

2023

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### Recommended Citation

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# Matter, nature, cosmos: The scientific art of the early modern English stage

JEAN E. FEERICK

## TALES OF THE MOON

In Act 2, scene 2 of *The Tempest*, as Stefano stumbles upon an islander he takes to be a ‘mooncalf’ (2.2.105), their first conversation turns curiously to lunar matters. Having already tasted Stefano’s ‘celestial liquor’ (2.2.115), Caliban asks: ‘Has thou not dropped from heaven?’ (2.2.134). Flushed with the effects of wine, Stefano plays along, affirming the outrageous idea in responding ‘I was the man i’t’h’ moon when time was’ (2.2.135–36). The words of a drunken butler, Stefano’s preposterous assertion yet creates a bond with his interlocutor. Caliban has heard stories of this figure and affirms Stefano’s claim as truth: ‘I have seen thee in her, and I do adore thee! / My mistress showed me thee, and thy dog and thy bush’ (2.2.137–38). Earlier, in dispute with Prospero, Caliban had alluded to the cosmological dimensions of his education at the hands of his ‘master’, recalling how he was taught ‘To name the bigger light and how the less / That burn by day and night’ (2.3.336–37). A moment of enlightenment he seems to value, the progress of his education is yet subsequently curtailed when Prospero charges him with attempting to ‘violate’ (1.2.348–49) Miranda’s honour.

But what are we to make of Caliban’s fascination with the moon? A sign of his gullibility or his penchant for idolatry, Caliban’s orientation towards the sky positions this play in relation to major challenges to received wisdom about the cosmos newly circulating at the time of the play’s first performance in 1611.<sup>1</sup> A year earlier Galileo published his *Sidereus nuncius* and delivered a powerful blow to the old cosmology. The version of ancient cosmology most widely available through the Middle Ages and into the Renaissance was that transmitted via Aristotle’s *Physics*, which construed the celestial realm as ontologically distinct from the terrestrial world. In this view the two spheres were made from different materials and governed by fundamentally different principles of motion. As Daniel Garber explains, ‘The sublunar world was a world of things in flux’, defined by the ongoing combination and separation of

the four elements, whereas the celestial realm was comprised of heavenly bodies made from a fifth element, the quintessence, and constituting ‘an unchanging world of physical perfection’ (2006: 28). Caliban inhabits this traditional world view in believing moons harbour men and clouds distribute riches, implicitly voicing the coordinates of wonder and cosmic clarity that defined this earlier sensibility. His certainty that a benign man oversees the world imparts both the anthropocentric features of this ideology and its faith in an ordered and providential universe (Shapin 1996: 24). But this view was in fast decline at the turn of the century. Galileo’s glassy instrument revealed that the marks that seemed to limn the features of a man in the moon were actually a cluster of hills and valleys.<sup>2</sup> In place of the smooth, luminous surface that poets had praised in hymns to a celestial body, he bluntly noted that the moon is ‘rough and uneven’ and, like the earth, ‘full of vast protuberances, deep chasms, and sinuosities’ (Galileo 1880: 8). Stefano signals the unsettled state of cosmic knowledge in hailing Caliban’s vision as residual, evocative of a bygone world ‘when time was’ (*Tem* 2.2.136).

Galileo’s observations of a changeable heavens and a vast universe proliferating with suns and moons were building on earlier discoveries that had gradually chipped away at the traditional wisdom. Copernicus had published his theory of a heliocentric universe in 1543, reaching a broad English audience with Thomas Digges’s 1576 translation, while Tycho Brahe published his observations of a comet firing through what appeared to be a highly changeable celestial canopy in 1577, challenging ‘the solidity of the Aristotelian cosmos’ (Ait-Touati 2011: 18–19). Alongside these astronomical developments, a group of Italian naturalists – including Ficino, Telesio, Bruno and Campanella – were spurred by Plato’s newly accessible works to theorize an alternative view of the physical world, positing an infinite universe and a plurality of worlds.<sup>3</sup> In the mid-1580s, while residing in England, the outspoken Bruno issued a direct attack on Aristotle’s claim for a finite universe by asserting, ‘There are no ends, boundaries, limits or walls which defraud or deprive us of the infinite multitude of things’. His repudiation of the Ptolemaic model, which he colourfully compared to having one’s ‘brains’ ‘imprisoned ... within Venetian glass ornaments’, circulated at the highest levels of the English court, since two of his books published at this time were dedicated to the courtier-poet Sir Philip Sidney (Bruno 2014: 29). Neoplatonists like Bruno defended an animistic conception of the universe in which stars and planets were understood as ‘mighty living divinities’ capable of working on the lower world through sympathies and antipathies; the *anima mundi* or world-soul was the link that joined these realms, infusing all creatures and matter (Copenhaver and Schmitt 1992: 288). Bruno mocked Aristotle for being cavalier in rejecting the ideas of pre-Socratics like Pythagoras and Democritus and described his philosophy as a tangle of ‘definitions, notions, certain quintessences, and other fragments and miscarriages of fantastic thought’ (2017: 218). Against such excesses, he promoted ‘the art of speculating upon things lofty as well as base, upon things divine as well as human’ (Bruno 2017: 194) as a more secure path to knowledge, suggesting that imaginative work might compensate for the errors of logic. Brash and unrelenting, Bruno would eventually pay for his beliefs with his life, being executed by the Italian Inquisition, but his cosmological ideas continued to resonate well beyond his death.

