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From the Halls of the Academy to the Streets and Coffee Shops: The Marginalization of Astrology in Early Modern Europe

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Abstract

In 2023 David Barrado Navascués published *Cosmography in the Age of Discovery and the Scientific Revolution*, arguing among other points that a wave of rationalism that began with Pico della Mirandola's *Disputations Against Astrological Revolution* swept astrology out of the universities. This argument is reductive. Instead, the historical record shows that in regions of Europe such as France and England judicial astrology—the form of the discipline used to make predictions—became increasingly associated with riot, unrest, civil war, and perhaps most damning in the eyes of Early Modern intellectuals in these areas, the lower classes. As a result, intellectuals such as Pierre Gassendi and the Fellows of the Royal Society of Science in England adopted a mechanical model of the cosmos that did not require celestial influences. The influence of the latter body was particularly important, as its prestige—and the concomitant prestige of the *Philosophical Transactions of the Royal Society*—undercut the reputation of astrology, since the journal would accept no astrological paper. These changes in England were in large part the result of the appropriation of astrological forecasting by those who lacked a university degree during the English Civil War (1642-46). Thus, the lapsing of astrology as an academic discipline owed more to social and cultural factors than to any rising tide of scientific rationalism.

Keywords: history of astrology; Scientific Revolution; English Civil War; Johannes Kepler; Pierre Gassendi; history of universities; Philip Melancthon; Georg Joachim Rheticus; John Gadbury

1. Introduction

In 2023 David Barrado Navascués published *Cosmography in the Age of Discovery and the Scientific Revolution,* a work that does have its strengths. This is especially true regarding the way the author traces the contributions of Spanish and Portuguese intellectuals, naval professionals, and others in their contributions to cosmography and issues such as the "longitude problem" (Navascués 2023). Unfortunately, Navascués' analysis is burdened by modernist prejudices, particularly in regard to subjects the author sees as superstitions. This is especially obvious when it comes to astrology –the study of the heavens to understand celestial influences and make predictions about terrestrial events in the past, present, or future based on a mathematical analysis of these presumed influences. Navascués represents Giovanni Pico della Mirandola's (1463–94) *Disputations Against Divinatory Astrology*, left unfinished at the death of its author, as a sort of foundation stone upon which skeptics built a defense against the superstition of astrology—while also wrongly attributing the problems Pico experienced with the papacy to an incipient heliocentrism rather than his preoccupations with kabbalah and magic, among other things (Navascués 2023: 155-156; Copenhaver 2022: 53-54). Navascués then draws a direct line from Pico's work to "the rationalist movement" that "would soon become a gale that swept away all superstition, at least at the university level," as evidenced (he says) by the Universities of Pisa and Salamanca, both of which "abandoned astrology" by the closing decades of the sixteenth century—a statement that is not, in fact accurate (Navascués 2023: 156). As

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H. Darrell Rutkin has demonstrated, there were faculty dedicated either to teaching astrology directly or who integrated it into various other courses such as medicine at all Italian universities—including Pisa—through the end of the seventeenth century (Rutkin 2005:1000-11). Furthermore, the masters holding the Chairs of *astronomia* at the Universities of Salamanca and Bologna were required to create astrological almanacs for the medical students of the university as late as 1770 and 1799, respectively (Jensen 2021: 54-56).

What Navascués is doing is presenting a very traditional—some might say old-fashioned—narrative of scientific rationalism crushing superstition. Unfortunately, this account is too limited, even if it is widely held within the scientific community. As Alistair McGrath discusses, scientists from a wide range of disciplines, from the astrophysicist Neil deGrasse Tyson to the evolutionary biologist Richard Dawkins, have promoted this view of the triumph of rationalism over astrology in recent years (McGrath 2015: 147-149). Despite what Navascués writes, astrology maintained its status as an academic discipline well into the early modern period, with practitioners active at all levels of society, many of whom had studied the subject at universities across Europe—including the Universities of Pisa and Salamanca (Dooley 2014:233-266). During the sixteenth and seventeenth centuries, such august scholars as Philip Melancthon (1497-1560) and Johannes Kepler (1571-1630) defended the discipline (Caroti 1986; Rabin 1997). In England, interest in astrological divination reached a feverish peak during the seventeenth century, largely as a response to the English Civil Wars and Revolution—though long before century's end the emerging class of gentlemen scientists would turn decisively away from such pursuits. One practitioner, the classically educated attorney John Heydon (1629-c.72), lamented in 1664 that the revolutionary decades of the 1640s and 50s "admitted stocking-weavers, shoemakers, millers, masons, carpenters, bricklayers, gunsmiths, porters, butlers, &c. to write and teach astrology" (Hill 1984: 284). Thus, the lapsing of astrology's authoritative status did not solely occur because of Pico's unfinished and uneven "attack" on astrology nor because of a wholesale loss of interest in the discipline or rejection of its theories. Instead, while astrology's marginalization as an academic discipline *did* begin in the sixteenth century and was completed by the latter years of the seventeenth, this marginalization resulted as much from changing social and historical pressures as from any rationalist movement.

In order to unpack these statements, let us consider a few examples from Early Modern Europe. In sixteenth-century England one of the most learned men of his day—John Dee (1527-1608)—played an important role at the court of Queen Elizabeth I (r.1558-1603). Frequently summoned to court, his duties at court ranged from casting an astrological election to determine the most propitious day and time for Elizabeth's coronation to casting a counter charm at the behest of the Privy Council to nullify any potential negative effects from an image of the Queen found in Lincoln's Inn fields with a pin stuck through its heart (French 1972: 4-7). The hardly less-learned queen of England and her well-educated advisors welcomed Dee and sought out his advice and services, demonstrating the ongoing interest in astrology evidenced by the elite classes. Meanwhile plays such as *Troilus and Cressida* by William Shakespeare (1564-1616) demonstrated the continuing fascination that astrology held for the theater-going public, which ranged from commoners to nobles. As the Bard of Avon wrote:

The heavens themselves, the planets and this centre, observe degree, priority, and place, Insisture, course, proportion, season, form, office and custom, in all line of order: and therefore is the glorious planet Sol in noble eminence enthron'd and spher'd amidst the other; whose med'cinable eye corrects the ill aspects of planets evil, And posts, like the commandments of a king, sans check, to good and bad: but when the planets in evil mixture, to disorder wander, what plagues and what portents! (Shakespeare 2002, 24).

Theater goers would have readily understood this reference to celestial influence over terrestrial affairs. Evidence for the populace of England's continuing interest in celestial divination is reinforced by the fact that the production of almanacs and astrological prophesying became a booming business in mid-seventeenth-century England during the years surrounding the Civil Wars of 1642-49 and 1650 and into the Restoration period beginning in 1660 (Curry 1989 101-102; Capp 1979, 102-31). However, this very popularity would prove problematic, a point to which I will return shortly.

