



THE LEGACY OF CLASSICAL COSMOLOGY IN THE RENAISSANCE: SHAKESPEARE AND ASTRONOMY

Nicholas Champion

*Sophia Centre for the Study of Cosmology in Culture, Senior Lecturer, School of
Archaeology, History and Anthropology, University of Wales Trinity Saint David,
(n.champion@tsd.uwtsd.ac.uk)*

ABSTRACT

Athens was the focus for the development of three philosophies of astronomy – Platonism, Aristotelianism and Stoicism, which were to dominate the classical world up to the fifth century. All three were vital components of Renaissance European culture, combining notions of purpose, order and an ensouled cosmos in which all things were interdependent, including people and planets. This consensus was dramatically challenged by the publication of Galileo's *Sidereus Nuncius* in 1610 which did much to destroyed the physical model of nested spheres on which classical cosmology rested. Teleology, order and ensoulment survived but in an impoverished form and largely excluded from the new scientific, observational astronomy. This paper will examine the use of astronomy by William Shakespeare, the greatest writer in the English language, the majority of whose plays were written prior to 1610, and will explore how key passages and themes in his work relate back to classical Athenian astronomical theory, particularly its relation to fate. It will argue that, through his dramatic narratives, Shakespeare was the last great exponent of classical astronomical theory before the Galilean revolution.

KEYWORDS: astronomy, cosmology, fate, Shakespeare

1. INTRODUCTION

William Shakespeare, the English playwright, was born in 1564 and died in 1616, just a few years after Galileo's *Sidereus Nuncius* was published, in 1610. This paper will consider the use of astronomy and cosmology by Shakespeare, the majority of whose plays were written prior to 1610, and will explore how key passages and themes in his work relate back to classical Athenian astronomical theory, and should therefore be considered pre-Galilean. The revolutionary impact of the *Sidereus Nuncius* was immediate, as was evident from John Donne's (1896) poem 'An Anatomy of the World', published in 1611:

*And new philosophy calls all in doubt,
The element of fire is quite put out,
The sun is lost, and th' earth, and no man's wit
Can well direct him where to look for it.
And freely men confess that this world's spent,
When in the planets, and the firmament
They seek so many new...
'Tis all in pieces, all coherence gone...*

Shakespeare was born into the 'coherent' world which preceded Galileo's discoveries. Only four of his plays were first performed at a time when he could possibly have known of Galileo's discoveries; 'A Winter's Tale', 1610-11, 'The Tempest', 1611-12, 'Henry VIII', 1612-13, and 'Two Noble Kinsmen', 1612-13. The shock to the educated European world inflicted by Galileo was relatively sudden, at least, compared to that resulting from Copernicanism, which was a familiar part of intellectual culture in late 16th century England: the possibility that the universe was heliocentric was part of the learned discourse of the time and was supported by a number of notable sixteenth century English thinkers, such as Thomas Digges (c.1546-1595) (Westman 2011, 268-80). Shakespeare's circle included the poet Leonard Digges (1588-1635), one of the earliest literary commentators on

Shakespeare's work, and son of Thomas Digges, and grandson of Leonard Digges (c.1515-c.1559), the mathematician and astronomer (Freehafer, 1970); both Thomas and Leonard the elder were also distinguished as pioneers in the construction of the telescope and its use while the latter is credited with the invention of the theodolite. Yet, it is commonly argued (Clark 1929, Meadows 1969) that Shakespeare neither referred to the Copernican controversy, nor used it as a metaphor. Only Peter Usher (2010) has consistently argued that Shakespeare employed Copernican references in his writing. Usher also argues that Shakespeare made extensive use of knowledge derived from the pioneering, pre-Galilean, magnifying glass and telescopic observations of Leonard Digges senior and Thomas Digges, and in his final plays, Galileo himself. However, Usher over-interprets Shakespeare's words in order to reveal a supposedly hidden astronomical code.