At stake in this swirl of competing theories was the method by which humans could arrive at knowledge of the world and cosmos. Mary Thomas Crane has read the flurry of theories and discoveries in the late sixteenth century as collectively serving to discount an intuitive approach to nature that had been underwritten by Aristotelian philosophy. Little by little, natural philosophers were questioning the ability of the senses to serve as a portal to knowledge, offering instead a highly abstract and mathematical conception of the universe, one largely inaccessible to the layperson (Crane 2014). Empiricists, too, insisted that the senses could not be relied on to deliver accurate information about the immediate world, let alone the celestial realms beyond (Shapin 1996: 85–93). To prop up these fallible human faculties, Bacon urged philosophers to work collectively to gather data of every variety and to embrace artificial experiment as a means of observing the hidden ways of nature (Shapin 1996: 96–100). Like Bruno, he rejected the Aristotelian philosophical model, accusing its followers of being trapped in circular forms of thinking, most especially by positing the ‘end’ or ‘telos’ that any natural thing moved towards. For Bacon, such philosophy deduced the conclusions it ought instead to prove, and he offered his *Novum organon* as a model of induction to replace the old philosophy. By underscoring the power of art – of humanly crafted inquiries – to reveal nature’s patterns, Bacon rejected Aristotle’s move to cordon off certain knowledge from human activities. As Shapin notes, although Aristotle describes nature as an artificer in his *Physics*, he did not thereby view it as ‘proper to suppose that the artifice of nature and that of humans belonged on the same plane. Nature ... was far superior to human artifice, and it was impossible that humans should compete with nature’ (1996: 31). Elizabeth Spiller echoes these claims in understanding this tendency by Bacon and other empiricists to validate the knowledge delivered by humanly crafted inventions as effecting an important break with the past, even one that is a hallmark of early modernity. As natural philosophers of the day toggled between old and new theories of the world, conceptual space was created for a range of practitioners – scientists and astronomers, but also poets – to contribute to the new knowledge culture (Spiller 2004: 1–23; 2009). A window between the arts and sciences was thereby opened in this era of late humanism.

Indeed, the proliferation of allusions to the man in the moon in plays, prose tracts and fictional travel narratives during the seventeenth century provides evidence that what we, as moderns, think of as discrete domains – the literary as against the scientific – does not align with the possibilities then alive. Rather, as critics like Spiller have argued, literary and scientific modes of thinking in the late Renaissance overlap in method and goal. To date, critics have mostly observed such intersections – especially when cosmology is the topic – in poetry and prose of the period, examining thematic ideas in the poetry of Sidney, Spenser and Donne or the prose works of a physician like Sir Thomas Browne (Spiller 2004; Blake 2019; Crane 2017; Hyman 2017). But attention to the ways drama of the day registered these epistemological innovations warrants more critical attention.<sup>4</sup> In this chapter I attempt to move in that direction by exploring how dramatists were actively testing and directing cosmological ideas, transforming the stage into a speculative space to scrutinize theories of the material world. I focus on how such

ideas gained expression in two plays staged during this watershed moment, famously described by John Donne as one in which ‘new philosophy calls all in doubt’ (Donne 1957: 213). Although separated by genre and theatrical context, the plays I discuss share a deep preoccupation with the skies. I consider Lyly’s *Endymion*, a comedy that revived a classical myth in shaping the idea of one man’s love for the moon, alongside Shakespeare and Middleton’s *Timon of Athens*, a generically anomalous play – identified simply as a ‘life’ but leaning towards tragedy – which portrays a man’s cosmic rage at being dislodged from the centre of the universe. Read together, the plays capture the massive cultural shift catalysed by the new science; they also bookend this period of rapid change with their contrasting cosmic sensibilities. Together they demonstrate that the theatre was not a passive bystander to debates about matter, nature and the cosmos. Rather, dramatists indicate they were attuned to the implications of these theories and used the stage to render them concrete. Of course, the name of Shakespeare’s most famous theatrical home – the Globe – announced these connections, first, in calling itself a mini earth and, second, in featuring a canopied roof for the heavens as a feature of its set design. A veritable microcosm, the Renaissance stage proved a powerful medium for disseminating scientific musings to elite and popular audiences. As I argue, the stories dramatists told of the moon should be seen as contributing to the project of ‘making’ knowledge that critics have identified as a unique feature of early modernity, when for a short time *scientia* and *poesis* shared a common purpose.