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Nor was continental Europe ready to reject astrology in the sixteenth or seventeenth century. Giovanni Pontano (1429-1503), the Umbrian polymath astrologer, wrote his *De rebus coelestibus* to promote the use of celestial divination in order to better the human condition while supporting astrology against critics—including Pico—in the last years of the fifteenth and the opening of the sixteenth century (Trinkaus 1985: 446-472). Pontano's position, and his importance, have not always been clear. As Ovanes Akopyan has demonstrated, the editor of the earliest printed edition of the *De rebus coelestibus*, Pietro Summonte (1463-1526), altered the text in a manner to minimize Pontano's strong defense of judicial astrology while also softening his critique of Pico's *Disputationes adversus astrologiam divinatricem* (Akopyan 2020: 195-196). As Akopyan makes clear, criticisms of astrological determinism remained marginalized in Pontano's Naples, largely due to his influence, as he and his circle instead promoted a view of *fortuna* and astrological divination as representing the foundation of an "anti-deterministic foundation of astrology" in keeping with the writings of Thomas Aquinas, as Pontano understood them (Akopyan 2020: 197-198). Thus, Pontano writes that "a sagacious mind works together with the operations of the heavens," not to dominate, but cooperatively in such a way as to minimize or overcome bad influences by working with those that are good (Roick 2018: 151).

Rather than being an aberration, Pontano's defense of astrology was in keeping with the opinion many educated people of his day held, with intellectuals in many parts of Europe closing ranks against those who might question the premises of this ancient discipline. As another example, Philip Melancthon wrote:

First, that we might discern from the movement of the sun and of the moon and of other stars, and of their position among themselves [here referring to the celestial signs as well as the relationship of celestial bodies to one another] or watchers on Earth. But second, regarding the changes that are brought about in bodies, which correspond to those positions, we should consider [those changes] according to the natural qualities of the stars.[1]

As Wolf-Dieter Müller-Jahncke has demonstrated, astrology was an ongoing preoccupation for Melancthon, used for everything to explain why he refused to undertake travel on the Baltic (due to an astrological forecast predicting doom should he do so) to Martin Luther's character based on his natal horoscope (Müller-Jahncke `1998:123-136). This was a time in which almost every noble court had an astrologer in residence, medical doctors used astrology as part of their practice and frequently cast horoscopes on the side—or gave up medicine entirely for astrology as in the case of Michel de Notre Dame (1503-66), known more commonly as Nostradamus today—and astrology was integrated into courses at every university in Europe (Dooley 2014; Crouzet 2014).

2. Astrology's Early Modern Academic Status

So if skepticism was not the sole cause of the death of astrology as an academic discipline and its reemergence in the field of esoterica beginning in the early modern period, what did lead to its marginalization? The answer to that story is too wide ranging for complete analysis in a short study, but a few demonstrative examples can highlight its complexity. Even as astrology attracted defenders of the highest caliber, in what is now Poland an unassuming canon lawyer working at Frauenburg near the Baltic was developing a new cosmology that would eventually provide an alternative to the model in which astrology held pride of place. Nicolas Copernicus (1473-1543) graduated from the University of Ferrara in 1503 with a doctorate in canon law before moving on to Padua to undertake the study of medicine (Hartner 1973: 413-422). Although he left off his medical studies after only one year, eventually taking up his post of canon at the Chapter of Frauenburg in 1510, this period of study

[1] "Unum, quod primum ordine est, et poteste, quo deprehendimus quodlibet tempore motus Solis et Lunae et aliorum siderum, euromque positus inter sese, aut spectantes terram. Alteram vero, quo mutationes, quae efficuntur in corporibus, quae congruunt ad illos positus, consideramus per naturales qualitates siderum," Philip Melancthon. 1852. *Corpus reformatorum.* Leipzig: Halis Saxonum. Vol. 18, S.10-11. The translation is my own.

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grounded him in the study of natural astrology—the branch of the discipline that concerned itself with celestial influences on terrestrial objects such as the human body (Goddu 2010:198-203). This canon lawyer cum mathematical astronomer had no notion that his work would someday be heralded as the beginning of what many still call the Scientific Revolution. Nor did he understand that the model he was developing would eventually, in the hands of modern scientists, make astrology obsolete as a learned discipline. To us it seems self-evident that a heliocentric model of the universe would leave little room for a science built around geocentric presumptions, but there is no evidence that any of this occurred to Copernicus. After all, the reason why it appears "self-evident" to us is that we have grown up in the wake of the Scientific Revolution, comfortable in the idea that our world, so seemingly stable, is in reality flying around the sun at a dizzying pace.

We should forgive Copernicus for failing to see the revolutionary implications of his work. While he held off publication because he was hesitant to challenge the enshrined authority of Ptolemy, his mathematics were in line with his Alexandrian predecessor as developed and refined by Arabic intermediaries. The resulting system was something of a hodge-podge that was both clumsier and less accurate in its ability to describe celestial motion than what it sought to replace (Swerdlow and Neugabauer 1984: vol. 1, 33). The only advantages that his system offered lay in the ability to determine the order and distances of the planets with greater ease and accuracy while clearing up a handful of problems with the Ptolemaic system (Swerdlow and Neugabauer 1984: vol. 1, 20-23). Copernicus seems to have adopted his system based upon little more than an internal certitude that he was right, built perhaps on an interest in Hermetic philosophy that equated the Sun with the One from which all things emanated and maintained in the virtual absence of evidence. Fortunately, his conviction was infectious, winning over the avid astrologer George Rheticus (1514-74), who convinced his dying master to allow the posthumous publication of *De revolutionibus*.

Intriguingly, Rheticus was himself most interested in Copernicus' ideas as they might apply to judicial astrology, rather than what we think of today as astronomy. Having become interested in astrology as a university student, Rheticus earned his *magister artium* with a disputation on 17 April 1536 entitled "Do the Laws Condemn Astrological Prognostication?" After completing his M.A., Rheticus taught at Wittenberg University where his popular course on astronomy revolved around his own notes as well as a series of thirty-two horoscopes used for in-class analysis, including those of Luther and Melanchthon, as well as the astrological sections of his 1540 *Narratio prima*, detailing and defending the Copernican system (Repcheck 2007: 114-18; 151-54). Thus, a desire to reform and improve judicial astrology drove Rheticus' interest in Copernicus' work, motivations that would be familiar to later well-known names in the Scientific Revolution, as we will see below.

Rheticus was not the only sixteenth-century natural philosopher to attempt to reform astrology using Copernican principles, though. A fellow German, far more famous than he, made no small effort in that regard: Johannes Kepler (1571-1630). Born in in the sleepy little town of Weil der Stadt in what is now southern Germany in the late sixteenth century, the grandson of the town's Lord Mayor and son of a mercenary soldier who most likely died when fighting in the 80 Year's War (a struggle between the Calvinist Dutch and their Catholic Spanish overlords), Kepler was no stranger to chaos and uncertainty (Caspar 1993: 29-37). Smallpox almost killed him as a boy, leaving Kepler with weakened eyes and hands that would make him incapable of gathering empirical data on the heavens as an adult (Caspar 1993: 36). However, his mind was unaffected and driven by his innate curiosity, a deepfelt Lutheran faith that drove him to contemplate the heavens as a means of understanding their Creator, and a Christianized Hermetic philosophy that equated the Sun with the One—and thus God—from which all things sprang, Kepler devoted most of his life to the study of celestial motion once he had given up his early hope of becoming a Lutheran minister (Caspar 1993, 17-19; 85-95). What followed was a life filled with challenges, ranging from he and his family becoming refugees during the Thirty Years War, the death of his first wife and the short-lived imprisonment of his mother on charges of witchcraft, and constant economic uncertainty (Caspar 1993, passim; Connor 2009).

