sun and all the other causes create heat, rain, wind, and other things of such a nature.'⁶³ Commenting on Epicurus' *ratae sententiae*, Gassendi remarks that astronomical phenomena cannot have a necessary part in the causation of weather conditions because they are relative to time and place. For instance, the constellation *Canis maior* was widely seen as indicative of the arrival of the hot season.

⁶¹ Gassendi, *Animadversiones*, p. 941: '(...) verum illud adnotatione dignum est, quod interea habet Aristoteles, praehabuisse illum futurae ubertatis notitiam *exacta nondum* hymene [...]: scilicet intelligentissimum ipsum, cum esset Physicus, & aquam rerum principium statuens, observasset saepius qui fructus provenirent laetius ex multa aut ex pauca aqua; ac pluvia quidem regnante continuo, vel ineunte solum, vel media, vel desinente hymene; potuisse illum idem praenosse per eam hyemem, quod iam praenosci novimus a praedictis agricolis, qui futuram olearum ubertatem nobis praedixerunt non ab hyeme modo, vel autumno, sed ab usque etiam praecedente aestate, habita ratione pluviarum, quae per illam ingruerant.'

⁶² Gassendi, *Animadversiones*, p. 924: '...Thaletem fuisse ob Astronomiam non modo a caeteris, sed a propria quoque ancilla derisum; ac fuisse adeo ipsius studium non in versandis Tabulis, Ephemeridibusve consulendis positum; sed in ipisimet Sideribus spectandis, atque observandis; cum Astrologi tamen, dum praedictiones suas concinnant, non ad ipsum coelum attendant, quod maxima pars illorum non novit, sed ad Ephemeridas solum, placitaque in libris extantia.'

⁶³ Gassendi, *Animadversiones*, p. 916: '...non tanquam causas, sed tanquam signa tempestatum, mutationumque contingentium in aëre. Nam causam quidem tempestatum generale agnovissent esse Solem; variarum autem aëris affectionum partim Solem, partim Lunam, partim causas alias in hisce inferioribus; At Sidera reliqua nihil aliud esse, quam Signa singulorum temporum, quibus Sol, & caeterae causae, aestus, pluvias, ventos, & alia id genus crearent.'

But, Gassendi explains, the transit of the fixed stars is now delayed by about a month compared to ancient times: and nevertheless the meteorological conditions they were supposed to signal are not delayed by a month compared to the past, for they are due to the sun, and to its transit across the zodiac. Ten thousand years from now, *Canis maior* will appear in January: who would believe, Gassendi asks, that it will then signal that season to be hot?⁶⁴ Further, the meaning of the signs is not univocal, but rather depends on the region where one observes them. *Canis maior*, for instance, could signal the arrival of cold weather at the antipodes, while it here indicates heat.⁶⁵ This brings Gassendi to conclude that 'such signs are only modest conjectures, for indeed they are highly uncertain even in respect to the same region or place: which would not happen if they were genuine causes.'⁶⁶ In this way, Gassendi appears to radicalise a traditional position that tended to describe natural astrology as conjectural, and that was held by authors as diverse as Ptolemy and Aquinas.⁶⁷

Contrary to the Greeks, when it came to weather the astrologers argued that '...the celestial bodies are not only signs, but also the physical causes of a number of effects.' This idea, Gassendi explained, depends on the core principle that 'things below are with a reason underneath those above, for indeed they are clearly sustained, moved, and ruled by them.' Consequently, as the sun and the moon cause observable effects on the weather, so do the other planets and stars, astrologers believe:

...[according to the astrologers] there are influences through which these two celestial bodies, as much as all the others, exert forces on the things below, for celestial bodies cannot be there for nothing, and there are effects – such as the crises of diseases or variations in atmospherical conditions – that cannot be ascribed to any other cause than the stars. For while the sun moves uniformly, [the seasons] do not return the same every year, but are now warmer, now more humid', etc.⁶⁸

⁶⁴ Gassendi, *Animadversiones*, p. 917.

⁶⁵ Gassendi, *Animadversiones*, p. 917-918.