## HUMANISM’S OPENINGS

Identifying scientific allusions in plays by Marlowe, Shakespeare and Jonson, of course, is nothing new. Writing in the early twentieth century, when ‘science studies’ was emerging as a discipline, a first wave of literary critics seeking to draw attention to overlapping interests among natural philosophers and poets identified allusions to scientific events, figures or discoveries within the plays, even as they construed science as distinct from imaginative work.<sup>5</sup> Despite the innovative angles these critics provided, their approaches tended to flatten the literary text, viewing it as secondary to a more primary scientific ‘context’. Recently, a second wave of critics has construed the relationship between science and literature more dynamically, describing the sharing of ideas and representational strategies as a ‘trading zone’ (Ait-Touati 2011: 6). As Carla Mazzio explains, whereas the earlier tendency was to ‘thematize science’, thereby reducing literature’s relation to science to that of a bystander offering commentary, the second wave of critics has focused on epistemology, on ‘shared procedures of thought’ evident in the work both of philosophers and poets (Mazzio 2009: 6). In an important volume dedicated to exploring these soft disciplinary boundaries for early modernity, Howard Marchitello and Evelyn Tribble assemble work that focuses on the literary features of scientific texts – their narrative strategies and use of metaphor – while also demonstrating how poets and playwrights deploy imaginative strategies like the hypotheses or speculative thinking that are often misconstrued as the exclusive domain of philosophical thinkers (2017).

Indeed, we should expect to find disciplinary crossings in this era of late humanism, a time that has been described as one that enabled ‘privileged “*passages*” between the human sciences and the exact sciences’ (Aït-Touati 2011: 3). In contrast to our modern moment, which C. P. Snow famously described as a two-culture system, in which the arts are rigidly cordoned off from the sciences, Renaissance humanism united language and philosophy, scrambling the lines dividing imaginative or factual thought as well as subjective or objective knowledge in ways that our modern paradigm resists (Latour 1993). As Aït-Touati compellingly argues, science lacked a ‘fixed form’ and was ‘full of scraps taken from traditional marvelous tales and magic’ (2011: 5). What possibilities emerge when we consider knowledge projects through the prism of a humanist paradigm? We should begin by noting that all students receiving a grammar school education were treated to a heavy diet of classical texts, which exposed them to philosophical ideas in colourful form through Ovidian myths, the storied lives of Greeks and Romans, and classical poetry. Given the exercises of double translation and imitation required in these schoolrooms, such ideas were deeply imprinted on even the most reluctant students. When students advanced to the university level, as some but not all did, their training would have followed the *studia humanitatis* curriculum, which taught them first grammar, rhetoric, poetry and history, before proceeding to natural philosophy, math, metaphysics and logic (Kristeller 1988: 131). This educational system blended fields of knowledge that we moderns tend to put in discrete boxes. In this earlier moment, poetry and language were not cut off from natural philosophy; rather, they were regarded as doorways that led directly to such inquiry.

One of the fruits of this educational model was its yield of students equipped to offer translations of Greek materials into Latin or the vernacular, which led to the market being flooded with philosophical ideas embedded in the works of writers as diverse as Plutarch, Plato, Virgil and Lucretius, to name just a few. Aristotle’s theories, dominant throughout the Middle Ages, slowly came to be measured against these other theories of the material world. Indeed, as Michael MacDonald has argued, ‘The early stages of the scientific revolution were less a battle between the ancients and the moderns than a contest between the proponents of one set of ancients against the others’, allowing some to level challenges and explore alternate cosmological models ‘under the banner of Plato and the pre-Socratics’ (1985: 178). Scientists whom we hail today as the forbears of modern science found in ancient texts the ideas that guided them in construing the material world anew. Hence, ‘Copernicus defended his heliocentric universe with an appeal to Pythagoreans’, just as Gilbert’s work on magnetism – first published in 1600 – wove ancient mysticism into his understanding of magnetism as an ‘animistic force that permeates the universe’ (MacDonald 1985: 179).

For poets and dramatists of the day, in turn, the philosophical ideas encountered in classical texts provided a mine of material to draw upon in their literary works, with many of them responding by threading philosophical plots and characters into their imagined worlds. In doing so, they constituted the stage as a space of cosmic inquiry. Through their imaginative engagement with the flood of ideas circulating in print culture, they shaped the playhouse into a chamber where philosophical truth

claims could be tested and explored, where the speculative work of science could occur. Indeed, as Ait-Touati has eloquently argued in exploring the intersections of prose fiction and natural philosophy of the time, the ‘new astronomy’, in particular, necessitated a high degree of imaginative work, since many of its hypotheses could not be empirically observed and were the result of complex mathematical computations (2011: 10–11). Hence, figures like Kepler readily embraced literary modes like the imaginary voyage to the moon to aid astronomical interventions. So, too, the stage was uniquely poised to transform abstractions into concrete and embodied form – to give to ‘airy nothing / A local habitation and a name’ (*MND*, 5.1.16–17) – and there is abundant evidence that Renaissance dramatists engaged in the ‘thought experiments’ then used by scientists to test theories of the cosmos and humanity’s position therein (Shapin 1996: 84).<sup>6</sup>