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In the face of all these problems it is remarkable that Kepler managed to maintain enough focus to accomplish anything, yet his accomplishments built upon the work of Copernicus, correcting his erroneous notion about the circularity of planetary orbits by discovering the elliptical nature of their motion driven by what he termed inertia rather than "moving intelligences" as Aristotle had posited, and much more besides (Aiton 1975: 250-60). Kepler did maintain the Sun possessed a sort of soul, in keeping with his Christianized Hermetic philosophy, that kept the whole system in order, but in spite of that, Kepler laid the foundation for the mechanistic model of the cosmos with which we are now familiar (Barker and Goldstein 2001: 88–113). However, what interests us in this article is not the astronomical work Kepler undertook, but instead the efforts he put into astrology.

The effort Kepler expended on his astrological pursuits was considerable. There are still some eight hundred horoscopes extant in Kepler's own hand, and these were done not only for paying clients, but also for himself and his family—a fact unexplainable unless he thought judicial astrology to be valid as a discipline (North 1994: 309-26). True, he had harsh words for astrology as it was practiced in his day. As Navascués notes, Kepler wrote of astrology in his *De stella nova* that

A spirit accustomed to mathematical deduction, when confronted with the fallacious foundations [of astrology] resists long, long, like a stubborn mule, to set foot in that filthy puddle, until he is forced to do so by blows and curses (quoted in Navascués 2023: 156).

However, what Kepler was referring to was the need he saw to refine and improve, rather than reject, astrology. This is amply demonstrated by his own efforts to do just that in his 1601 work, *On the More Certain Foundations of Astrology* (Brackenridge and Rossi 1979; Rothman 2017: 117-120). In his later work, *The Intervening Third Man, or a Warning to Theologians, Physicians and Philosophers* (1610) Kepler makes it very clear that he accepted the idea that celestial influences affected terrestrial events, and thus making predictions about *future* occurrences was simply a matter of coupling competent mathematics to adequate empirical observations (Rabin 2010: 59-66; Boner 2020: 138-44).

While Kepler made many innovations regarding mathematical astronomy, his beliefs about astrology were not innovatory and the few comments presented above are meant only to demonstrate that judicial astrology was firmly part of the mainstream in the sixteenth century and would remain so well into the seventeenth. Contemporaries of Kepler and fellow luminaries of the Scientific Revolution such as Tycho Brahe (1546-1601)—personal astrologer to the king of Denmark—and Galileo Galilei (1564-1642)—who left behind twenty-five surviving horoscopes drawn up in his own hand—saw no reason to doubt the presence of celestial influences affecting terrestrial events, or the ability to make mathematical judgements about those influences (Thoren 1990; Hendrix 2011). It would take something more than the development of a new heliocentric understanding of the Earth's place in the Solar System and the concomitant elaboration of mathematical thereof for astrology to become marginalized. It was not quite so simple as a "gale of rationalism sweeping away superstition" that Navascués writes about.

3. The Marginalization of Astrology: Case Studies

Perhaps the first scholar to perceive that Copernicus, Brahe, Kepler, and those like them had been creating a system that could function without astrological forces and predictions was Pierre Gassendi (1592-1655). Born in the sleepy town of Champtercier, he quickly showed academic ability, studying first at the Jesuit college in Digne and then at the University of Aix-en-Provence. There he received his Doctor of Theology in 1617, the same year of his ordination to the priesthood (Lolordo 2006: 7-19). He then went on to teach rhetoric in Dijon (1612-14) and philosophy at Aix (1617-23), before being named canon and provost of the cathedral chapter at Digne (1634-55). During this latter period, he also held the post of professor of mathematics at the University of Paris from 1645-48, primarily teaching courses on astronomy (Fisher 2005; Lolordo 2006:100-80). But it was Gassendi's humanist scholarship that led him to a close study of Epicurus, instilling within the French polymath a deep-seated atomism and empiricism that would lead him to attack astrology and its practitioners (Osler 1994: 153-70). However, this attack was rooted not just in his eclectic learning, but also in the social upheaval that had beset Gassendi's beloved nation.

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Gassendi's time teaching astronomy at the University of Paris was neither the beginning nor the end of his interest in the subject, having both recorded celestial observations as an adolescent and corresponded with Galileo about astronomical matters as a mature man (Carré 1958: 112-20). This interest in the heavens led him to perceive the newly emerging physico-mathematical models of cosmology and inquiry to be a validation of the materialistic and empirical understanding of the universe promoted by his classical hero, Epicurus. It was this scholarly interest that caused the Frenchman to become an avid proponent of the Copernican heliocentric model of the universe, which he saw as more defensible than the alternatives in light of the work of both Kepler and Galileo Galilei (1564-1642) (Carré 1958: 120). In his later years he may have switched his allegiance from Galileo's heliocentric system to the Tychonic model, but whether this switch was a public act made for the sake of appearances or genuine is still open to debate (Galluzi 2000: 509-45). What unquestionably did not change, though, was Gassendi's continuing adherence to empirical-mathematical reasoning.

Gassendi's interests also led him to become a committed materialist in terms of those things that occur within the bounds of the created universe, leading him to argue passionately for the use of the experimental method. Instilling within him an intimate understanding of the process of cause and effect, he ultimately came to reject astrology in its entirety, a journey made easier for him by the association between astrology and unrest that existed in France (Osler 2002: 167-84). Armed with a thoroughgoing command of the sources and arguments used by astrologers, Gassendi applied knowledge of the new science and its methodologies to tearing those arguments down. He stated that the heavens cannot influence the seasons, because those seasons have remained the same over the millennia despite the precession of the equinoxes.[2] Furthermore, heavenly bodies are presumed to cause the same effect everywhere upon the earth, but this is demonstrably untrue. After all, astrologers stated that Sirius imparts great heat, but Gassendi notes that when it is hot in France, it is quite cold elsewhere on the globe. Working from a model of "corpuscular mechanism" he averred that the primary action of stars was illumination and secondarily heating, but that latter effect does not make it to the sublunar realm. As such, any celestial effects can only be general, never specific (Garau 2020: 154-155). Finally, if the stars were causes, then they should always be right, yet in the French mathematician's phrasing, astrological predictions "never or seldom take place" as predicted, "and when it takes place, the cause deriving from the heavens is totally unclear," making judicial astrology no better than "chance or mere prophecy"(Gassendi quoted in Lau 2020: 165). Additionally Gassendi asserts disparagingly that astrologers rely upon charts created by others, while true scientists trust only observation and experiment. Therefore, their methodology put astrologers into conflict with what was coming to be seen as acceptable professional standards. In his estimation, this is doubly true for judicial astrology, which is no more than "ancient and bookish charlatanism" (Lau 2020: 163)

[2] The precession of the equinoxes is the apparent rotation of the sky around the earth that leads to the shifting of all the constellations and individual stars over the course of time. Equinoctial precession is a circular motion of earth's rotational axis with respect to the "fixed" stars, also known as lunisolar precession, caused by the countervailing tensions that the sun and moon place on the earth's rotational bulge. The axis precesses with a period of approximately 25,770 years and would have been unnoticeable if astrologers had not kept records of the night sky for centuries upon end. See J. K Beatty, C.C. Peterson, and A. Chaiken, eds., *The New Solar System* (Cambridge: Cambridge University Press, 1990, 4th edition), p. 105. On Gassendi's attitude toward astrology, see Tester 1987: 230-231.