⁶⁶ Gassendi, *Animadversiones*, p. 918: '...huiuscemodi Signa esse solum quasdam leveis coniecturas: Nempe incertissima sunt, etiam respectu eiusdem regionis, seu loci; quod nihilominus non fieret, si causae simul germanae forent.'

⁶⁷ D. H. Rutkin, 'Is Astrology a Type of Divination? Thomas Aquinas, the Index of Prohibited Books, and the Construction of a Legitimate Astrology in the Middle Ages and the Renaissance', *International Journal of Divination and Prognostication*, vol. 1, 2019, pp. 36-74.

⁶⁸ Gassendi, *Animadversiones*, pp. 919-920: 'Denique dari Influencias, quibus tam haec duo, quam caetera astra vireis exseunt in haec inferiora; quippe cum & astra otiosa esse non valeant, & effectus sint, qui ad alias causas, quam ad sidera revocari non possint, ut Crises morborum, & inaequalitates tempestatum; quae nempe, cum aliunde Sol moveatur uniformiter, eadem tamen quotannis non redeunt; sed nunc calidiores, nunc humidiores, &.'

In other words, the astrologers claim that since the seasonal position of the sun in respect to the earth is constant, it cannot account for the variation of the seasons across different years. This variation must be accounted for on the basis of phenomena that do not repeat themselves with precise periodicity every year: the relative positioning of the planets and their combined effects.

However, Gassendi asks, what actual experience can we have of the effect of each individual celestial body on earthly phenomena? And, absent such experience, how can we produce a viable theory of their influences on the seasonal weather? Although we experience that the sun affects the climate, and that the moon swells oysters,

...can through a similar experience something similar be proven for the signs and degrees of the Zodiac, or for Saturn, Mercury, or the rest of the celestial bodies? Indeed not. Not the slightest effect is ever shown for them from any observation, that should be ascribed to a specific sign or celestial body, rather than to another [body] or another cause [in general]. None at all; for every theory should be supported by experience, and here no experience is provided [...].⁶⁹

In addition to criticising the arbitrariness of the ‘natures’ assigned to planets (pp. 930-931) and houses (pp. 932-933), Gassendi – here following Pico – raises a further epistemological objection: the variety of seasonal phenomena across the years does not need to be explained through recurring planetary influences, for general causes (in this case, the action of the sun) do not produce uniform effects:

...when we have to account for the causes of the smells that are in an ointment, we ascribe that smell to the rose, this to the jasmine, another to the orange, and no special smell to the oil itself because it is supposed to be the general cause [of the smell], and no more of this than of that. And when we explain why in a garden this plant grows here, and not there, we attribute it to the seeds which we planted, one here and one there, and not to the water with which they are irrigated, because it is only the general and indifferent cause of both. And in the same way it seems that one should philosophise when it comes to those effects that are attributed to the celestial bodies. So, for instance, the sun’s heat is a general cause: that hardening happens here and liquefaction there, is to be ascribed to the nature of the clay and of the wax.⁷⁰

⁶⁹ Gassendi, *Animadversiones*, p. 920: ‘experientia quidem probatur, variare Solem tempestates, implere Lunam conchylia, & quae sunt alia huiusmodi: At probaturne eadem experientia quidpiam simile de Zodiaci signis, gradibusque, de Saturno, Mercurio, caeterisque sideribus? Non sane; Neque illi unquam observatione ulla ostendet minimum effectum, quem ad unum signum, sidusve, potiusquam ad aliud, aut ad aliam causam referre oporteat. Nulla omnino; cum omnis ratio nitatur experientia, & experientia heic nulla sit [...]’

⁷⁰ Gassendi, *Animadversiones*, pp. 920-921: ‘Ut enim, dum causas odororum, quae in unguentis sunt, reddimus, referimus illum odorem ad rosam, hunc ad Ielseminum, alium ad Arantium, &

Gassendi supports his critique of 'meteorological' astrology also by quoting the infamous prediction of a deluge made by the German astronomer and mathematician Johannes Stöfler (1452–1531), which caused considerable troubles in the early sixteenth century:

