

Shakespeare's Concept of Astronomy

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Abstract

This contribution scrutinizes Shakespeare knowledge and views about cosmological theories i.e., Ptolemaic, Copernicus, TychoBrahe and Galileo. In addition, it claims that William Shakespeare had a profound interest and specialized knowledge in the domain of technical astronomy. Plays by Shakespeare are loaded with astronomical allusions. Because that is injected in Shakespeare's nature to discuss every aspect of his age like medicine, falconry and agriculture but his astronomy is quite interesting. Furthermore, this effort examines the Shakespeare's astronomical concept in allegorical form in his plays, especially in Hamlet, King Lear, Othello, Julius and Ceaser, Henry VI, The Tempest and Antony and Cleopatra.

Keywords: William Shakespeare , Renaissance astronomy, Ptolemaic, Copernicanism, Hamlet, King Lear, Othello, Julius and Ceaser, Henry VI, The Tempest and Antony and Cleopatra.

Shakespeare's Concept of Astronomy

During Shakespeare's time England was a breeding ground for Copernicanism. At that time England was safe location to talk over these fresh concepts and theories. Moreover, that was the boundary of the thinkers and mathematician of Elizabethan's court and Magus John Dee that Copernicus theories progressed. Dee was adviser and tutor to Queen Elizabeth and it was almost Dee that he progressed the Copernicanism in Elizabethan era.

Shakespeare was also influenced by the prevailing and emerging theories of cosmos. Shakespeare has 'never made luminous and direct contact to the astronomical theories like heliocentric and geocentric theory in his works. Dawn of Modern Science (2010) and Hamlet's

Universe (2006) however are the two books by Peter Usher in which he emphasizes on the fact that Copernicanism is what Hamlet believes in. Moreover, Usher created several inquisitive questions that, do the language of Shakespearean plays shows that Shakespeare had profound knowledge about technical astronomy? Was he impacted by heliocentric theory of Copernicus? Or is it that Shakespeare tacitly the inferences of Copernican astronomy? Why did Shakespeare select the names of Rosenkrantz and Guildenstern (two historical astronomers of Tycho Brahe)? The answer to these questions throw light on the important and indirect the relationship between Shakespeare, science, and technology.

Literature review.

Half a century back, we are still in the realm of the perfect universe. William Shakespeare (1564-1616) was born about twenty years back after Nicolaus Copernicus, whose book (*De Revolutionibus Orbium Coelestium* in 1543) laid out the concept for the sun-centered solar system. It took a time for Copernicus theory to take hold. The era of Elizabethan was highly primitive to have wholly absorbed numerous syllable deep understandings and explorations in cosmology as well as physics.

Shakespeare stood at the dawning of the new age of modern astronomy. He did not hesitate to use such allusions of the cosmic scene for his poetic and dramatic purposes, which accelerated the power to his pen. Many other writers of different ages and different tongues narrated the mystery and majesty of heavenly events in poems, plays, and prose. However, we can find such abundance of astronomical allusions in the work of Shakespeare. It is a matter of interest to astrochemists to focus on their theme using the vision of the great spectacular intellect of the Elizabethan epoch, contemporary to Bruno, Tycho Brahe, Galileo and Kepler.

David Levy, the astronomer, and literary scholar establishes the astute observation "At the time of most of the Shakespeare's writing, the real impact of Copernicus's astronomical ideas had yet to be felt.....had Shakespeare prime writing years ended a decade later, his plays might have reflected a vastly different situation" (Levy 2000:65-66). Furthermore, the Copernican reference

in Shakespeare's work has also detected by one commentator and three textual editors. In Hamlet when prince of Denmark wrote a part of free verse to Ophelia "Doubt that the sun doth move" (Bevington 2009: L.:117). A.J Meadows thinks of it as "an oblique reference to the heliocentric concept" (Meadows 1969). Whereas the three editors made it complex that it demotes to the Ptolemaic concept that sun revolved around the globe. So it can be said that Shakespeare wrote the play under the astronomical theme but in allegorical form.

Peter Usher (2007-2010) studied the relationship between Shakespeare, his concept of astronomy and science. As a researcher, he found a deep connection and affiliation of Shakespeare to cosmos and technology. Usher claimed (2007-2010) to uncover the elaborated metaphor of the contending earth system of Shakespeare's time like Ptolemaic, Copernican, as well as Tyconic. Although Usher does not properly clear that what is the purpose and motivation for using such allegorical themes and how he relates it to the themes of his plays, so he collected several observations and references to prove it.