## NATURAL PHILOSOPHY ON THE EARLY MODERN STAGE

What cosmic speculations, then, can we discern in plays of the late sixteenth and early seventeenth centuries? The linkages between knowledge projects of the Renaissance and the drama are perhaps most evident in plays like *Doctor Faustus* and *The Tempest*, which build their plots around characters defined by a will to know the hidden realities of the material world, whether conceived as magical, supernatural or elemental.<sup>7</sup> Faustus famously wagers his soul for forms of knowledge that, while requiring the ultimate sacrifice from him, can appear mundane, while Prospero practises an art of knowledge-making that, while limited, yet allows him to reclaim his kingdom.<sup>8</sup> Compared to such plays, in which controlling nature by sorcery or science is front and centre, plays like *Endymion* and *Timon* may not seem to be fertile ground to find engagements with the upheaval of knowledge then underway. Lyly’s *Endymion* builds a plot around lovers in a context ruled by the ethereal Cynthia, while *Timon* brushes up against city comedy in anatomizing the corruptions of ancient Athens. Separated by 20 years, the plays capture two quite distinct political moments – Elizabethan and Jacobean – and are deeply bound in theme and mode to their respective moments. Performed by the Children of St. Paul’s before the Queen in 1588 and printed in 1591, *Endymion* is a hymn to the chaste Diana so central to Elizabethan drama. *Timon of Athens*, whose composition editors have placed around 1605 due to its thematic and stylistic overlaps with both *King Lear* and *Volpone*, captures a darker Jacobean theme of corrupt patriarchs and patrons (Jowett 2004). But read together, the plays also express a shared tendency to transform court-based politics into the stuff of speculative thinking about the material world, humanity’s place in that world and the status and possibility of worlds beyond.

And yet their two quite distinct takes on humanity’s place within a cosmic frame make visible the epistemic shift that they straddle. Lyly’s play expresses a Neoplatonic view of the world, in which a divine spark conjoins the celestial and the terrestrial, anchoring the characters’ sense of inhabiting a morally ordered, hierarchically delimited place in the cosmos. His play bears the strong imprint of Giordano

Bruno's theories of an animistic universe, recently published in England after the author delivered a series of lectures at the University of Oxford. Lyly's patron in the period of the play's composition was Edward de Vere, the Earl of Oxford, who had returned from a trip to Italy in the late 1570s. In composing this rewriting of a classical myth, Lyly may have aimed at pleasing Oxford, who was known to be a skilled dramatist and poet himself, as much as the Queen, but in choosing an allegory that could be read on many levels, he arguably arrived at a path to flattering both. Shakespeare and Middleton's much darker play provides an account of Timon's self-exile from Athens, a city state animated by money, which is also a tale of radical cosmic displacement in a world where the signs of providential oversight are murky at best. Timon's perspective, which dominates the entire second half of the play, captures a growing awareness of man's smallness within a vast elemental universe. His confrontation with cosmic forces, the elemental transmutation of matter, conveys a fading confidence in man's exceptionalism and his ability to access the celestial realm. The play thereby captures the growing sense of alienation from the natural world that Crane identifies with challenges to Aristotelianism.

In the same way that *Doctor Faustus* and *The Tempest* announce their epistemological interests by placing magicians at the centre of their plots, so *Endymion* and *Timon* signal a shared philosophical orientation by setting their action in classical antiquity and staging philosophers. *Timon* is set in fifth-century Athens, the period when Alcibiades lived and the Peloponnesian Wars raged, while *Endymion* obliquely asserts its ties to a classical world by referring to Thessaly, Athens and Egypt. Pressing these philosophical connections still further, *Endymion* features Pythagoras as a character; though given only a few lines in the play, one of them proffers a reminder of the challenges of gaining true knowledge for mortals whose minds are clouded by 'grossness' and 'thickness' (Lyly 2002: 4.2.47–9). His presence in the play thereby directs us to consider the means of knowing the world. It is notable, too, that at the play's end, the character Pythagoras opts to remain in Cynthia's court, suggesting that his philosophical insights have been appropriated by this new Athens. *Timon of Athens* follows suit in bringing a range of philosophical types onstage, including the cynic Apemantus who condemns Athenian hypocrisy and Timon's misanthropy. Moreover, the play's thick engagement with the elemental transactions that comprise the cosmos, an idea traceable to the pre-Socratics, suggests the dramatists' desire to inhabit these newly revived theories and explore their implications. By foregrounding philosophical theories, both plays contribute to the re-evaluation of the material world then underway.

## STITCHING THOUGHT TO STARS

Lyly's *Endymion* opens with a lover who, like Caliban, is mesmerized by the moon, an allegorical figure gendered female in the play through association with the divine Cynthia. Indeed, the central conflict of Lyly's play involves the 'impossible' love Endymion feels for Cynthia, which persists despite warnings from his friends. He will die, he claims, if he does not 'possess the moon' (1.1.17–18), and as the story proceeds, we watch as his pursuit of this luminous deity consumes seven years of



his life and then an additional twenty years when a spell traps him in an endless slumber. A Petrarchan cliché, Endymion's love echoes that of countless lovers caught in a paralysing desire for a lady beyond their reach. Yet Lyly's lover loves with a difference. As he tells his friend, Eumenides, at the play's start, 'My thoughts ... are stitched to the stars, which, being as high as I can see, thou mayst imagine how much higher they are than I can reach' (1.1.4–7). His love for Cynthia, which he here associates with cognition, is unusual for propelling him into the cosmos, out towards the stars, serving as a metaphor for moving beyond earthly realms on a path to gaining cosmic awareness. His love aims 'high' in contrast to almost all the other lovers in the play, whose desires are earthly, worldly and lowly.