The following, which can be read in the histories and in almost all the books of the previous centuries, is certainly memorable. When astrologers, because of many great and some middle conjunctions occurring in watery signs, predicted a general deluge in February 1524, as well as an unheard-of massacre, many souls were frightened throughout France, Spain, Italy, and Germany. They prepared boats or, having stocked up on flour and other necessary things, moved to higher places. But it happened that the whole of February passed most peacefully and pleasantly, indeed, as if it had taken trouble to prepare itself to refute the vaticinations of the astrologers (because it is otherwise unusual that the month of February passes without rain). This not even Cardano and Origanus could hide, regretting that this judgment on the future Deluge had been issued by Stöfler not without infamy for astrology.⁷¹

3.3. *The critique of judiciary astrology*

Gassendi's criticism of judiciary astrology lacks the kind eye that he cast on what we called 'practical climatology.' Here, Gassendi's strategy is one of highlighting the difference between sciences and arts grounded on empirical observations and sounder methodologies on the one hand, and astrology on the other. Judiciary astrology is portrayed as an ancient and bookish charlatanism which is not up-to-date with new scientific discoveries. For instance, even allowing that planets and constellations can influence earthly phenomena, how can astrologers ignore

nullum specialem ad oleum, quod generalis supponitur, neque huius magis, quam illius, causa. Et dum explicamus, cur in viridaro heic ista planta, non illeic crescat; [...] id tribuimus seminibus, quorum unum heic, aliud illeic severimus; non vero aquae qua irrigantur, utpote quae causa solum generalis, indifferensque utrique sit: Ita & circa illos effectus qui tribuuntur sideribus, videtur esse philosophandum. Nam cum Solis calor, v.g. generalis sit; quare heic induratio, illeic liquefactio contingat, ad naturam luti, ac cerae referendum est.'

⁷¹ Gassendi, *Animadversiones*, pp. 938-939: 'Memorable certe est, quod in historiis, ac omnibus pene superioris saeculi libris legitur; Cum Astrologi ob plureis Coniunctiones magnas, & nonnullas mediocreis in Aqueis Signis celebrandas, praedixissent mense Februario anni MDXXIV. fore diluvium generale, ac stragem tantam, quanta fuisset ante id tempus inaudita; adeo ut non paucis consternatis per Galliam, Hispaniam, Italiam, Germaniamque animis, apparassent navigia, aut comportatis farinis, aliisque rebus necessariis, petiissent loca editiora; contigisse tamen, ut totus Febrarius serenissimus, pulcerrimusque exstiterit; plane, ut si opera data comparatus fuisset vaticiniis Astrologorum refellendis (cum sit alioquin insolitum, abire Februarium impluvium) quod ne ipsi quidem Cardano, & Origano dissimulare licuit; dolentibus illud de futuro diluvio iudicium fuisse non sine Astrologiae infamia a Stoefflero prolatum.'

the recent changes in astronomical geography brought about by the use of the telescope? As Gassendi puts it,

I do not add anything concerning the rising and setting of fixed stars, which we discussed earlier, and merely admonish this: the telescope reveals innumerable stars besides those we hitherto knew and believed to exist. Therefore, if any effect is to be ascribed to the stars at all, it is now necessary to establish new precepts in conformity to the effects which the newly discovered stars claim for themselves, and have been falsely attributed to others. Nor shall you reply they are too small. For since their number is incredible (especially in the Milky Way), it certainly follows that however little an effect each individually has, the joint effect of all together must nevertheless be great. In this respect it is surprising that although the Milky Way is clearly visible in the heavens, no special effects were attributed to it. while [effects] were conversely attributed not only to the Asseli (that is, those two little stars of Cancer), but even to the Beehive cluster in the same and other star nebulae, which are nothing but very small heaps of the most minute stars, whereas the Milky Way contains similar heaps all around the heavens, and even throughout the Zodiac.⁷²

However, as astrologers too claimed that they had been once established ‘on the basis of painstaking observations,’ and already ‘confirmed by various experiments,’ Gassendi here engages more directly with the meaning and nature of astrological experiments. First, why do astrological predictions fail, if their art was established on such a firm basis? Indeed, according to the astrologers

...even if the effects sometimes do not correspond to the predictions, the mistake is to be attributed not to the art, but to the artificer, who did not take everything into account; moreover, since they submit the stars not to fate, but to God’s providence, it is possible that God averted what would otherwise have happened: astrology therefore has no fault. And so they respond to all the arguments cast against them by arguing that, at best, astrology is a conjectural art, like medicine, navigation, and rhetoric, and indeed an art, not pure prophecy.⁷³