Discussion

Shakespeare and astronomy

William Shakespeare the most hermetic thinker and observer of the earthborn condition, the world has ever known, came across these events. Furthermore, his works are dazzled with observations on death and life, vengeance and love, reader would be hard-pressed to relate Shakespeare on science. But there is science in Shakespeare's work.

In the first half of November 1572, when the great playwright Shakespeare was only eight years old boy. The supernova burst in the Cassiopeia (a northern constellation between Andromeda and Cephus) in the northern firmament. This event dispatched the accepted concept of the geo-centric universe, ultimately flashing a scientific revolution that set the track, we think and live in, today. When Shakespeare was born, the prevailing concept of the cosmos was stationary, since the ancient Greek astronomer Claudius Ptolemy, who fixed the earth at the center of the universe in his geocentric theory, orbited by the sun and the other planets. With the happening of Cassiopeia

supernova, earth-centered theory began to decline, by profound and carefully measuring the supernova position comparative to the moon, Tycho Brahe the Danish astronomer and others proved once that the stars were not settled at the same distance from earth. Nor all heavenly events happened in the space between the moon and the earth.

Almost forty years later, Galileo the great Italian astronomer and physicist, born the fellow year as Shakespeare was. He juncture refractive telescope improved towards the stars. He observed two moons revolving around Jupiter and Venus diminishing and growing like the moon in phases. They were certainly on orbits that were not geocentric. So these observations unravel the chippy and continuous "heliocentric" views of Copernicus. This measuring placed the earth as another planet circling the sun.

Now let's see how Shakespeare was impacted by different cosmic theories and how he describes his views in his works.

Shakespeare disguised Copernicanism in Hamlet

Peter Usher argues in his books *Hamlet's Universe* (2007), my thesis is that "he was a powerful supporter of the new world view" Usher thinks that Shakespeare, in fact, championed the heliocentric theory of Copernicus. It can be easily caught in his heavily disguised form in *Hamlet*. Which are mentioned below:

Usher while studying *Hamlet*, realized that *Hamlet's* great enemy his uncle Claudius bears the similar name as Claudius Ptolemy. In which Claudius symbolises the Aristotelian geocentric views launched by Claudius Ptolemy. So he evolved the theory that *Hamlet* is an allegory of the contending views of his age.

On another place, Usher hints the star that, in Act 1 is an omen for the emergence of *Hamlet's* father's ghost. Usher verbalizes this star is Tycho Brahe's supernova and sets the whole story and theme of drama, if the first act set about at the time when supernova situates its show in Cassiopeia, then the rest of the five acts must hold between 1572 and 1576.

Another reference to his cosmological concept according to Usher is that Hamlet had been studying at Wittenberg, the nucleus for Copernican learning. Usher says that some of the dialogue even indicates like when Hamlet says that he wants to go back to Wittenberg for study, the king is disagreed and says, "It is more retrograde to our desire" (Hamlet: L. 317). Here Usher takes the double meaning of retrograde. He believes that the term retrograde does not refer only to the contentious views clung by Wittenberg University but also to a common astronomical concept that the visible backward movement of Saturn when caught up in its orbit by the earth.

An additional potential insinuation to a Copernican space metaphor is Hamlet's pursuit of academic goals at the University of Wittenberg, an institution for Copernican learning. In which Usher indicates a question that what made Shakespeare to have Hamlet learn at Wittenberg together with Guildenstern as well as Rosencrantz, the name of two imperative scientists and cousins to Tycho Brahe. A portrayal of Tycho Brahe along Rosencrantz and Guildenstern appears in Tycho's *Epistole* (1596). A first December 1590 letter was written from Tycho to English astrochemists Thomas Savile, offered compliments to Dee as well as Digges, moreover include two versions of Tycho's *De Recentioribus Phaenomenis* (1588); along emblematic Tychonic conceit, and four imprinted portrayals of himself delimited by relations ridges, in which the two pinnacles are "Rosencrantz and Guildenstern". Shakespeare might have erudited the stopover of Frederik Rosenkrantz and Knud Gyldenstjerne to England in 1592, two relatives of Tycho Brahe, who had together premeditated at Wittenberg. (Simpson 1926:28; Srigley 2002: 178-80).

Palle Rosencrantz, an anon descendant of Rosencrantz, as a writer, he signifies that a couple of cousins nearly seemed together plus often established in public together. They might have a role amid the diminutive aristocrats in Hamlet. As a result, the usage of these two names must not unavoidably raise the concept of Tycho Brahe or his classification of earth. (Swank 2003:12-15; Rosenkrantz 1910.)