As a man of the pre-Galilean world, Shakespeare's philosophical influences would have been derived mainly from Holy Scripture, along with the classical Athenian philosophy inherited from Plato, Aristotle and the Stoics. He would have been familiar with the Scriptural idea of stars as signs from God (Hegedus 2007), Plato's notion of the cosmos as a vast, living machine in which the planets are 'organs of time' (1931, 42A, 42D) and that time itself can be seen as an organising principle (Campion 2009), Aristotle's (1933, 1937, 1986) theory of the cosmos as interlinked by a web of psychic and physical influences and Stoic model of the cosmos as an organ of fate (Sandbach, 1975). An obvious piece of Aristotelian astronomy, drawing on Aristotle's (2004) ideas of a constant process of generation and corruption which pervades the entire sub-Lunar, natural world, is found in Sonnet 15 (Shakespeare, 2005):

*When I consider every thing that grows
Holds in perfection but a little moment,*

*That this huge stage presenteth nought but
showes,
Whereon the Stars in secret influence
comment.
When I perceive that men as plants increase,
Cheered and cheque'd even by the self-same
sky:
Vaunt in their youthful sap, at height
decrease,*

One of the most important cosmological works in medieval and Renaissance Europe was *The Consolation of Philosophy*, written by the Christian Stoic Boethius (c 476-80 - 524/5). This was the last major late-classical work of theoretical speculation on humanity's relationship with the cosmos. It is actually said to have been the most widely used text-book in the medieval western curriculum, and its translators included Queen Elizabeth I of England, who was on the throne when Shakespeare's writing career began. Boethius merged Platonic concepts, such as the theory of archetypes which emerge from God in association with an astronomical regulated world, the outcome being a life in which freedom of action only exists within a context in which the individual is required to deal with circumstances which follow a broadly predetermined pattern. This passage (Boethius, 1969, III.IX) was well known:

*O Thou who dost by everlasting reason rule,
Creator of the planets and the sky, who time
From timelessness didst bring, unchanging
Mover, No cause drove Thee to mould
unstable matter, but The form benign of
highest good within Thee set, All things
Thou bringest forth from Thy high
archetype, The soul once cut, in circles two
its motion joins, Goes round and to itself
returns encircling mind, And turns in
pattern similar the firmament.*

Evidence of a Platonic-Stoic concern with order is also evident in many of Shakespeare's passages. For example in 'Troilus and Cressida' (Shakespeare 2005,

I.iii), which was probably written in 1601-2, and printed in 1603:

*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 enthroned and sphered
Amidst the other; whose medicinable eye
Corrects the ill aspects of planets evil,
And posts like the commandment of a king,
Sans check, to good and bad.*

Note in particular the words 'And therefore is the glorious planet Sol In noble eminence enthroned and sphered'. Such a line could have been inspired by Copernicus' (1995, I.10) preface to *De Revolutionibus*:

*In the midst of all assuredly dwells the Sun.
For, in this most beautiful temple, who
would place this luminary in any other or
better position from which he can illuminate
the whole at once? Indeed, some rightly call
Him the Light of the World, others, the
Mind or the Ruler of the Universe: Hermes
Trismegistus names him the visible God.
Sophocles Electra calls him the all-seeing. So
indeed the Sun remains, as if in his kingly
dominion, governing the family of Heavenly
bodies which circles around him.*

Yet Copernicus, and most likely Shakespeare, were aware of the classical tradition which accorded the Sun a central and monarchical position in the celestial pantheon by virtue of its median, and hence central, distance from the earth in the sequence of planets (Grant 1996, 452). Here is the Greek author Vettius Valens (2010, I.1) on the Sun, in the second century:

*the all-seeing sun, nature's fire and
intellectual light, the organ of mental
perception, indicates kingship, rule,
intellect, intelligence, beauty, motion,
loftiness of fortune, the ordinance of the
gods, judgement, public reputation, action,*

authority over the masses, the father, the master.

A familiar idea from the classical world was the notion that certain combinations of planetary motions indicate political crisis. Plato believed that when all the eight spheres – of the seven planets and the stars – returned simultaneously to the points of their creation, the world would come to an end, to be reborn after the crisis had passed (Plato 1931, 39D):

The complete number of Time fulfils the Complete year when all the eight circuits with their relative speeds, finish together and come to a head, when measured by the revolution of the Same and the Similarly-moving.