That Endymion's desire seeks after unworldly realms is evident in the name of the rival for his affections: Tellus – Latin for 'earth'. To distract him from his attraction to Cynthia, she conspires to ensnare him with 'untamed thoughts and unbridled affections' (1.2.64–65), forms of earthly matter that block his access to his beloved. In the classical fable from which the play borrows – as told by Apollodorus, Ovid, Lucian and others – the love dynamic first appeared in inverted form, with the moon presented as the desiring subject, smitten by a shepherd boy. In Lyly's recasting of the myth, it is key that the mortal be the source of the longing, since the playwright's project is to explore how humans can know realms beyond through the 'sweet contemplation' (5.4.165–66) of 'impossibilities' (5.4.162). Tellus puts this orientation succinctly when she names this drive a 'divine fury' (5.4.76), implying Endymion's goal is inaccessible to a mortal like him and 'breaketh the brains' (5.4.72).

Readings of the play have often interpreted Lyly's poetical expression of a lover's incurable longing for Cynthia as a political allegory, professing the dramatist's devotion to the Queen.<sup>9</sup> The 1580s and 1590s were indeed the heyday of Elizabethan love discourse, an idiom that praised the Queen and one that she appropriated for political purposes.<sup>10</sup> Certainly, Lyly flatters his royal audience and seeks his own advancement. But the play's allegorizing signifies on multiple levels, and political readings downplay its more daring philosophical investments. Moreover, although critics of the early to mid-twentieth century did comment on the play's Neoplatonic resonances,<sup>11</sup> they did not consider how these overlaps position the play as itself a speculative instrument or a space of epistemological experimentation, as I do here.<sup>12</sup> Like the philosophical works of a figure like Bruno, which offer a blueprint for accessing the cosmic world-soul, Lyly's courtly play envisions the contemplative quest at various stages, mapping its methods and pathways, but also its obstacles. As such, it establishes the stage as a context for knowledge-making in its own right.

Indeed, in positioning Lyly's play alongside Bruno's *De gli eroici furori*, translated as *The Heroic Frenzies* and published in England in 1585 just a few years before Lyly's play was performed at court, we can observe the degree to which dramatic text and philosophical tract converge in considering the means and methods by which knowledge comes about. Compellingly, in his poetical-philosophical account of the journey to true knowledge, Bruno frames the relation between mortals and cosmic knowledge as a love affair, identifying the quester who seeks such knowledge as a possessed lover pining for union with the world-soul. Bruno's text charts the

arduous process that this lover must undergo to realize his goal, involving the refinement of perceptions and the tempering of distracting thoughts. Along the way, Bruno notes, the lover endures periods of long slumber, when he appears to inhabit a vegetative state, being detached from the stimuli of the world. It is during such moments, he argues, that deep contemplation occurs.

The cosmic quest at the heart of Bruno's creative rendering of philosophical ideas also shapes the content and structure of Lyly's philosophical play. In the Prologue, Lyly invites his audience to imagine fiction as a path to truth, but he does so in a playful, indirect manner. He first discounts his project's worth by referring to it as a 'tale' (Prol. 3, 5, 12), a kind of 'Chimera' that he notes was 'forbidden in old time' (Prol. 6). But he subsequently implies that the tendency towards imaginative speculation evident in fiction has value in situations when 'none under the sun ... knows' (Prol. 9) the truth. Where knowledge is in progress and unsettled, that is, the imaginative powers of the poet can help light the path forward. In the cryptic play on words and concepts that constitute this opening, Lyly identifies three axes for his 'tale': method, matter and 'means incredible' (Prol. 4). Those words, which often appeared as touchstones of philosophical inquiry of the day, convey the purpose of his play: it will tap the unbelievable – the imaginary realm – as a method of revealing how humans come to know the matter of the world. Poetry thereby becomes a partner to natural philosophy.

He accomplishes this goal by constructing a set of parallel love plots to flank the central one involving Endymion, imitating Bruno's identification of nine different types of lovers of truth. Indeed, love plots in the play keep hatching. Sir Tophas, who early on rejects erotic alliances, soon falls into a lovesick stupor and bursts with desire for the play's least desirable woman, Dipsas. Meanwhile, Tellus feels the pangs of unrequited love for Endymion. So, too, Corsites is spurned by Tellus, while Eumenides is rejected by Semele. Each of these lovesick figures refracts Endymion's orientation towards the heavenly Cynthia, whose perfection 'alloweth no companion nor comparison' (2.1.27–28). In desiring her, then, Endymion outflanks his loving counterparts, who are enamoured of people who deceive, demean and degrade them. Tellus's love for Endymion is based on a lie that he loves her in return, while Corsites's love for Tellus is based on a false front she presents him. So, too, Sir Tophas's love for Dipsas only flourishes amid the illusion that she is unwed and might be his 'sweet Venus' (3.3.142). All of these lovers are led astray by their fallible senses, making it clear that only in sleep, when there is a 'binding of the senses' (3.3.134–35), will real knowledge be gained. Corsites captures Endymion's sleep as just such a vegetative state when he observes in trying to move him: 'What, stone still? Turned ... to earth' (4.3.13–14). Bruno had identified the lover's perception of cosmic unity amid apparent diversity as requiring just such a withdrawal. When Endymion awakens after twenty years of slumber, having forgotten himself and his dearest friend, we witness an instance of his cognitive readiness. Notably, the only thing the awakened Endymion initially remembers is the contemplative object: Cynthia.