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For Gassendi, analyzing "the digressions of Mercury, or of Venus, or the stations, directions and retrogradations around the universe"[3] offer nothing to one desirous of understanding terrestrial events (Gassendi 1658: 14). True, he referenced Pico in making his critique of astrology, but when he did so, it was to summon up an illustration in order to make a point. For example, he does so when discussing an unnamed French soldier who suddenly found wine to his liking though he had previously been a non-drinker, once afflicted by a fever (Gassendi 1972: 89). However, Gassendi's critiques run far deeper, drawing inspiration more from the atomism of Epicurus than from the Pico's religious inclined *Disputationes* (Paganini 2024: 75-105). Thus, Pico's preexisting critique served as an example for Gassendi, but it was only one part of a much more complex whole.

Gassendi was doing something new, rejecting rather than critiquing astrology, leaving no room for maneuver. He jettisoned medical applications of astrology alongside the indirect influence of the heavenly bodies that even the most ardent critics of the discipline had always preserved. Intriguingly his rejection was built upon the work of Copernicus, Kepler, and others—all of whom believed in the efficacy of astrology. Gassendi insisted that a rational individual could understand the "world machine" that constituted the universe through the application of inductive logic in conjunction with observation and experimentation, an idea which had been a commonplace in the work of many medieval writers, such as Albert the Great (c.1200-1280) and Konrad de Megenberg (c.1350) (Bianchi 1999: 55-8). However, unlike earlier writers, Gassendi disallowed mystical explanations posited to fill in the gaps of human understanding while admitting that some things may be beyond human comprehension. Nevertheless, lacunae of understanding indicate areas ripe for research, rather than a need for the introduction of some metaphysical or mystical explanation derived solely from philosophical introspection.

During the years that Gassendi was writing and teaching, Copernican cosmology was becoming increasingly sophisticated and accurate in its predictions about celestial motion, but there may have been an even stronger reason why Gassendi found this heliocentric system attractive in opposition to the older Ptolemaic model with its concomitant support for astrology: the incitement to unrest astrology had provided during France's troubled sixteenth century. Although much work still needs to be done on French attitudes toward astrology in the seventeenth century, there were certainly strong reasons to be suspicious of all arts aimed at predicting the future. As Denis Crouzet argues in his two-volume *Les Guerriers de Dieu*, almanacs and astrology had combined with prophetic sermons and accounts of omens and prodigies to create a level of "eschatalogical anxiety" that had driven the Catholic population of France to ever greater heights of violence, culminating in the horrible events of St. Bartholomew's day 1572 (Crouzet 1990: vol. 1, 101-304).

There are strengths to Crouzet's analysis that make it appear altogether plausible. Astrological works were popular and widely distributed among at all levels of French society, with content that may have been linked to events in Germany, such as Luther's identification of the pope with the antichrist and the Peasant's War of 1524 to 1525, serving to heighten eschatological tensions among the Catholic population of France (Crouzet 1990: vol. 1, 103; 109-10). Astrologers' predictions of a deluge of biblical proportions for 1524 since at least 1480 had heightened the significance of the Peasant's War as far as the history of astrology is concerned. While the uprising of peasant farmers and the subsequent bloodletting that the social elites of Germany had visited upon them was no flood, it certainly had the appearance of a cataclysmic event to readers in France and therefore was frequently cited as a substantiation of the predictions that astrologers had been making for decades.

As Crouzet notes, astrological works with an increasingly apocalyptic tone rolled out of French printing presses at an ever more rapid pace until at least the 1570s (Crouzet 1990: vol. 1, 103; 300-04). But the story may be more complicated than that which he presents, for it is unclear whether this flood of divinatory literature drove "eschatological anxiety" and civil unrest or if astrologers wrote

[3] Pierre Gassendi, "prætereà quod opponitur circa digressiones Mercurij, ac Veneris, & vniuerse circa directiones, statiores retrogradationes," *Syntagma philosophicum*, Lyon: 1658, 14r. The translation is my own.

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in response to an existing demand (Crouzet 1990: vol. 1, 103). The most recent scholar to undertake an untangling of the complex forces at work in France during this period is Jean Sanchez, whose dissertation "Lois des astres, lois des hommes, lois de Dieu: théologiens, magistrats et philosophes face à la question de l'astrologie en France (1560-1628)" deserves to be better known (2022). As he points out, despite Crouzet's use of François Rabelais (1494-1553) as an example of a sixteenth-century intellectual who rejected astrology due to its associations with civil unrest, Rabelais composed numerous astrological almanacs the contents of which leave no doubt that he accepted the validity of celestial influences (Sanchez 2022: 301-303). Sheila J. Rabin has made the same point about Rabelais, at least in regards to natural rather than judicial astrology (Rabin 2004: 13-4). However, by the late sixteenth century French elites and intellectuals had clearly begun to see a connection between divination—whether through religious prophecy or by observation of the heavens—and violence in society (Crouzet 1990: 301-3). By the 1660s, within five years of Gassendi's death, astrology was officially excluded from scientific institutions such as the prestigious Celle-ci fut officiellement exclue des nouvelles institutions scientifiques créées dans les années 1660, en particulier Académie royale des sciences (Sanchez 2022: 6). The last astrologer to hold a position of academic prominence in France was Jean-Baptiste Morin (1583-1656), who held the post of professor of mathematics at the Collège Royal from 1630 to his death (Garau 2024: 605). In spite of Morin's vigorous defense of the subject in the face of his academic rival, Gassendi, judicial astrology would quickly lose favor among the French elite and as this happened, its practitioners lost patronage (Garau 2024: 611-616).

Furthermore, Gassendi may have been consciously contextualizing his rejection of astrology against the backdrop of political instability and violence in France. In the midst of the Franco-Spanish War phase of the Thirty Years War starting in 1635, the first in a series of revolts known as the Fronde occurred in 1648 and 49. It was against this backdrop of unrest that the dispute between one time friends, Jean-Baptiste Morin and Pierre Gassendi, broke out. Morin veered perilously close to accusing his old friend of heresy while Gassendi's followers slung accusations of sorcery and more back at Morin (Garau 2024: 614-16). The result was what Robert A. Hatch has memorobably termed the "public execution" of astrology (Hatch 2017: 497). As part of the exchange of polemics occuring during this time of unrest, a work with the title *A Ridiculous Mouse* appeared in 1651. Although traditionally attributed to Gassendi's pupil, François Bernier, Rodolfo Garau has persuasively argued that the work and its 1653 sequel, *Ashes of a Ridiculous Mouse*, were both products of the pen of Pierre Gassendi himself (Garau 2024b). This is important, because in the first of these works Gassendi (if Garau is correct, as he appears to be), wrote:

you should feel ashamed to flaunt [your astrology] further, after it caused so many evils throughout France, since you dissuaded the gullible minister not to persuade to peace the good Queen, because you predicted, on the basis of his natal chart, that he would have fallen from his ministry as soon as peace had been made (Gassendi, quoted in Garau 2024b: 617).