⁷² Gassendi, *Animadversiones*, pp. 939-940: ‘Nihil addo de ortu, occasuque Fixarum, de quo iam ante dictum est; hoc solum moneo; cum Telescopium detegat innumeras stellas, praeter eas, quae hactenus cognitae, creditaeque fuerunt; oportere sane, si stellis attribuendum sit aliquid, nova praecepta condere, iuxta effectus, quos detectae stellae sibi vendicent, falso aliis attributos. Neque dicas eas esse nimis minutas; nam cum ipsarum multitudo incredibilis sit, ac tota praesertim via Lactea; oportet sane, ut quamvis unaquaeque sigillatim parum conferat, multum tamen sit, quod ab omnibus simul conferetur, Quo loco mirum cum via lactea res sit in coelo adeo insignis; nullos fuisse ipsi attributos speciales effectus; cum attributi tamen fuerint non modo Asellis, seu duabus illis stellulis cancri, sed etiam Praesepe eiusdem, ac aliis stellis nebulosis, quae tamen nihil aliud sunt, quam perexigua aggeres minutissimarum stellarum; cum via lactea simileis aggeres toto circum coelo, ac per ipsum quoque Zodiacum contineat?’

⁷³ Gassendi, *Animadversiones*, p. 940: ‘Caeterum illi tuentur sese, quod placita fuerint pridem constituta ab Astrologis, post diuturnas observationes; quod ea etiamnum confirmentur

But astrology, Gassendi continues, cannot be seen as a conjectural art as, for instance, medicine is. For its predictions do not prove to be correct for the most part as those of medicine, and, even when they are so, their underlying causation remains uncertain:

...those who concede that [astrology] is no more than a conjectural art behave modestly, but they certainly arrogate too much when they claim the same rights for it as for medicine and other arts. Now in these [arts] prudence, industry, and human labour have such a part that the proposed and desired outcomes happen for the most part, and when they happen, their cause is not hidden. But in astrology chance lays down the law, and the [predicted] event never, or seldom, takes place; and when it takes place, the cause deriving from the heavens is totally unclear, and no one can more easily show that is not another than the astrologer. Therefore astrology should not so much be considered a true art, but rather mere chance or prophecy.⁷⁴

The object of Gassendi's criticism is also the actual performance of the astrological experiment. Taking inspiration from Sextus Empiricus, Gassendi argues that while astrologers insist that the measurement of the time of birth should be exact in order to issue a correct nativity, the imperfection of the instruments used for

experimentis variis; quod ex antiquis memorabilis potissimum sit illa ubertatis olearum praenotio, ob quam Thales cum parvo pretio conduxisset omnes olei Officinas, quae & Mileti, & in Chio erant, magnam vim pecuniae coëgit: quod licet aliquando effectus praedictionibus non respondeant; defectus imputandus sit non arti, sed artifici, qui non attenderit ad omnia: Quod cum subiiciant Astra non fato, sed Dei providentiae, possit Deus ea, quae alioquin evenirent, avertere; nullaque proinde Astrologiae sit culpa: quod proinde omnia, quae ipsis obiciuntur, arguant ad summum Astrologiam artem esse coniecturalem, ut Medicinam, Nauticam, Rhetoricam, non autem artem esse nullam, seu hariolationem meram.' It is interesting to note that astrologers were increasingly arguing for an epistemological rather than an ontological interpretation of their art's conjectural status. See S. Vanden Broecke, 'Astrological Contingency: Between Ontology and Epistemology (1300–1600)', in: P. D. Omodeo and R. Garau, eds, *Contingency and Natural Order in Early Modern Science*, Dordrecht, 2019, pp. 137–155 (137): '...astrology was now presented as an art which studied a specific class of sublunary effects, not so much the universal governance of sublunary matter. This opened a conceptual space where celestial influence could be treated as necessary, and astrological predictions as secure *ceteris paribus*. We argue that this shaped a different interpretation of astrological contingency: astrological conjecture now became an epistemological phenomenon that was often accidental to the art, rather than an ontological one that was mostly internal to it.'