Lyly's highly stylized, allegorical play thus advances a detailed philosophical claim about the material bonds conjoining the celestial and terrestrial worlds, inflecting theories circulating among astronomers, astrologers, mathematicians

and natural philosophers at the time. Indeed, if Endymion embodies this ideal orientation towards cosmic knowledge at the play's start, the play's other characters take more circuitous paths to a similar end, revealing various stages of knowledge acquisition. For Endymion's friend, Eumenides, the knowledge quest requires that he pierce the mire of a fountain in search of a remedy for his friend (3.4.17, 3.4.22). Neoplatonists, too, sought out secret meanings buried in nature and believed it was the natural philosopher's role to decode them.<sup>13</sup> Like such philosophers, the quest facing Eumenides exacts labour, patience and sacrifice as the price of knowledge. He must decode first one cryptic message in the fountain – 'Ask one for all, and but one thing at all' (3.4.84–85) – and then another before being led to the concept of the circle and, thus, to the celestial body of Cynthia. His path to knowledge, like Endymion's, proceeds slowly, but by piercing worldly illusions, even coming to see his love for Semele as secondary to other forms of love, he is awakened to truth: 'now only do I begin to live' (5.4.210–11). Notably, the play ends comedically as Cynthia guides each of these couples to break through the obstacles that block their union, emblemizing the bond between mortals and cosmic knowledge. In these resolutions, the play affirms the value of aspiring after the 'impossible' (1.2.35), despite claims that such pursuits are 'ridiculous' (1.1.9) or mere 'fancies' (Prol. 8). If the barrage of new theories of the material world made the universe opaque and inaccessible, the stage fashioned itself into a space where such speculative reveries could be made concrete and, eventually, comprehensible.

## TIMON'S COSMIC BLUNDER

*Timon of Athens* offers a much darker vision of the universe. This play follows the fortunes of a man who exceeds Endymion's quest to love the moon by laying claim to the generative powers of the sun, only to be crushed by the knowledge of his own earthly limits. If Lyly's play traces human advancement beyond earthly constraints to tap cosmic divinity, *Timon of Athens* exposes the folly of trying to rise above the material realm. *Timon's* universe is one that understands human actions as bound by elemental laws, engaging a strand of pre-Socratic thinking that emphasized humanity's modest place within the cosmos. Compellingly, if the play anticipates the 'depersonalization of natural knowledge' that defines the new science (Shapin 1996: 13), surrendering the firm footing of a providential and orderly universe, it also anticipates the insights of ecocritics today. Such critics reject the fallout from a two-culture model, which places humans (and the arts) to one side and nature (and the sciences) to the other,<sup>14</sup> urging instead that humanity stop seeing itself as a special case and acknowledge that 'we are made of the world, and the world is made of us' (Jones 2017: 12).<sup>15</sup>

Shakespeare and Middleton arrive at a similar assessment of the physical world and humanity's place therein not by being ahead of their time but by returning to the past. Like Copernicus, Gilbert and Kepler, these playwrights dabbled in theories and ideas gleaned from the ancient philosophies of Pythagoras and Empedocles. A disciple of Pythagoras, Empedocles popularized a view of the cosmos as a metamorphic, lively and transformative force in a set of poem-fragments that were

translated into Latin in 1573. His theory understood the four elements – earth, water, air and fire – as ‘rhizomata’ or roots, viewing them as the building blocks of the universe, itself imagined as a vortex of creativity in which elements wax and wane. The dyad of love and strife that Empedocles names the movers of the universe were popularized by Horace’s epistles, where the concept was translated as *concordia discors* and would later be picked up by Renaissance poets as a catchphrase to describe their own creative work. Ovid, too, helped to popularize these philosophical theories through his epic poem, *The Metamorphoses*, which became a staple of Renaissance grammar schools. A compendium of classical myths, Ovid’s poem makes its philosophical stakes evident by concluding with a 400-line oration by Pythagoras, which presents his theory of an elementally infused world and the doctrine of metempsychosis. If Ovid concludes with these ideas, they also serve as the backbone to the poem, given its primary theme of the radical fungibility of all living forms, which the poem’s English translator, Arthur Golding, famously described as the ‘wonderful exchange / Of gods, men, beasts and elements’ (Ovid 2001: Epistle, 13–14).

Rooted in the classical world by virtue of both source and context, Shakespeare and Middleton’s play dramatizes the dark side of man’s growing awareness that he is enmeshed in a material world. As the play opens, Timon imagines himself residing above the world, devoted as he is to ways of thinking that position him outside its circuits of conversion, exchange and transformation. A liberal benefactor in Athens, he regards himself as an endless source of resources for his ‘friends’, who receive a steady stream of gifts from him. Though seeming to denote his munificence, Timon’s gifts are problematic for being decidedly linear, expressing his latent desire to rise above mortal limits.