Within the context of his writing, it is not completely obvious whether Gassendi is referring to peace in the Thirty Years War or the Fronde, but either way, the meaning is clear: Gassendi is accusing Morin's use of judicial astrology to lengthen and deepen the violence in France.

The precise context of Pierre Gassendi's rejection of astrology is too complex for further discussion here, but his influence was not confined to France as his works soon became a staple of discussion among European intellectuals. This would be particularly true for England's Royal Society, formed in 1666 (Clericuzio 2023: 334-376). Because of the significance of the Royal Society to the history of science, a consideration of astrology's decline in that nation can serve as a useful case study. Gassendi's argument that astrology should be rejected based upon its failure to employ proper scientific methodologies fell upon receptive ears among members of the Royal Society, both for reasons related to empiricism and the developing scientific thought of the day as well as the unrest that wracked England in the seventeenth century. The founding members of the Royal Society had matured in an England wracked with social turmoil and open warfare, and the changes to the makeup of those who practiced judicial astrology wrought by this turmoil would exacerbate the suspicion some intellectuals already evidenced toward the discipline. The most prominent example

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of such suspicion is Henry Savile (1549-1622), whose 1592 speech before Queen Elizabeth I at Oxford describes astrology as "deceitful about outcomes, superstitious in practice, imported from barbarous nations . . . an art which is worst in all its art, woven together by not principles, supported by no proof, established by no syllogism" (Savile 2014: 642). When Savile had a chance to put his beliefs into action he seized it, dictating that the holder of the Savile Chair in Astronomy he endowed in 1619 would teach nothing of astrology (Feingold 2021). However, he was something of an outlier. Savile's life-long friend and fellow Oxonian, William Camden (1551-1623), though best known as an historian and antiquarian was also avidly interested in astrology (Feingold 1984: 101). Furthermore, while the holder of the Savilian chair of astronomy could not teach judicial astrology, that did not mean English university students could not study the subject. At Cambridge Joseph Mede (1586-1639) taught astrology as one among many subjects from 1613-1638, and an anonymous notebook from an Oxford student dated to the same time period contains notes on astrology, suggesting study of the subject continued at both universities (Feingold 1984: 99-100).

However, suspicious attitudes about judicial astrology would become more commonplace in years to come. The bloodshed of the Civil Wars, fought between 1642 and 1650, killed twelve percent of the English population while wiping out almost half of the population of Ireland (Morrill 1980: 189-91). Within the context of such widespread devastation, it is hardly surprising that the populace became desperate to find solace in anything that promised to explain these events while predicting what might come next. With the collapse of censorship during the Civil Wars, the increased production of astrological almanacs handily met this need. Bernard Capp estimates that by 1650 one-third of the families of England owned one or more of these works (Capp 1979: 79-80). Within the pages of these almanacs the reader could find not only astrological information and predictions but also calendars of events and news of current happenings, often juxtaposed with an astrological explanation, serving simultaneously to serve the public's needs for reassurance, information, and advice by mingling predictions with rumors and news accounts of the war.

But with the country tearing itself apart, we should not expect these astrologers to have been unbiased observers. Some, such as George Wharton (1617-81), turned their predictions into propaganda for the Royalist cause while others, such as William Lilly (1602-81), were just as active in their support of the Parliamentarian position (Geneva 1995: 31-60, 57, 73-86). Propaganda pieces or not, the works of England's astrologers were extremely popular, with 30,000 of Lilly's works selling in 1659 alone, and total almanac sales by all authors climbing to 400,000 per annum in the 1660s. Ironically, this very popularity was a significant contributing factor in the death of astrology as a learned discipline.

As these vernacular almanacs proliferated among the increasingly literate population of England, the basics of astrology spread with them. New practitioners arose to meet the explosively growing demand increasingly drawn from non-elite backgrounds (Curry 1989: 20, 46-8). As Lilly's patron, Elias Ashmole (1617-92), stated in his 1652 work, *Theatrum chemicum Britannicum*

Astrologie is a profound science. . . Never was any age so pester'd with a multitude of Pretenders, who would be accounted . . . masters, yet are not worthy to wear the badge of illustrious Urania. And (oh to be lamented) the swarme is likely to increase, until through their ignorance they become the ridiculous object of the enemies of Astrologie . . . and eclipse the glory of that light, which if judiciously dispensed to the world would cause admiration, but unskilfully exposed becomes the scorne and contempt of the vulgar (Ashmole 1652: 453).

In other words, astrology had slipped the bonds of respectable society to be taken up by tradesmen and the "rabble" of England, and this vulgarization of the discipline lead to a decline in the accepted standards of practice (Curry 1989: 36-8). This new breed of astrologers was increasingly drawn from outside the ranks of the intellectual elite, making them less apt to possess the skills necessary to apply themselves to the classical sources of astrological knowledge (Curry 1989: 109-22). In 1648, the astrologer George Wharton wrote bitterly that for many, "Ptolemy may be something to eat for aught they know" (Quoted in Curry 1989: 196). The decline in accepted standards was problematic for the future of astrology, but the backgrounds of the new breed of astrologers were

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perhaps more damning. Elites such as Elias Ashmole had no interest in associating with those whom they viewed as socially and intellectually inferior.

At times England's critics of astrology appealed directly to their Continental counterpart, Pierre Gassendi, as can be seen in the translation and abridgegment of his 1649 *De praesignificatione siderum* bearing the title: *The vanity of judiciary astrology. Or Divination by the stars*, translated by an anonymous "person of quality" (1659; Garau 2020: 147). The title itself speaks volumes, as does the brief "history" included in chapter 1, in which the tranlsator avers astrology and astronomy had once been synonyms, until "after a long process of time, when the fraudulent and superstitious Chaldeans had corrupted the purity of this Science, by foisting in their Vanities, and ascribing certain prodigious vertues to Heavenly Bodies over inferior," thus creating a distinction between the "noble" astronomy and the "vain" astrology (1658: 1). The critique of astrology only deepens from there, rising to a point where the text asserts "little of Reason can be urged in defence of Astrology" and in fact any astrological prediction that appears to come true "may be said to work by chance or accident" (1658 125,131). And in a passage seeming to reflect more of the changes having occurred regarding the social position and education of English astrologers than that of the original French text:

let us reflect upon the Variety of the Art it self; it being no secret, that the Artificers are at irreconcilable variance among themselves; and even about their Fundamentals. And hence comes it, that they differ in their doctrine in many things, and among the rest, in the Manner of Erecting Scheams; for few of them now a dayes retain either the Old Chaldean way of casting Nativities, or the Placits relating to them (1658: 135).

It is tempting to see concerns about the state of England in such sections, where the translation from the French is rather free to say the least, as well as in repeated references to predictions such as those for whom "Astrologers had threatned violent and untime|ly deaths by the hand of an executioner . . . or the miserable death of such as lay violent hands upon themselves" (1658, 151-152).