⁷⁴ Gassendi, *Animadversiones*, p. 943: 'Ad modestiam quoque accedunt, qui artem non amplius quam coniecturalem concedunt; at nimium sane arrogant, dum parvis iuris cum Medicina, artibusque aliis faciunt. Nam in istis quidem prudentia, industria, laborque humanus ita agit parteis, ut propositus, optatusque eventus consequatur ut plurimum; ; & dum consequitur, caussa sit non immanifesta; verum in astrologia casus utramque paginam facit ; & eventus nunquam, aut raro contingit; ac dum contingit, caussa ex coelo immanifesta est penitus; nemoque non aliam facilius, quam Astrologus monstrare est potis; sicque Astrologia non tam vera ars, quam mera alea, sive hariolatio videtur habenda.'

such purpose reveals the inconsistency of the astrological art in general. Indeed, clocks are not yet the reliable instruments they will be later in the century, to the extent ‘that if you check many of them, you will realise their remarkable discrepancy.’⁷⁵ Similarly, ‘[i]t would be tedious to survey the various causes of inequalities and errors in our instruments, either solar or hydraulic ones, which were disapproved of by Ptolemy, who judged that the time could not be measured precisely unless through the astrolabe.’⁷⁶ But the use of the astrolabe too proves arduous, and its measurements imprecise:

Truly, concerning the use of the astrolabe, I ask if among a thousand nativities which they judged, there was one whose precise hour an observer determined with the astrolabe? What if the sky was covered, so that he could not see the sun or the star? What if the precise motion of the sun or the true positions of the stars were unknown, as they certainly were until this century, as even now something remains to be corrected? What if the true altitude of the pole is not explored, as it is in few places? What if local longitude or the difference of the meridians is not correctly determined, as it is certain not to have been determined? What if the refractions are not heeded enough, as noone before Tycho heeded them? What if the astrolabe were too thin, not sufficiently exquisitely crafted, or not marked with sufficient precision, or not used cautiously and accurately enough, since nothing is easier than erring in this?⁷⁷

3.4. *Epistemological inconsistencies*

Another locus classicus of the defence of astrology consisted in the comparison with the attractive virtue of the magnet – an invisible force that could be compared to the one advocated by the astrologers:

⁷⁵ Gassendi, *Animadversiones*, p. 952: ‘...cum si ad plura attenderis, mirabilem sis discrepantia observaturus.’

⁷⁶ Gassendi, *Animadversiones*, p. 952: ‘Longum esset recensere varias inaequalitatis, & fallaciae causas in nostris machinalibus; solaris quoque & hydraulica a Ptolemaeo improbata, qui tempus nisi per astrolabium posse exquisite haberi non censuit.’

⁷⁷ Gassendi, *Animadversiones*, 952: ‘Verum & quod spectat ad usum Astrolabii, cedo an ex mille nativitatibus, de quibus illis pronunciant, vel unica detur, cuius tempore observator adstiterit, qui Astrolabio horam captarit? Quid si coelum obductum sit, ut Solem, aut Stellam videre non liceat? Quid, si verus Solis motus, vera stellarum loca ignorentur, ut ignorata fuisse constat ante hoc nostrum saeculum; cum & quidpiam adhuc corrigendum restet? Quid, si vera poli altitudo non sit explorata, ut paucis in locis explorata sit? Quid, si de loci longitudine, seu Meridianorum differentia non probe constet, ut non constare deprehenditur? Quid, si refractiones non satis caveantur; ut ante Tychonem nemo illas cavet? Quid, si Astrolabium aut nimis exile, aut non satis exquisite conformatum, denotatum fuerit, aut non satis caute accurateque usurpetur; ut nihil est proclivius, quam peccari in his aliquid?’ Gassendi’s arguments based on the arbitrariness of time calculation were probably derived from his reading of Empiricus’ *Against the Astrologers*. See S. Empiricus, ‘Against the Astrologers’ in *Against Professors*, R. G. Bury, tr., Cambridge, 1949, pp. 322-371.