An earlier play about Timon, believed to be a source for Shakespeare and Middleton’s tragedy and to have been performed at the Inns of Court in 1601, had made these linkages explicit. In this comedy Timon is repeatedly compared to the mythological gods. His friends hail him as ‘sublunary Jupiter’ (337) and ‘humane Jupiter’ (299), while the woman he woos proclaims: ‘Thou are my Titan, I thy Cynthia; / From thy bright beams my beauty is deriv’d’ (*Timon* 1980: 316). In Shakespeare and Middleton’s tragedy, however, references to the classical gods are replaced by a materialist version of the cosmos. Instead of styling himself an earthly Jupiter, Timon covets the life-giving powers associated with the sun, defying his own mortal limits and the cosmic principle of exchange. In blocking circuits of exchange, he positions himself as the axis of all life in Athens. This ethos emerges in his refusal to accept repayment of his loans from peers such as Ventidius, Lord Lucius and Lord Lucullus. When these men seek to repay him, their gifts are nullified, with Timon insisting that they be ‘worthily entertained’ (1.2.187) or overwritten by ‘fair reward’ (1.2.194). While appearing beneficent, Timon’s refusal of reciprocity shuts down the possibility that they might transform his gifts – in imitation of the cosmic principle of conversion – into something of their own making. Indeed, even when Timon needs the help of these men, as his finances flounder, his requests for a return on his gifts are less an invitation for them to join the gift-giving circle than an attempt at an extraction that he, once again, controls.

Indeed, in telling his suitors 'I gave it freely ever' (1.2.10), Timon intimates that he is beyond time and space, since his gifts, like himself, are not bound by physical constraints. Later in the play, the Poet will channel Timon's inflated sense of self when he commends him for his 'star-like nobleness [that] gave life and influence / To their whole being' (5.1.61–62). Apemantus has already made a similar association in observing how 'Men shut their doors against a setting sun' (1.2.144), as has Lucius in noting: 'the days are waxed shorter with him', since his 'prodigal course / Is like the sun's, but not like his recoverable' (3.4.11–13). There is no elemental return for this man who styles himself a sun.

In this moment of self-reckoning, when Timon's human limits are exposed, he flees Athens for the woods where his presumptions about the material world are challenged and subverted. Though seeming an altered man in this altered context, particularly given his embrace of a misanthropic perspective, Timon continues to behave like a god. If earlier he sought to 'create' his peers by being the sole source of gifts, he now commits himself to their undoing. He issues one imperative after the next for plagues, blights and monstrosities, seeking to undo the bonds between parent and child, husband and wife, master and servant. His urgent appeals to the sun and heavens seek nothing less than a reversal of creation.

Through his shotgun exchanges with Alcibiades, Apemantus and others, it becomes apparent that Timon loathes and assaults the principle of transformation itself, which he considers a feminine principle. Whereas he describes the 'marbled' (4.3.190) heavens as 'crisp' (4.3.182) and 'clear' (4.3.28), emphasizing its bounded and masculine ontology in ways that echoes Aristotle's concept of an immutable realm, the feminine earth cannot help but be 'common' (4.3.176) in his eyes. Earth appears to him a source of blighted matter, a breeder of rotten humidity, monstrous animals and excremental life, while man emerges as one of her cursed offspring, kin to 'the black toad ... gilded newt and ... venom'd worm' (4.3.180–81).

And yet, if Timon views earthly life as damned and depraved, his understanding of cosmic processes also undergoes a shift in this interlude in the woods, after he is granted sustenance from earth in the form of a root. In a moment that marks a first instance of his being positioned on the receiving end of a gift, Timon pauses his tirade to express 'dear thanks' (4.3.191) to the earth. From this moment, his appeals to the earth soften, reflecting a world view revolving. In dialogue with the thieves, who have fled Alcibiades's army due to hunger, we can detect this changing perspective. Timon tells them to use the fruits of the 'bounteous housewife Nature' (4.3.415) to satisfy their needs, noting that she offers roots to eat, timbers to build, water to drink and berries to please. Being in the grip of 'want', the men dismiss her gifts, seeking the gold they think Timon has. He interrogates their desires, asking, 'Want? Why Want?' (4.3.416), urging them to limit their appetites. His words also express a growing awareness of the gifts this 'Common mother' (4.3.176) has bestowed: food, shelter, water. Nature has met, if not exceeded his basic needs for living. Her 'commonness', thus, comes to suggest less a form of degradation than a readiness to widely distribute her wares.