The revolutions of the Same and the Similarly-moving are the motions of the fixed stars on the one hand, and the planets on the other. Within the tradition which then developed, lesser critical points in planetary cycles might result in lesser political crises. Such apocalyptic ideas were propagated in the classical world by the Stoics (Sandbach 1975) and the Platonic-Stoic notion of cyclical rhythms in history, which remained a staple of historical thought in the Renaissance. The poet Fulke Greville (1554–1628) (Rebholz), Chancellor of the exchequer, and commissioner of the Treasury under Elizabeth I and James VI/1, and therefore a participant in the intellectual circle which included Shakespeare, wrote (Greville, 1633, 77-8):

*Needfull it therefore is, and clearly true,
That all great Empires, Cities, Seats of Power,
Must rise and fall, waxe old, and not renew...
States have degrees, as human bodies have Springs, Summer, Autumn, Winter and the grave.*

The idea of periodic political crises in which time reaches critical points was recognised in Hamlet's (Shakespeare, 2005,

I.5.189) declaration (published in 1603) that 'The time is out of joint', as a response to the claim (I.4.67) that 'Something is rotten in the state of Denmark.' Hamlet's closest friend, Horatio, introduces a note of Stoic astral fate in his response I.4.68) that 'Heaven will direct it', referring ambiguously to both the ghost of Hamlet's father and the unfolding crisis. Hamlet himself later replies (I.5.190) 'O cursed spite, That ever I was born to set it right!', suggesting simultaneously a problem with time, perceived as an organising principle, but which is 'out of joint', the idea that he was destined from birth to correct the problem, and that he was obliged to take a free action in order to accomplish the inevitable. A similar sentiment appears in the *Faerie Queene*, written by Shakespeare's contemporary, Edmund Spenser (1552-99), published in 1599 (Spenser 2003, v, Prologue 1):

*Me seemes the world is runne quite out of square,
From the first point of his appointed course,
And being once amisse, growes daily wourse
and wourse.*

Similarly, the theme of collapse is fundamental to 'King Lear' (2005, 6.30-1, in which the Duke of Gloucester complains, 'O ruin'd piece of nature!, This great world shall so wear out to naught'. In 'Romeo and Juliet' (first performed in 1594-5, and printed in 1597) Shakespeare introduces us to the concept of 'star-cross'd', as an astronomical analogy to time being out of joint, in the famous passage in the prologue (Shakespeare, 2005, Prologue, 1-5):

*Two households, both alike in dignity,
In fair Verona, where we lay our scene,
From ancient grudge break to new mutiny,
Where civil blood makes civil hands unclean.
From forth the fatal loins of these two foes
A pair of star-cross'd lovers take their lives.*

The notion is revisited in 'A Midsummer Night's Dream' (Shakespeare, 2005, I.1), which was first performed in 1595-6 and

printed in 1600. Hermia says to Lysander of their troubles: 'If then lovers have been ever crosse'd, It stands as an edict in destiny'. The passage continues with a typical appeal to Stoic forbearance (I.1, 152-5):

*Then let us teach our trial patience,
Because it is a customary cross,
As due to love as thoughts and dreams and
sighs, Wishes and tears, poor fancy's
followers.*

Romeo, on his way to Juliet's house, expresses similar views to Hamlet's sense of gloomy, unavoidable, destiny yet, this time, also adds a specific astronomical analogy (Shakespeare, 2005, I.4.106-7):

*My mind misgives
Some consequence, yet hanging in the stars,
Shall bitterly begin his fearful date
With this night's revels.*

Such astronomically-related personal crises, with their consequences hanging in the stars, achieve political significance in Shakespeare's tragedies, particularly in *King Lear*, probably written, and certainly first performed, in 1604-5, but perhaps as late as 1608, the year before Galileo's observations were made. The most famous such speech occurs in 'King Lear' in which the Duke of Gloucester describes the effect of recent eclipses on the collapse of the kingdom. This is from the first quarto edition of 1608 (Shakespeare, 2005, I.2, 101-7, 112-5):

*These late eclipses in the sun and moon portend
no good to us: though the wisdom of nature can
reason it thus and thus, yet nature finds itself
scourged by the sequent effects: love cools,
friendship falls off, brothers divide: in
cities, mutinies; in countries, discord; in
palaces, treason; and the bond cracked 'twixt
son
and father. This villain of mine comes under the
prediction; there's son against father: the king
falls from bias of nature; there's father against
child. We have seen the best of our time:
machinations, hollowness, treachery, and all*

*ruinous disorders, follow us disquietly to our
graves. Find out this villain, Edmund; it shall
lose thee nothing; do it carefully. And the
noble and true-hearted Kent banished! his
offence, honesty! 'Tis strange indeed.*

When the first folio edition of 'King Lear' was printed in 1623 (Shakespeare, 1623) the passage had been expanded to include the following insertion (I.3.107-12), elaborating the Platonic concept of astronomically-coincident political crises:

*This villain of mine comes under the
prediction; the king falls from bias of nature;
there's father against child.
We have seen the best of our time:
machinations, hollowness, treachery, and all
ruinous disorders, follow us disquietly to
our graves!*

Mary Floyd-Wilson (2013) discusses the kind of breakdown in the cosmos initiated by the Lear eclipses as one of 'sympathetic contagion', in which the interplay of sympathies and antipathies, which were thought to link all things and preserve harmony in the cosmos, breaks down. Yet Shakespeare also puts an opposing point of view in 'King Lear', through the words of Edgar, Gloucester's bastard son. In Edgar's contemptuous response to Gloucester's view of the significance of eclipses for social and political disintegration, he denounces the concept of astral fate and pours scorn on the notion that political crisis corresponds to astronomical cycles. (Shakespeare, 2005, I.2.116-30):

*This is the excellent foppery of the world,
that,
when we are sick in fortune,--often the
surfeit
of our own behaviour,--we make guilty of
our
disasters the sun, the moon, and the stars: as
if we were villains by necessity; fools by
heavenly compulsion; knaves, thieves, and
treachers, by spherical predominance;
drunkards,
liars, and adulterers, by an enforced*

*obedience of
planetary influence; and all that we are evil
in,
by a divine thrusting on: an admirable
evasion
of whoremaster man, to lay his goatish
disposition to the charge of a star! My
father compounded with my mother under
the
dragon's tail; and my nativity was under
Ursa
major; so that it follows, I am rough and
lecherous. Tut, I should have been that I am,
had the maidenliest star in the firmament
twinkled on my bastardizing.*

Are such events inevitable? Shakespeare plays around with the extent to which human beings are free from the diktats of time, represented in the planets. In the end Edmund's fate is also inevitable, and he dies.

Elsewhere Shakespeare insists that Fate results from inner rather than outer causes. The famous passage in 'Julius Caesar' (Shakespeare, 2005, I.2,140-1), where Cassius proclaims, 'The fault, dear Brutus, is not in our stars, But in ourselves, that we are underlings', is reminiscent of Plato's (1935, X.617E) claim that 'The blame is he who chooses: God is blameless'. The paradox, that fate is unavoidable yet can be qualified, and freedom developed, by the individual who develops virtue, was spelled out in a series of statements by the Stoic philosophers. Chrysippus' claimed that although 'all things happen by fate or destiny', and Diogenes Laertius' argued that 'if a man be possessed of virtue, he is at once able to discover and to put into practice what he ought to do' and 'he [the wise man] alone is free and bad men are slaves, freedom is the power of independent action, whereas slavery is the privation of the same' (Diogenes Laertius, 1925-8, VII.149, 126. 122).

The Lear-eclipse passages also suggest a familiarity with the popular astronomical forecasting of the time: when his brother Edgar asks him why he is speculating, Edmund tells him, 'I am

thinking Brother of a prediction I read this other day, what should follow these Eclipses' I.2.138-9). That such ideas concerning the significance of eclipses were current is evident from this forecast concerning a solar eclipse in 1652, the year after the execution of the English king Charles I, echoed the devastation visited upon the fictional king Lear (Lilly, 1652, 26):

The Conjunction of the two Luminaries in Aries, occasions strange Alienations of friendship and Death. viz break of Leagues, Amities and friendships: from thence Warre and controversy, after which follows quarrels, and then Death and Destruction; many times a Famine and scarcity of provisions...Nor are men or Cattle onely concerned in this our great Eclips: without doubt whole Kingdomes, Nations, People, Cities and Common-wealths.

Lilly's work was some half-century after Lear, but his delineation of the effect of eclipses was consistent with standard medieval theory. But was a major astronomical event of the time an inspiration behind the use of eclipses as a dramatic device in Lear? On 5 November 1605 the Gunpowder Plot, allegedly a conspiracy to blow up the English houses of Parliament, including the king, was discovered: this is one of the most famous political events in English history. F.E. Halliday (1956, 282) wrote that 'The Moon, indeed, portended no good. There was an eclipse on the 27th, and only a fortnight before [12 October NS] there had been a total eclipse of the sun'.

