

The Response of John Donne to the New Philosophy

Aliya Shahnoor Ameen*

Abstract

John Donne (1572-1631), is known as a revolutionary among his contemporaries. This is because of his extensive use of anti-Petrarchan convention, conceit, paradox, metaphysical ideas and above all skepticism in his writings. During his lifetime he was sometimes criticized for his adherence to the Copernican theory. The Copernican theory was, in a way, the beginning of the end of medieval austerity. The outcome of the theory was the storm of controversy and distrust in adopting the heliocentric theory as propounded by Copernicus. It does not mean that the Copernican theory is flawless and complete. It came to fullness with further investigation by Brahe, Kepler, Galileo, and Newton. John Donne belonging to the Elizabethan period found it sometimes quite uncomfortable to reconcile with the findings of the Copernican theory. Still, I find it most interesting that the very revolutionary seed which characterized the new philosophy is also evident in the works of John Donne. The use of metaphysics, to which school of thought Donne belongs, amply justifies the revolutionary nature of his poetry. In this article I will try to find out his attitude towards the Copernican theory as well as the new philosophy.

Keywords: skepticism, revolutionary, eccentricity, theology, natural philosophy, geocentric theory, heliocentric theory.

The Age of Elizabeth is, as we all know, marked by several ground-breaking scientific inventions and many revolutionary theories. At the beginning of the sixteenth century the entire Europe was mostly governed by the kings. During that time Church of Rome was the supreme authority in determining the culture and forms of government throughout Europe. In 1534, under Henry VIII, England was separated from Rome. By the end of the century it became evident that the old culture had given way to the new sets of thought. Under the rule of the Stuart kings, James I and Charles I, strong demand was raised for a new form of government-government by the consent of those governed, instead of government by the will of the sovereign. Donne was born in 1572 when these thoughts brought a significant change in the minds of the intellectuals. Donne himself is not much different from them. In 1627 a sermon of his on the duties of the subjects towards the sovereigns offended Charles I, much to the surprise of Donne. The religious controversies of the century moulded both his private and public life. The medieval principles were reshaped to usher in the spirit of the Renaissance. Modern scholars have called these principles ‘the Elizabethan World Picture’. These principles are order, sin, the chain of being, the links in the chain, the corresponding planes, the correspondences, the cosmic dance etc. Massive changes at every level of the Elizabethan society brought substantial setbacks. Like Shakespeare and Ben Jonson, Donne had to respond to a wide variety of unsettling influences of which the heliocentric theory of Copernicus was the most far-reaching. Apart from this, individual conscience was stirred by theological arguments carried on by Martin Luther (1483-1546) and John Calvin (1509-64).

* Lecturer, Southeast University, Dhaka

In 1590s the city of London was the center of literary and cultural life in England and Donne was greatly influenced by the excitement of the city. Richard Baker, one of Donne's contemporaries, commented that he was 'a great visitor of Ladies, a great frequenter of Playes, a great writer of conceited Verses'. By 'conceited' he wanted to mean that his poems were intellectually complicated and ingenious. Izaac Walton (1593-1683), Donne's earliest biographer, relates that at times Donne was 'unresolved' about his religious faith. While at Oxford, his Catholicism prevented his taking a degree and eventually debarred him from public office. Thereafter, Donne met several other misfortunes which led him to forsake the Church of Rome. His doubts and hesitations are apparent in *Saryre iii* –'Kind pity chokes my spleen'. After great mental and spiritual battle he changed his faith. His writings about the religious controversies were illustrated in *Pseudo-Martyr* (1610) and in *Ignatius His Conclave* (1611).

Donne's restless and skeptical mind did not allow him to use the traditional Petrarchan convention in the *Elegies* of 1590s and in the *Songs and Sonnets*. Francesco Petrarca (July 20, 1304 – July 19, 1374), known in English as Petrarch, was an Italian scholar, poet and one of the earliest Renaissance humanists. In Petrarchan tradition the comparison applied to the lady is elaborate and extravagant. The lady-love is as cold and remote as she is beautiful, while on the other hand, the lover is presented as subservient to his beloved. Donne discards this tradition in most of these poems- the lady is no longer remote, but in the bedroom, and the poet no longer a passive servant but an active lover. Donne's poetry establishes him as a true realist because the recurrent theme of the *Songs and Sonnets* is the human love not in timeless and ideal world of Petrarchan poetry, but in a world susceptible to mutability and death. *The Sunne Rising*, *Good-Morrow*, *Love's Alchemy* and *The Anniversarie* demonstrate how wonderfully Donne evokes the world at peace and strife, joys and pains. F. R. Leavis has aptly written in *Revaluation* in 1936 that Donne is 'obviously a living poet in the most important sense'.