There is nothing they insist more on than observations and experience. They add that even if we ignore or cannot explain the genuine cause of some effects, that is no reason to hold that such effects cannot exist, or that an art cannot be erected from the observation of many of them. Otherwise we would have to say that a magnet cannot have that power to attract iron which we observe and which directs itself towards the Poles. Nor could the nautical art be founded on the observation of many effects of magnets, since no fitting cause is offered by which those admirable properties of the magnet are explained. For the same reason, although we cannot demonstrate why specific predictable effects follow from this or that sky, it suffices that, given a single sky, many similar observations are made of their consequent effects. Thus an art can be constructed by means of which it is predicted that the same effects will return when the same celestial positions return. They add that such an art can be even proved by certain experiments [...].⁷⁸

It is worth noting that Gassendi had already dealt with the issue of magnetic attraction in the first two letters *De motu impresso*, offering a mechanical explanation for the phenomenon according to the maxim 'nulla actio physica sit sine agente physico.'⁷⁹ As he compared magnetic attraction to terrestrial attraction to defend a proto-inertial concept of gravitation, his interpretation of the attractive action of the magnet (and of the earth) became one of the major points of contention in his polemic with Morin.⁸⁰

Here, however, what is at stake is not the ontology of magnetic attraction – that is, the nature of the 'force' that attracts iron – but rather whether it can serve as a model to justify, on empirical grounds, the practical or theoretical status of

⁷⁸ Gassendi, *Animadversiones*, 960-961: 'Ad haec nihil urgent magis, quam Observationem, atque Experientiam; Siquidem inquit, licet ignoremus, aut non reddamus germanam causam aliquorum effectum; non ideo tamen asserendum est, aut taleis effectus non contingere, aut ex observatione plurium existere Artem non posse; Alioquin dicendum Magnetem, non habere, quam experimur vim ferri tractoricem, directricemque versus polos; vel nauticam artem non posse constare ex observatione plurium magneticorum effectuum; quod non reddatur idonea causa, qua proprietates illae magnetis admirabiles demonstrantur: videlicet, pari ratione, quamvis demonstrari a nobis non possit, cur ex hoc, aut illo caeli positu tales effectus consequantur, quos possimus praedicere; satis est tamen, quod similes multae, eiusdem caeli positu, consequutorumque eorumdem effectuum observationes factae sint, ut confici potuerit Ars, iuxta quam praediceretur, redeunte pari positu, pareis effectus rediturus. Pergunt hanc Artem comprobari certis adeo experimentis [...].'

⁷⁹ P. Gassendi, *Opera Omnia*, vol. 3, p. 942.

⁸⁰ Especially in Morin, *Alae telluris fractae*. On Gassendi's 'proto-inertial' theory of gravitation, see P. A. Pav, 'Gassendi's Statement of the Principle of Inertia', *Isis*, vol 57:1, 1966, pp. 24-43; C. R. Palmerino, 'Galileo's Theories of Free Fall and Projectile Motion as Interpreted by Pierre Gassendi', in: *The Reception of the Galilean Science of Motion in Seventeenth-Century Europe*, C. R. Palmerino and J. M. M. H. Thijssen, eds, Dordrecht, 2004, pp 137-164; and C. R. Palmerino, 'Une force invisible à l'œuvre: le rôle de la vis attrahens dans la physique de Gassendi', in: *Gassendi et la modernité*, S. Taussig, ed., Turnhout, 2008, pp. 141-176.

disciplines which are thought to be based on an uncertain ontology. In Gassendi's epistemology – inspired by Epicureanism, but motivated by Scepticism – this point had a particular relevance. Gassendi proposed that scientific discovery ultimately stems from finding a 'sign' that allows us to validate (or invalidate) a certain statement about nature.⁸¹ Signs allow inferences and judgements concerning things that cannot be directly observed; for instance, transpiration – which I can observe – indicates that the skin must have pores, which I cannot observe. Not surprisingly, in this framework the correct collection of empirical data becomes central, and this is also the kernel of Gassendi's criticism of astrology. First, how can we perform a clear observation of the action of each celestial body on our world, and have astrologers ever taken care of performing observations to prove the reality of such influences? Gassendi writes,