Shakespeare also appeared to reference some well-known scriptural passages, although ones which could equally well be justified by Stoicism. For example, the theory of cyclical repetitions in time embedded in Ecclesiastes 1.9 ('*The thing that hath been is that which shall be; and that which hath been done is that which shall be done; and there is no new thing under the sun*') appears to be elaborated in Sonnet 59, with

the addition of some psychological theory (Shakespeare, 2005):

*If there be nothing new, but that which is
Hath been before, how are our brains
beguiled,
Which, labouring for invention, bear amiss
The second burden of a former child.
O, that record could with a backward look,
Even of five hundred courses of the sun,
Show me your image in some antique book,
Since mind at first in character was done!*

Shakespeare also suggests that the use of astronomy to interpret detailed events, as documented in *King Lear*, is ultimately unsatisfying. One reading of Sonnet 14 (Shakespeare, 2005) has Shakespeare contrasting the use of the stars to reach judgments about the world with the simple benefits of gazing at a starry sky.

*Not from the stars do I my judgment
pluck; And yet methinks I have
astronomy, But not to tell of good or evil
luck,
Of plagues, of dearths, or seasons'
quality; Nor can I fortune to brief minutes
tell,
Pointing to each his thunder, rain and wind,
Or say with princes if it shall go well, By oft
predict that I in heaven find:
But from thine eyes my knowledge I derive,
And, constant stars, in them I read such art
As truth and beauty shall together thrive.*

Here again, Shakespeare was indebted to the classical tradition that to gaze at the stars was good for the soul. The Roman Emperor and Stoic Philosopher, Marcus Aurelius (1964, V.47), urged,

*Survey the circling stars as though yourself
were in mid-course with them. Often picture
the changing and re-changing dance of the
elements. Visions of this kind purge away
the dross of our earth-bound life.*

The Roman poet Ovid (1968, I.97-114) considered that to gaze at the stars is to be human. In the *Metamorphoses* he wrote:

*On earth the brute creation bends its
gaze, but man was given a lofty countenance
and was commanded to behold the skies.*

The time in which Shakespeare lived was one of intellectual discovery and excitement, encouraged by the Renaissance and the European voyages of exploration. Shakespeare would well have understood Frances Bacon's statement in *Novum Organum*, one of the seminal works of modern scientific method, published in 1620, four years after his death. Bacon (1952, XLVIII) wrote:

*The human understanding is unquiet. It
cannot stop of rest, and still presses
onward. Therefore it is that we cannot
conceive of any end or limit to the world,
but always as of necessary it occurs to us
that there is something beyond.*

On hearing of Galileo's discoveries, the diplomat Henry Wotton, wrote a letter to King James I of England, echoing Donne's poem, and cited by Dava Sobel (1999, 30):

*So as upon the whole subject he hath first
overthrown all former astronomy – for we
must have a new sphere to save the
appearances – and next all astrology. For the
virtue of these new planets must needs vary
the judicial part, and why may there not yet
be more?*

In another of his plays, 'All's Well That Ends Well', probably written in 1604-15 around the same time as 'King Lear', Shakespeare anticipates Donne and Wootton's responses to Galileo, and Bacon's musings on science. His character Lafeu (Shakespeare, 2005, II.3.1-6), says:

*They say miracles are past; and we have our
philosophical persons, to make modern and
familiar, things supernatural and causeless.
Hence is it that we make trifles of terrors,
ensconcing ourselves into seeming*

knowledge, when we should submit ourselves to an unknown fear.

Shakespeare made use of astronomy as a dramatic and literary device, including reference to its use to make detailed prognostications concerning human affairs. Yet he anticipated the rejection of such practices that followed the Galilean discoveries. He adhered to the clear and unambiguous cosmology of the time, in which humanity was inextricably a part of the celestial as well as the terrestrial environment (Spencer, 1949). Repeatedly his plays, especially the great political tragedies, 'King Lear', 'Hamlet' and 'Macbeth', pursue a familiar theme in which his lead characters are trapped in a

cosmos which reverberates between order and disorder. Planetary movements are then seen as related to, or illustrative of, corresponding movements in human affairs. I have argued that, through his dramatic narratives, Shakespeare may be considered the last great literary exponent of the classical astronomical and cosmological theory formulated in Athenian culture in the fifth to third centuries BCE. His body of work was largely completed before the Galilean revolution shattered the coherent cosmology inherited from the classical world. As Spencer (1949, 222) wrote, Shakespeare 'was in touch with something more than his age'.

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