Shakespeare connection with great astronomer Thomas Digges(1546-1595).

Tycho Brahe the contemporary to Shakespeare, was in correspondence to lead English copernicanism. When he sent a letter to Thomas Savile including his book (1588) portraying the cross sample of his solar system, and four framed dummies of Tycho's picture, retaining the names of two scientists and relatives of Tycho, Sophie Gyldenstjerne and Erik Rosenkrantz. Tycho Brahe peculiarly conveys greetings to Thomas Digges and John Dee. One of his portrait was in possession of Thomas Digges.

The English astronomer and mathematician, Thomas Digges was the first that championed the copernicanism in english. Digges was the member of the John Dee's circle. After the death of his father Leronard Digges, John Dee was a guardian to Thomas Digges. His father was also a popular surveyor and mathematician and has been attributed to the innovation of telescope primary to Galileo. Whereas Digges progressed the copernican theory to its logical conclusion. According to Harrison, Digges was the first that proposed the infinity of universe. He comments;

“Copernicus had said little or nothing about what lay beyond the sphere of fixed stars. Digges's original contribution to cosmology consisted of dismantling the starry sphere, and scattering the stars throughout endless space.”

"By grafting endless space onto the Copernican system and scattering the stars throughout this endless space, Digges pioneered... the idea of an unlimited universe filled with the mingling rays of countless stars.”

It is mentioned that in London Shakespeare were living near to the Digges home. Shakespeare was prased by Leonard Digges for his respecting poem in the Folio edition of 1623. And after the death of Thomas Digges his wife remarried to Thomas Russell,who was elected as a overseer by Shakeseare's will. Now these two families of Digges and Shakespeare were connected. It is justified that Shakespeare got the name of Rosenkrantz and Guildenstern from Thomas Digges.

Hamlet Dream of.

Hamlet sees a vision of never-ending space: “ O God, I could be bounded in a nutshell and count myself a king of infinite space”(L:55-56). Copernicus understood that yet no one had completed to notice astral parallax, and for which he intimated two hypothesis: either the stars are enormously distant from the world, or the globe may not be in motion. But finally, he enclosed that the globe revolve. He handover this term for philosophers to examine the infinity of the cosmos. Whereas the perpetuity of the cosmos was a classical topic and this idea was discovered by the ancient school. In English thought, this concept of infinity was first connected to the Copernican system by Thomas Digges in the Prognostication Everlasting (Johnson 1934). So Hamlet’s dream of never-ending space is symbol to occur as of the revival of this inspiration in both fiction throughout Shakespeare’s vocation and technical astronomy.

Shakespeare astronomy is not only limited to Hamlet. Usher never relates the astronomical references to the Hamlet. Usher elaborate in second volume of Shakespeare and the Dawn of Modern Science , stressing on his theory to include, The Merchant of Venice, Cymbeline, The Winter’s Tale and Love’s Labour’s Lust. And he says; “I think that cosmology was a major part of Shakspeare’s world view”

Shakespeare Astronomical touch in Othello.

However, the Bard exposes the more modern the concept of the moon’s circulation around earth, that the moon’s distance differs in its orbit, a term mentioned in Othello, where Shakespeare marks the madness of moon. “It is the very error of the moon; She comes nearer the earth, Than she was not, And makes men mad.”(Othello: L.3434).

Another astrometrical allusion of Shakespeare in Othello when Othello induces eclipses to ventilate his agony; “O insupportable, O heavy hour! Methinks it should be now a huge eclipse Of sun and moon, and that th’affrighted globe Should yawn at alteration.” (Othello; L.3412). Here these words symbolise a little touch of astronomical boob because moon and sun never eclipse at the same time.

Shakespeare Cosmological touch in Henry IV.

The geocentric concept of the solar system had its own problems when forecasting the paths of the planets. Astronomers and the scientists were unable to solve that system had why Mars in its orbit reversed in the sky. Shakespeare mentioned this problem in Henry IV: “Mars his true moving, even as in the heaven, So in the earth, this day is not known.” (Henry IV:L.191)

Shakespeare astronomical touch in Julius and Ceaser.

In Julius and Ceaser the Brutus fails to tell the time: “I cannot by the progress of the stars, Give guess how near to day.”(1599: L.600).

His another popular remark from Julius and Ceaser:“ When beggars die there are no comets seen, The heavens themselves blaze forth the death of princes.”(1599: L.1006). This is more interesting because it relates the definite phenomena of the dark and night sky, comets.