The fidelity of this anonymous "person of quality" to Gassendi's text, the reasons for the decisions made in translating that work, and other questions related to it are worth further study, but it seems clear that his decision to translate Gassendi was made with an eye toward the changing nature of those who practiced judicial astrology in England. But it was not just the social class and educational levels of these self-styled astrologers that provoked feelings of mistrust, apprehension, and distaste upon the part of England's elite practitioners: many of the new low-born astrological writers were associated with the provocation of social disorder. In the absence of any effective form of censorship in the 1640s and into the 1650s, many of the almanacs enjoying the briskest sales promoted antinomian beliefs –presumably supported by celestial portents "proving" that the established social order was no more –as well as strongly anti-royalist messages (Curry 1989: 46). While agents of the Lord Protector Oliver Cromwell (1599-1658) might have overlooked the latter aspect of this newly demotic astrology, none of the country's elites could countenance the socially subversive elements visible in so many of these new almanacs, though there were periodic attempts to rehabilitate the discipline among the intelligentsia or least a continuing interest in the subject. Robert Boyle's (1627-1691) posthumously published *General History of the Air* (1692) contained references both to possible mechanistic effects of astrology as well as celestial influence on the atmosphere (Harrison 2000: 26-28). However, this was no longer the England of the pre-Civil War period. With the Restoration of Charles II (r.1660-85) to the throne, astrologers who appeared to have supported the Parliamentarian position found themselves in a precarious position. The 1662 Act of Uniformity reinstated censorship and Parliament established the staunch Royalist and Anglican Roger L'Estrange to enforce it. His assigned task was to "seize all seditious books and libels, to apprehend the authors, and to bring them before council" (Quoted in Capp 1979: 49). William Lilly, to whom L'Estrange referred as "old Crackfart," complained that censors "macerated, obliterated, sliced and quartered" his books, causing his sales to plummet from a high of 30,000 per year in 1659 to less than 8,000 in 1664 (Quoted in Capp 1979: 49, 89).

Perhaps desperate to reestablish their position, many astrologers attempted to reform their discipline along lines accepted by the new scientific elite, but it was too little and far too late. John

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Gadbury (1628-1704)—a tailor who studied with the astrologer and physician Nicholas Fiske (1575-1659)— who assiduously gathered birth charts and honed astrological principles, no amount of effort was going to breathe life back into a field of study that had become associated with popular enthusiasms and unrest, especially since the majority of the new practitioners were self-taught members of the lower classes (Curry 1989: 72-6). This vulgarization of astrology had turned the majority of England's intellectual elites against it, leaving them receptive to and in need of an alternative cosmological view. Just such an alternative had been slowly coalescing in the mathematical models and abstract theories of Copernicus, Brahe, and Kepler. Gassendi's work was important too, as he promoted the idea that any discipline failing to apply the scientific method, as promoted by Galileo, could not be considered a science. Since "scientific," however ill-defined it might have been as a construct, was becoming virtually synonymous with "rational" in the minds of Europe's new intellectual elite, astrology's imperviousness to controlled experimentation left it outside the realm of mainstream academia. Therefore, Gassendi enjoyed considerable success in convincing his readers that focusing on natural, mathematically describable forces explicable through experimentation represented a method of comprehending the universe that was a viable alternative to astrology.

With the publication of Gassendi's collected works in the late 1650s, members of the Royal Society such as Robert Boyle and Sir Isaac Newton (1642-1727) embraced him (Clericuzio 2023). In this way, the French astronomer's ideas served to advance the idea of a rigorously empirical system of science that would be promoted as an alternative to the astrological thought that had become associated with ill-educated social radicals. Even though these very scientists continued to study other forms of esoterica, including efforts on the part of Newton to develop of means of predicting the future based on analysis of the bible, astrology was banished from their systems of thought (Snobelen 2003: 537-551). The emerging forms of the new science would step in to fill the void, offering replicable results attained through a process –experimentation—mutually agreed upon by gentlemanly practitioners who wished to distance themselves from the masses. Those such as Gadbury who applied the new learning to attempted reforms of astrology were out of step with the times, fighting a doomed holding action to preserve the study of this art within the respectable ranks of academia. Instead, Jonathan Swift (1667-1745) was the voice of the things to come, with his bitingly brilliant satire of all things astrological in his "Prediction for the Year 1708, by Isaac Bickerstaff, Esq.," foreshadowing astrology's future as an object suitable more for ridicule than study in the view of the intellectual mainstream (Swift 1757: 305-14). As the Royal Society increased its European reputation and England became recognized as a scientific leader in the seventeenth and eighteenth centuries, English distaste for astrology spread along with the other ideas of the Society's members.

4. Conclusion

In the following centuries a few intellectuals continued attempts to shore up or revive interest in celestial divination in light of newly emerging scientific theories. For example, the Bohemian-Polish mathematician Jan Kołaczek, known more commonly by the latinized version of his name, Johannes Placentinus (1629/30-83), developed a creative reworking hybridization of astrological principles based upon a Cartesian corpuscular that obviated the need for action at a distance (Omedeo 2022: 177-188). These efforts bear some similarities to those of the physician Dr. Richard Mead (1673-1754), who equated Newtonian forces to presumed interactions between the heavenly bodies, earth's atmosphere, and the human body in his writings, but such efforts were lost upon most of Europe's learned elite (Roos 2000: 433-57). However, by this point Mead was an anomaly: The primary marketplace for astrological ideas was among the laboring classes. As Steven Vanden Broecke has written, in the seventeenth century:

First it became increasingly difficult to find astrological practitioners among Europe's academically trained mathematicians and philosophers. Secondly, the robust presence of astrological textbooks and detailed predictions in European print culture took a strong downturn. Thirdly,

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astrology seems to have become more alien to the cultural horizons of Europe's elites (Vanden Broecke 2003: 317).

The contempt that most among the educated elite felt toward the subject meant that the majority of self-proclaimed authorities during this period were autodidacts who wrote for one of the various almanacs that struggled financially in the eighteenth century, before seeing success in the nineteenth (Fara 2003: vol. IV, 497-99). Foremost among these was the *Vox Stellarum*, which the London physician Francis Moore (1657-1714) had put into publication in 1700 (Bobrick 2006: 256). This almanac combined information on simple predictions based on the motions of the sun and moon with herbal remedies and thinly veiled advertisements about the efficacy of Moore's medicines. In 1803 the *Vox Stellarum* sold 200,000 copies, spawning inevitable imitators and additions to the field, such as *The Straggling Astrologer*, which began publication in 1824 as the first such magazine to offer weekly predictions.

During this time the autodidactic nature of astrologers both in Europe and the United States became solidified. Astrology had fallen out of the university curriculum since the lapsing of the requirement in 1799 for the chair of *astronomia* at the University of Bologna to produce an annual almanac for the use of the medical students and faculty (Dooley 2014:233-266). This meant that anyone who wished to learn about astrology was left to his or her own devices. Typical of this period—although far more important than his contemporaries in the eyes of modern astrologers—was the English travelling salesman William Frederick Allen (1860-1917) (Bobrick 2006: 266). Being almost entirely self-taught, Allen understood little or nothing of the complex mathematics and learning that had characterized an earlier era of the discipline, instead developing a simplified—astrologers of the past would have said "debased"—system focused on sun signs and character analysis.[4] Simplification was a necessity for Allen. The disappearance of his father while he was very young forced him to take on a variety of trades occupations rather than engage in formal schooling, and at one point he was even reduced to living on the streets. That meant that both his formal education and his training in astrology were extremely basic. As time passed, however, his station in life improved and he was able to divert enough of his energies from his job selling sweets door to door to launch *The Astrologer's Magazine* in 1890, which was later renamed *Astrology Today*. This magazine remained in circulation until 1998, more than a century after Allen founded it. Taking the professional name of Alan Leo, his publishing efforts eventually paid off, allowing him to devote himself completely to his work as an astrologer by 1898. Needless to say, the intellectual community was no more receptive toward Allen than to his reform-minded predecessor Gadbury, but this did no harm to his popular reputation. In 1915 he founded the London Astrological Lodge of the Theosophical Society and is today known as the father of the modern astrology movement, which still attracts many thousands worldwide (Campbell 1980:117-20).