It is not denied that the sun and the moon affect in many ways [the earth]. But from this it does not follow that the other stars, and first of all the planets, can be compared to them in force and efficacy. As we can attribute heat to the sun and the swelling of shells to the moon, how can we attribute a particular effect to Jupiter, and show that it should be attributed to Jupiter, rather than to Mars or Venus – or even to the sun or the moon? It is observed that as the moon approaches the sun, the marrow of bones diminishes. Is anything similar observed when Mars, Venus, or another planet approaches the sun, the moon, or another planet? The astrologers boasts that they observe these [phenomena] better than shepherds, sailors, or farmers, although they do not work under the sky, but locked in their houses, by the light of the oil-lamp alone, most not knowing any other star besides the sun and the moon. And, as they spend time with their ephemerides, can they better attend to this? For indeed in what way will they observe what Saturn delivers when, being beyond the sun, it is hidden by its body? How do the rays of its force penetrate the whole mass of the sun, to reach the earth and affect a baby's body? Through what difference do they recognise that it was Saturn, and not another cause, that left a certain mark?⁸²

⁸¹ P. Gassendi, *Pierre Gassendi's Institutio Logica (1658)*, H. Jones, ed. and tr., Assen, 1981, pp. 156-157.

⁸² Gassendi, *Animadversiones*, p. 965: 'Non negatur praeterea, quin Sol, & Luna plurima agant; at non sequitur alia sidera, ac Planetas imprimis, posse cum illis circa vim, efficaciamque comparati. Qua enim ratione, ut ad Solem calor, ad Lunam Ostrei plenitudo, sic potest ad Iovem aliquis effectus specialis referri, ac ostendi ad ipsum potius, quam ad MArtem, Venerem; imo quam ad Solem, aut Lunam spectare? Observatum est, dum Luna congregitur Soli, medullas intra ossa imminui; Ecquid simile observatum est, dum Mars, Venus, alius Planeta, cum Sole, cum Luna, aut cum alio congregitur? Et gloriantur Astrologi sese ista melius quam pastores, nautas, aut agricolas observare: cum tamen, non ut illi sub dio, sed conclusi domibus, & ad lucernam solum laborent; & maxima pars praeter Solem & Lunam ullum siderum ne noverint quidem. At, dum Ephemeridas versant, possunt id melius attendere? Quoniam igitur modo attenderunt, quidnam Saturnus ageret, cum ultra Solem factus ab eius corpore tegetetur? Quomodo radii virtutis

The alleged effects of a single planet cannot be clearly recognised nor isolated, nor have the astrologers attempted genuine empirical observations for it. So Gassendi claims that the supposed astrological experiences are indeed 'fallacious experiences', which present an overly broad plurality of possible causes. Certainly, astrologers end up selecting the wrong ones among them, and then build up paralogisms on such shaky foundations.⁸³ They do not verify by direct observation the results of such experiments, thus undermining the bases of their supposed art, for 'in such uncommon study of truth, one shall not give credit blindly to any experiment, and especially to those we gathered with our ears rather than with our eyes.'⁸⁴ At the same time, the very possibility of experiencing the diverse effects of the actions of planets is intrinsically paradoxical: the experiment is not replicable, 'for the same conformation of the sky does not return twice not even after a hundred or a thousand centuries, but indeed after innumerable ones.'⁸⁵ Provided direct observation could scaffold astrological predictions, how could we think of fixing in a few years what past astrologers have gotten wrong for centuries?

You say: the Chaldeans did not get it right. But since you derive the structure and certitude of the arts from their hands, I ask: if they did not get it right, what makes you think you can do better? You say you are led by experience: but will you dare to put the experiments of a few years before those of centuries – through which, if they could not establish the art firmly, you will not succeed in making it firmer [...].⁸⁶

eius universam Solis massam penetrarent, ut ad Terram perigerent, & nascentis tunc afficerent corpus? Quo discerniculo agnoverunt Saturnum esse, non aliam caussam, quae tale quidpiam imprimeret?'

⁸³ Gassendi, *Animadversiones*, p. 966: 'Sed vere nempe ab illo dictum est, esse *Experientiam fallacem*; quando tam varia interveniunt, quae hallucinationem faciant; & paralogismum non causae tanquam causae pariant; ut experimenta rarissima sint, quae quidpiam cuiuspiam effectus germanam esse causam convincant.'