Furthermore, his attraction in astronomy can be catch when Julius says;“I am constant as the northern star.” (1599: L.1263). So it can be conclude that Shakespeare was well aware that the night-sky circulates around polaris, the northern sky.

Shakespeare astronomical touch in King Lear.

In King Lear Shakespeare’s interest in the stars thathandling our destiny and fates and these indicates the existing astrological ideas of the period. And this point is quite prominent in King Lear;“This is the excellent foppery of the world ...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 teachers by spherical predominance, drunkards, liars and adulterers by enforced obedience of planetary influence.... I should have been that I am had the maidenliest star in the firmament twinkled on my bastardizing.” (L.442)”. This is a stunning attack on the astronomical fatalism that we listen from many characters in Shakespeare’s plays. Definitely these words spoken by villian of the play, Edmund. But it does not represent the sceptic views of Shakespeare.

Another astrological reference in King Lear when the earl of Gloucester commented; “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 scourg’d by the sequent effects”(L.429). Here, his illegitimate son Edmund mocked the concept of the eclipse that something usually unpleasant or bad is going to happen. Gloucester was well known to natural explanation of eclipse but despite it he relates eclipse with bad omen.

Shakespeare astronomical touch in Antony and Cleopatra.

Time and again Shakespeare mentioned the astronomical phenomena to express his views. In Antony and Cleopatra when Antony says; “Alack our terrene Moon is now eclipsed, And it portends alone the fall of Antony.”(2437-2438).

There is also astronomical allegory in Cleopatra as she resolves to die; “now from head to foot I am marble-constant: now the fleeting Moon No planet is of mine.” (Antony and Cleopatra: L.3686-3687).

However, in the end, Usher argues that Shakespeare was the progressive, knowledgeable and ultramodern in the Elizabethan authors, consequently he would have the largely improved acquaintance of cosmology, even in allegorical form as well as scientifically unprinted facts only known to a few.

Conclusion

Plays from Shakespeare are assuredly pervaded with the rational thoughts that were circularly, invoked by the recently evolving propositions and cosmology theories. He did not express his concept of astronomy prominently. However he mentioned it allegorically. He discussed new theories, infinity of universe, new world, especially Man’s relationship to the cosmos. Shakespeare disputed all sorts of things like supernaturalism, cosmical conceptions, scepticism throughout his work. He questioned all sorts of things, including social mores, justice and medieval world view. Overall science was the key to it. Through his works it may be concluded,

that he was having a wonderful knowledge about astronomical conceptions of his age and he mentioned his cosmical views to possible extent in his writing.

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Pushkin called Shakespeare a Romantic, meaning that true Romanticism creates art that is fitted to the time spirit and linked to national life. Pushkin tried to adapt Shakespeare's artistic method to the contemporary state of society. He considered objectivity, truthfulness of characters and a precise reflection of the period to be the main features of Shakespearean manner of writing.

In the manner of our Father Shakespeare Pushkin created his tragedy Boris Godunov (1825) and adopted Shakespeare's objectivity while depicting the time and characters.

Shakespeare's Life. Elizabethan Theater. Animated Summary. Home Explore Shakespeare Shakespedia Shakespeare's Plays. Taming of the Shrew. Synopsis and plot overview of Shakespeare's Taming of the Shrew. In this section. TL;DR: Katherine doesn't want to get married; Petruchio marries her and compels her to be obedient; everyone is happy? The end. Taming of the Shrew Summary. John Shakespeare was very pleased to have his first grandson, and everyone was happy. For a while. Will and I still went around together when we could. He was still reading, and writing, and soon I could see a change in him. He was twenty-three now, and he was not happy with his life. Stratford's too small, Toby, he said. Too slow.

1 William Shakespeare was born in London. 2 He was an actor and a playwright. 3 He wrote nearly forty plays. 4 He had five children. 5 He wrote the play Romeo and Juliet. 6 Toby was a real person. EH EH. Eh eh eh eh eh eh eh. Shumaila Rasheed. Muhammad Malik Zeeshan. Najia Asrar Zaidi. Muhammad Malik Zeeshan. The present study deals with the growth, photosynthesis, oxidative stress and heavy metal accumulation ability of *Nostoc muscorum* exposed to different levels (2, 4, 8, 16, 20 μ M) of cadmium (Cd) concentrations. Growth and photosynthetic pigments i.e., chlorophyll a, carotenoids and phycocyanin were significantly affected by cadmium exposure and inh... Saeed Mahfooz. Department. Department of Computer Science.