Thus, while today there are adherents to and believers in astrology the world over, its practice has passed beyond the walls of academia. However, the process whereby this occurred was no simple one of the triumph of science over superstition. To paraphrase one component of the Duhem-Quine thesis, scientists—or the natural philosophers who were their predecessors—do not abandon a theory simply because it has become falsified. Instead, they do so because it has become overly complicated or less useful than competing theories (Murphey 2011: 236-41). One way in which a theory can become less useful is if the educated elite come to view it as distasteful, which became increasingly true with judicial astrology. By the end of the seventeenth century this discipline had become inextricably linked to riot, unrest, and civil war in nations such as England and France. Perhaps most damnably, the gentleman scientists of the day, particularly in England, saw it as the province of the uneducated elite. These men would certainly not allow anything related to the practice of astrology to be published in the *Philosophical Transactions of the Royal Society*—the journal of the Royal Society of Science, which was the most prestigious such publication of the day. Therefore, in spite of the

[4] A sun sign indicates the point of the zodiac within which the sun rose on the day of an individual's birth. This is what modern people mean when they refer to their "sign."

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efforts of men such as John Gadbury (it probably did not help that he was a tailor) to refine astrology along the lines of the new heliocentric mechanical philosophy, astrology became increasingly marginalized until it was all but forgotten in England, only to be resurrected in the nineteenth century. Certainly, there are complexities yet to be explored regarding the history of astrology's marginalization in other parts of Europe—much less the world—but the case studies provided herein demonstrate there was more to this process than rationalism winning out over superstition.

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References

Aiton, E. J. 1975. "How Kepler discovered the elliptical orbit." *Mathematical Gazette*, 59(410): 250–260.

Ashmole, Elias. 1652. *Theatrum chemicum Britannicum*. Printed by J. Grismond for Nath. Brooke: London.

Beatty, J. K, C.C. Peterson, and A. Chaiken. 1990. *The New Solar System*. Cambridge: Cambridge University Press, 1990, 4th edition.

Barker, P. and B.R. Goldstein. 2001."Theological Foundations of Kepler's Astronomy." *Osiris*, 16: 88–113.

Bianchi, L. 1999. *Censure et Liberté intellectuelle à l' Université de Paris (XIII-XIV siècles)*. Paris: J. Vrin.

Bloch, Olivier René and T.J. Reiss. 1973. "Gassendi and the Transition from the Middle Ages to the Classical Era." *Yale French Studies* 49: 43-55.

Bobrick, Benso. 2006. *The Fated Sky*. New York: Simon and Schuster.

Boner, Patrick J. 2020. *Kepler's New Star (1604): Context and Controversy*. Leiden: Brill.

Brackenridge, J. Bruce and Mary Ann Rossi. 1979. "Johannes Kepler's 'On the More Certain Fundamentals of Astrology' Prague 1601." In *Proceedings of the American Philosophical Society* 123.2: 85-116.

Campbell, Bruce F. 1980. *Ancient Wisdom Revived, a History of the Theosophical Movement*. Berkeley: University of California Press 1980.

Capp, Bernard. 1979. *Astrology and the Popular Press: English Almanacs 1500-1800*. London and New York: Faber and Faber.

Caroti, Stefano. 1986. "Melanchthon's Astrology." In *'Astrologi hallucinati:' Stars and the End of the World in Luther's Time*. Editor, Paola Zambelli. New York: Walter de Gruyter, 1986: 109-121.

Carré, Meyrick H. 1958. "Pierre Gassendi and the New Philosophy." In *Philosophy* 33.125: 112-120.

Caspar, Max. 1993. *Kepler*. London: Dover Press.

Clericuzio, Antonio. 2023. "The Best Philosopher in France": The Reception of Gassendi's Natural Philosophy in England." In *Pierre Gassendi Humanism, Science, and the Birth of Modern Philosophy*. Editors Delphine Bellis, Daniel Garber, and Carla Rita Palmerino. New York: Taylor and Francis: 334-376.

Cohen, I. Bernard. 1960. "Newton in Light of Recent Scholarship." In *Isis* 51.4: 489-514.

Connor, James A. 2009. *Kepler's Witch: An Astronomer's Discovery of Cosmic Order Amid Religious War, Political Intrigue, and the Heresy Trial of His Mother*. New York: Harper Collins.

Crouzet, Denis. 1990. *Les Guerriers de Dieu*. Seyssel: Champ Vallon.

Crouzet, Denis. 2014. *Nostradamus: A Healer of Souls in the Renaissance*. Translator, Mark Greengrass. Cambridge: Polity Press.

Curry, Patrick. 1989. *Prophecy and Power: Astrology in Early Modern England*. Cambridge: Polity Press.

Dooley, Brendan. 2014. "Astrology and Science." In *A Companion to Astrology in the Renaissance*. Editor, Brendan Dooley. Leiden: Brill.

Fara, Patricia. 2003. "Marginalized Practices." In *The Cambridge History of Science: Eighteenth-Century Science*, vol. IV. Cambridge: Cambridge University Press.

Feingold, Mordechai. 1984. *The Mathematician's Apprenticeship: Science, Universities and Society in England 1560-1640*. Cambridge: Cambridge University Press.

Feingold, Mordechai. 2021. "Reading Mathematics in the English Collegiate–Humanist Universities." In *Reading Mathematics in Early Modern Europe: Studies in the Production, Collection, and Use of Mathematical Books*. Editors, Philip Beeley, Yelda Nasifoglu, and Benjamin Wardaugh. New York: Routledge. Ebook.

 doi:10.20944/preprints202510.0251.v1

Fisher, Saul. 2005. *Pierre Gassendi's Philosophy and Science.* Leiden: Brill, 2005.

Galluzzi, Paolo. 2000. "Gassendi and l'Affaire Galilée of the Laws of Motion." In *Science in Context* 13.3-4:509-545.

Garau, Rodolfo. 2020. "Gassendi's Critique of Astrology." In *Lias* 47.2: 143-174.

Garau, Rodolfo. 2024. "Evidence for Re-attributing to Pierre Gassendi the Authorship of *Anatomia ridiculi muris* (1651) and *Favilla ridiculi muris* (1653)." In Early Science and Medicine 29.4: 381-405.

Garau, Rodolfo. 2024b. "Patronage, Cultural Politics and the Marginalization of Astrology in Seventeenth-Century France: the Case of J.B. Morin and of his Polemics with Pierre Gassendi and his Circle." *British Journal for the History of Science* 57.4:603-622.

Gassendi, Pierre. 1658. *Syntagma philosophicum*. Lyon: 1658. Reprinted in Stuttgart-Bad Cannstatt: Friedrich Frommann Verlag, 1964.