So, too, his view of the heavens undergoes a change. The cosmic figure who was earlier hailed by Timon as a 'blessed' sun occupying the fixed heavens now

morphs into a king of ‘thieves’, who robs the vast sea of water. So, too, sun’s ‘sister’, the moon, imitates her brother in being an ‘arrant thief’ who snatches his light. If the sea is another thief for ‘resolving’ the moon to tears, and the earth her own kind of thief in breeding compost from excrement, they take their pattern from the cosmos. Significantly, in this ‘exemplum’ of thievery, adapted from a Greek ode by Anacreon, Timon begins to see the dizzying exchanges of matter as the condition of cosmic generativity. Here even the sun is positioned within the circuit of change, not standing above it as part of a static celestial realm; if the sun provides, it also receives, in a continuum that binds it with sublunary bodies. Earth’s gift emerges as part of a more expansive natural *oeconomy*, in which matter in the form of water, fire, air and earth passes from one orb to another, from body to body, in a cosmic circuit of making and unmaking. The shift in Timon’s view is detectable in the verbs he here uses to describe these processes: from a thieving body that ‘robs’ or ‘snatches’, he starts to figure cosmic cycling in generative terms, as an act that ‘resolves’, ‘feeds’ and ‘breeds’ (4.3.430–7). The force presiding over this wilderness emerges as a crafting, artisanal agent that freely and creatively transforms matter. Notably, she is not bound by Timon’s controlling bids. When he demands food, she provides gold. When he demands poison, she offers instead a root. Her gifts have a compelling tendency to resist his constraints, as she shapes elemental matter into the vibrant forms of gold, iron, stone, caves, roots, berries and trees.

If Timon is often viewed as a man who rejected humanity, I have argued for a reading of him as someone who eventually reclaims his cosmic footing. In that respect, this quirky, collaborative play anticipates the insights of post-humanists, new materialists and ecocritics today. It portrays the nightmare, for man, of discovering that he is not *the* centre or axis of earthly life but a ‘fellow traveler’. New materialists have challenged assertions of human exceptionalism by foregrounding matter’s immanent vitality and understanding the material world as a ‘multitude of interlocking systems’ that embrace not only the biological and climatic, but the economic and political as well as the artistic and cultural (Coole and Frost 2010: 8–9). Human and non-human, culture and nature cease to function as meaningful divides for such theorists. In their place emerge alliances, networks, assemblages and confederations of matter – that is, horizontal modes of construing living forms that foreground overlap and kinship between human and non-human entities. So, too, Jane Bennett urges us to explore the ‘structural parallels between material forms in “nature” and those in “culture”’ (2010: 99), to question the opposition that positions humans outside of nature. To undo such bifurcations, she suggests we create unholy alliances, invert hierarchies and ally the work of disciplines that modern epistemologies regard as separate. Renaissance texts present a unique opportunity for conducting such inquiries, since the wall between human culture and nature that Aristotle authored and subsequent generations defended was, for a time, softened, the creations of artists seen as analogous to and illuminating of nature’s patterns. So, too, disciplinary divisions allowed for a more expansive cross-fertilization between fields we consider ‘arts’ and those we call ‘sciences’ than is now possible. This chapter serves as a case study that identifies one such intersection, suggesting that Renaissance dramatists participated in contemporary debates about the nature

of the cosmos, making the theatre a space of philosophical speculation that shared some of the aims visible in imaginary voyages to the moon by natural philosophers like Kepler or Bruno. If critics have been thorough in identifying scientific inquiries in poetry and prose of the seventeenth centuries, there is more work that remains to be done in culling the epistemological work catalysed by the Renaissance stage.

## NOTES

- 1 For further discussion of the trend in alluding to the man in the moon, see Cressy (2006) and Trevor (2013). See also Nicolson (1948).
- 2 See Nicholson's discussion of Plutarch's account, following Anaxagoras, of the moon as cavernous in his *De Facie in Orbe Lunare* (1948: 17).
- 3 For discussion of Plato's dissemination following Ficino's translations, see Garber (2006: 33–3).
- 4 Recent collections focusing on 'Shakespeare and Science', such as that pioneered by Mazzio, have begun to redress this imbalance. Turner, too, models an innovative approach in charting the connections between geometry and stage practice (2006), in ways that advance the field beyond an early focus on Galenic medicine and the stage. Compellingly, Air-Touati argues that while drama has topical overlaps with scientific texts of the day, it does not share, in her view, similar 'modes of expression', leading her to omit drama from her study (2011: 8). By contrast, I see signs of compelling connection between Baconian empiricism and tragicomedy and believe these links hold promise for further work (Feerick 2017).
- 5 For some examples of this first wave, see Empson (1957) and Nicolson (1948). See also the excellent overview of such criticism in the introduction to Marchitello and Tribble, eds. (2017).
- 6 For allusions to Lucretian atomism in *King Lear*, see Crane (2014). For a discussion of alchemical ideas in a wide range of plays, see Eggert (2015).
- 7 For a discussion of the supernatural physics that inform *Doctor Faustus*, see Poole (2011). For a discussion of the imprint of natural philosophy on *The Tempest*, see Cowan (2016).
- 8 For the explication of such a reading, see Spiller (2009).
- 9 For such emphases, see, for instance, Pincombe (1996).
- 10 See the classic argument in Marotti (1982).
- 11 See, for instance, Lenz (1976).
- 12 For movement in this new critical direction, see Bozio (2016).
- 13 For the 'secrets of nature' tradition, see Copenhaver and Schmitt (1992: 288). See also Eamon (1994) and Floyd-Wilson (2013).
- 14 See the classic argument to this effect by Latour (1993).
- 15 Borlik (2011) makes a compelling case for ecocritical readings of early modern materials, exploring how they build on ideas borrowed from pre-Socratic philosophy.

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