⁸⁴ Gassendi, *Animadversiones*, p. 966: 'Quare nemo negaverit expendendam esse ratione Experientiam, ne fallacia aliqua subsit, quae iudicium praeripiat; & maxime quidem, cum inter experiendum nihil magis familiare sit viro imperito, quam falli; & non bono, quam fallere; adeo proinde, ut in tam raro veritatis studio, fides adhibenda temere non sit quibuslibet experimentis; ac illis praesertim, que auribus potius quam oculis hauserimus.'

⁸⁵ Gassendi, *Animadversiones*, p. 967: 'non licuisse idem, simileve experimentum ne bis quidem peragere; quod eadem caeli constitutio ne bis quidem redeat, etiam post saecula non centum, non mille, sed prorsus innumerabilia.'

⁸⁶ Gassendi, *Animadversiones*, p. 968: 'Dices, Chaldaeos non bene egisse; at cum tu Artis & structuram, & certitudinem non habeas, nisi ex manibus ipsorum; quaeso, si perperam egerunt, qui tibi liceat agere melius? Dices experientia te duci; an audebis tamen paucorum annorum experimenta praeferre experimentis saeculorum prope innumerabilium; ex quibus, nisi ipsi artem satis firmam constituerunt, non erit quod ipse firmiorem iam facias [...].'

Conclusion

Throughout the seventeenth century, astrology underwent a process of marginalisation that brought it gradually outside the domain of scholarly recognition. Evidence of this is the removal of astrology from the teaching of mathematical and astronomical disciplines in the beginning of the seventeenth century.⁸⁷ This marginalisation was a crucial element in the reordering of established knowledge, and must be regarded as a crucial moment in the history of science.⁸⁸ But the description of this process of marginalisation, as well as the search for its causes, are still largely to be explored. As I highlighted above, some characteristic early modern intellectual trends, such as Copernicanism and mechanism, offered ambiguous contributions to such a process of marginalisation.

In this paper, I argued that the core of Gassendi's influential polemical writings against astrology was not rooted in Copernicanism and only minimally in mechanism. Rather, it rested on the supposed experimental and observational bases of astrology. This might suggest that the epistemological concerns that spread during the seventeenth century – shared even by astrologers, as the case of Morin shows – may have played an important role in the process of marginalisation of astrology. It is unsurprising that in a world that paid increasing attention to the methods for the production of knowledge, and that moved from the 'more-or-less' to precision (to quote Koyré's famous expression),⁸⁹ the supposed experimental foundations of a discipline that had professed itself as 'conjectural' became the subject of preoccupation among astrologers, and of criticism among its adversaries. While it is still uncertain to what extent Gassendi's criticism of astrology influenced the scholarly circles of his time (though surely it impacted the French and the British ones), it might show an intellectual attitude that was more important than has been acknowledged so far.⁹⁰

⁸⁷ See for instance J. M. Lattis, *Between Copernicus and Galileo: Christoph Clavius and the Collapse of Ptolemaic Cosmology*, Chicago, 1995; D. H. Rutkin, 'Galileo Astrologer' (as in n. 21); R. Vermij, 'The Marginalization of Astrology among Dutch Astronomers in the First Half of the 17th Century', *History of Science*, vol. 52:2, 2014, pp. 153-177; D. H. Rutkin, 'How to Accurately Account for Astrology's Marginalization in the History of Science and Culture: The Central Importance of an Interpretive Framework', *Early Science and Medicine*, vol. 23:3, 2018, pp. 217-243.

⁸⁸ See for instance R. Vermij and H. Hirai, 'The Marginalization of Astrology: Introduction', *Early Science and Medicine*, vol. 22:5-6, 2017, pp. 405-409. See also R. S. Westman, *The Copernican Question*.

⁸⁹ A. Koyré, *Metaphysics and Measurement: Essays in Scientific Revolution*, London, 1968.

⁹⁰ For another case of empirically-based refutation of astrology in the early modern period, see G. Montanari, *L'astrologia convinta di falso col mezzo di nuove esperienze : e ragioni fisico-astronomiche, o' sia la caccia del frugnuolo*, Venezia: Nicolini, 1685.

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