Gassendi, Pierre. 1972. "Exercises Against the Aristotelians." In *Selected Works of Pierre Gassendi.* Craig B. Bush, editor and Translator. New York: Johnson Reprint Corporation.

Geneva, Ann. 1995. *Astrology and the Seventeenth Century Mind: William Lilly and the Language of the Stars*. Manchester: Manchester University Press.

Goddu, André. 2010. *Copernicus and the Aristotelian Tradition: Education, Reading, and Philosophy in Copernicus's Path to Heliocentrism*. Leiden: Brill.

Harrison, Mark. 2000. "From Medical Astrology to Medical Astronomy: Sol-Lunar and Planetary Theories of Disease in British Medicine, c. 1700-1850." *The British Journal for the History of Science* 33.1: 25-48.

Hartner, Willy. 1973. "Copernicus, the Man, the Work, and its History." In *Proceedings of the American Philosophical Society* 117.6: 413-422.

Hatch, Robert A. 2017. Between Astrology and Copernicanism: Morin – Gassendi – Boulliau." In *Early Science and Medicine, Marginalization of Astrology* 22.5/6: 487-516.

Hendrix, Scott E. 2011. "Natural Philosophy or Science in Premodern Epistemic Regimes? The case of the Astrology of Albert the Great and Galileo Galilei." *Teorie Vědy / Theory of Science* 33 (1):111-132.

Hill, Christopher. 1984. *The World Turned Upside Down: Radical Ideas During the English Revolution*. London: Peregrine Books, 1984.

Jensen, Phebe. 2021. *Astrology, Almanacs, and the Early Modern English Calendar*. London and New York: Wiley-Blackwell.

Lolordo, Antonia. 2006. *Pierre Gassendi and the Birth of Early Modern Philosophy.* Cambridge: Cambridge University Press.

Melancthon, Philip. 1852. *Corpus reformatorum.* Leipzig: Halis Saxonum. Vol. 18.

McGrath, Alistair. 2015. *Dawkins' God: From The Selfish Gene to The God Delusion*. Oxford: Wiley-Blackwell.

Morrill, J.S. 1980. *The Revolt of the Provinces: Conservatives and Radicals in the English Civil War, 1630-1650*. London and New York: Longman.

Müller-Jahncke, Wolf-Dieter. 1998. "Melanchthon und die Astrologie—Theoretisches und Mantisches." In *Melanchthon und die Naturwissenschaften seiner Zeit*. Editors, Günter Frank and Stefan Rhein. Stuttgart: frommann-holzboog.

Murphey, Murray G. 2011. *The Development of Quine's Philosophy*. London and New York: Springer International.

Navascués, David Barrado. 2023. *Cosmography in the Age of Discovery and the Scientific Revolution.* London and New York: Springer International.

North, John D. 1994. *The Fontana History of Astronomy and Cosmology*. London: Fontana Press.

Omodeo, Pietro Daniel. 2022. *Defending Descartes in Brandenburg-Prussia: The University of Frankfurt an Der Oder in the Seventeenth Century*. Cham: Springer International.

Osler, Margaret J. 1994. *Divine Will and the Mechanical Philosophy: Gassendi and Descartes on Contingency and Necessity in the Created World*. Cambridge: Cambridge University Press.

Osler, Margaret J. 2002. "New Wine in Old Bottles: Gassendi and the Aristotelian Origin of Physics." In *Midwest Studies in Philosophy* 26.1: 167-184.

Paganini, Gianni. 2023. "Gassendi's Interplay between Skepticism and Empiricism." In *Pierre Gassendi Humanism, Science, and the Birth of Modern Philosophy*. Editors Delphine Bellis, Daniel Garber, and Carla Rita Palmerino. New York: Taylor and Francis: 75-105.

 doi:10.20944/preprints202510.0251.v1

Rabin, Sheila J. 1997. "Kepler's Attitude Toward Pico and the Anti-Astrology Polemic," *Renaissance Quarterly* 50.3: 750-770.

Rabin, Sheila J. 2004. S.V. "Astrology." In *The Rabelais Encyclopedia*. Editors Elizabeth A. Chesney and Elizabeth Chesney Zegura. Westport: Greenwood Publishing.

Rabin, Sheila J. 2010. "The Astrological Cosmos of Johannes Kepler." In *World Building and the Early-Modern Imagination.* Editor, Allison B. Kavey. New York: Palgrave Macmillan.

Roick, Matthias. *Pontano's Virtues: Aristotelian Moral and Political Thought in the Renaissance.* London: Bloomsbury Press.

Repcheck, Jack. 2007. *Copernicus' Secret: How the Scientific Revolution Began*. New York: Simon and Schuster.

Roos, Anna Maria. 2000. "Luminaries in medicine: Richard Mead, James Gibbs, and Solar and Lunar Effects on the Human Body in Early Modern England." In Bulletin of the History of Medicine 74.3: 433-457.

Rothman, Aviva. 2017. *The Pursuit of Harmony: Kepler on Cosmos, Confession, and Community*. Chicago: University of Chicago Press.

Rutkin, H. Darrell. 2005. "Galileo Astrologer: Astrology and Mathematical Practice in the Late-Sixteenth and Early-Seventeenth Centuries." *In Galilaeana: Journal of Galilean studies*, II: 1000-37.

Sanchez, Jean. 2022. "Lois des astres, lois des hommes, lois de Dieu: théologiens, magistrats et philosophes face à la question de l'astrologie en France (1560-1628)." Paris: University of Paris, unpublished doctoral dissertation.

Savile, Henry. 2014. "Henry Savile, Speech Delivered at Oxford in 1592." In *The Progresses and Public Processions of Queen Elizabeth: Volume III: 1579 to 1595*. Editor, John Nichols. Oxford: Oxford University Press.

Shakespeare, William. 2002. *Troilus and Cressida*. Editors, Daniel Seltzer and Sylvan Barnett. New York: Signet Classics.

Snobelen, Stephen D. 2003. "'A Time, the Times, and the Dividing of Time:' Isaac Newton, the Apocalypse, and 2060 A.D." In *Canadian Journal of History* XXXVIII: 537-551.

Swerdlow, N.M. and Otto Neugebauer. 1984. *Mathematical Astronomy in Copernicus'* De revolutionibus. New York: Springer Publishing.

Swift, Jonathan. 1757. "Prediction for the Year 1708, by Isaac Bickerstaff, Esq." in *The Works of Dr. Jonathan Swift.* Edinburgh: G. Hamilton, J. Balfour, and L. Hunter.

Tester, S.J. 1987. *A History of Western Astrology*. Woodbridge: The Boydell Press.

Thoren, Victor E.1990. *The Lord of Uraniborg: A Biography of Tycho Brahe*. Cambridge: Cambridge University Press.

Thorndike, Lynn. 1923. *History of Magic and Experimental Science*. New York: Columbia University Press.

Trinkaus, Charles. "The Astrological Cosmos and Rhetorical Culture of Giovanni Giovano Pontano." In *Renaissance Quarterly* 38.2 (1985): 446-472.

Vanden Broecke, Steven. 2003. The Limits of Influence: Pico, Louvain, and the Crisis of Renaissance Astrology. Leiden: Brill.

Westfall, Richard S. 1970. *The Construction of Modern Science: Mechanisms and Mechanics*. Cambridge: Cambridge University Press.