The "new philosophy" brought much excitement among the Elizabethans as well as the later generations. Much less work has so far been done on the issue of Donne's relationship with the new philosophy. The belief of the ancients was firmly based upon the Aristotelian world. Contradicting the Aristotelian philosophy was tantamount to heresy. During the Renaissance men became conscious of their potentials. So they raised numerous questions regarding their subsistence and cosmology. They eventually drew several inferences which instead of resolving the problem gave birth to lots of controversies. Donne was not different from that storm of controversy. Literary history has the testimony that his metaphysical poetry was severely attacked by the eminent critics and writers of the later period. The uses of paradoxes and conceits made Donne a controversial poet. Nevertheless this metaphysical poetry contains the true spirit of the new philosophy. The skeptical outlook is prevalent in Donne's poems. The gradual break-down of the inherited world picture is the underlying cause of the skepticism and uncertainty in Donne's poems. The emergence of modern experimental science gave rise to this cynicism. This was because medieval and Elizabethan scientists tried to explain natural phenomena in terms of divine purpose. But the new science was prompted by the endeavor of some of the bold discoverers who sought the mysteries of natural events through experiments. For example, the medieval or Elizabethan scientists would try to interpret the appearance of comet as something ominous- a warning of God to mankind of some kind of disorder. But the new science would try to experiment the course of the comet or predict the date of its return. The discovery of heliocentric theory was epoch-making in the history of scientific method. The heliocentric theory

propounds that earth and the other planets are revolving round the sun. This is just contrary to the geocentric theory which advocated that earth was at the center of the universe. Geocentric theory was part of the old philosophy and in harmony with the traditional teaching of the Church because it strongly established the supremacy and centrality of humankind. In refuting the ideas of the earlier theorists the new astronomers came into conflict with the theologians, because the new theory explicitly shows the displacement of man from the center of creation.

Donne's familiarity with the new learning does not mean that he was indifferent to the old philosophy. But it can safely be asserted that it is Copernicus who actually revolutionizes the ideas of Donne and broadens his horizon. Besides, Donne took much of his spirit from Galileo Galilei, Johannes Kepler and William Gilbert. It is, eventually, from them that Donne got a clear picture about the new found universe. However, the Copernicus's heliocentric theory at times perplexed Donne. So Donne's own philosophy is formulated based upon the old and the new sciences. Notwithstanding to satisfy his unquenchable thirst for knowledge, Donne read a lot of books on astronomy, especially those written by Copernicus, Kepler, Tycho Brahe and Galileo. But still he remained a skeptic in astronomy. His vast reading could not convince him fully to believe that the earth moved round the sun. And so did majority of his contemporaries. There were no fine instruments to make the necessary readings of the universe. People were accustomed to think of the earth-centered system of the universe, perfected by the Egyptian astronomer Ptolemy in second-century Alexandria. Besides, the judicial astrology was also dependent upon this system of the universe, because this was the branch of study which decided the influence of the planetary motions on men's lives. Now people were unwilling to subvert the motions of the planets. We can get the real picture of the treatment of the new science by the contemporary people from the popular epic on the Creation by the French Protestant Guillaume du Bartas. Du Bartas mockingly says-

Those Clarke that think (think how absurd a jest)
That neither Heav'ns nor Stars do turne at all,
Nor dance about this great round Earthly Ball;
But th' Earth itself, this massie Globe of ours ⁱ
Turns round-about once every twice-twelve hours.

In a verse letter to the Countess of Bedford, Donne reveals his true feelings about astronomy:

And new philosophy arrests the Sunne,
And bids the passive earth about it runne,
So wee have dull'd our minde, it hath no ends; ⁱⁱ
Onely the bodie's busie, and pretends.

Here we get the ironical statement of Donne regarding the plausibility of the new philosophy. But it does not mean that Donne gives up the idea altogether as meaningless. According to him it provides with the new material for thinking and exploring. This is how Donne was constantly oscillating from one opinion to another.

Despite all controversy regarding the adherence to the old or new science, Donne always keeps himself abreast with both knowledges. Donne was enlightened with the old science by his reading of annotations and commentary of *De Sphaera* of Sacrobosco written by an eminent Jesuit mathematician, Christopher Clavius. Clavius, however, was satirized by Donne in his *Ignatius his Conclave* for the revision of the calendar.

In the early seventeenth century Donne was much attracted by the fundamental principle of the Copernican theory, the motion of the earth. It was with Sir Henry Goodyer that Donne took lot of interest in talking over the nature of the universe. In 1609, Donne wrote,

I often compare not you and me, but the sphere in which your resolutions
are and my wheel, both I hope concentric to God: for methinks the new
astronomy is thus applicable well, that which are a little earth should
rather move towards God, than that ⁱⁱⁱHe which is fulfilling, and can come
no whither, should move towards us.

Donne here refers to the heliocentric universe where God is likened with the sun sitting at the centre with the earth moving round the sun. Goodyer is likened with the great circle through which the earth rotates annually round the sun. On the other hand, Donne himself is the ‘wheel’ or the axis on the circumference of the greater orbit. Both of them are moving towards one common center, the sun.

Again, Donne sets a psychological counterpart of the cosmological fact. The idea that man, being at the center, constantly enjoying the support and care of the heaven, no longer persists. With the shift of the physical position of the earth the religious point of view is susceptible to change. As a result, the old security and the sense of man’s importance have been evaporated. Donne in a sermon at “Paul’s Cross” in 1622 reveals that the new astronomy has “reduced and brought [man] back to God.”^{iv} But the reduction has not been used in the negative sense of the term. It refers to the potentials of the man which so far have not been discovered. Under the spell of heaven man could not recognize his own dignity and true identity. Donne further shows that in the new found universe just as earth moves round the sun to get light and life, similarly man also in the new spiritual world moves towards God in order to fulfill the “two-fold order”. Donne describes it in this way that not only “all creatures depend vpon *God*, as vpon their beginning, for their very *Being*,” but also, man is “to be reduced and brought back to *God*, as to his end.”^v

It is not clear whether Donne has read Robert Recordes *The Castle of Knowledge* where the writer shows that the followers of Pythagoras namely Heraclides, Ecphantus, Philolaus, Nicias (Hikitas) talked about the movement of the earth. Gilbert reiterated the names in his book *De Magnete*. In Kepler’s *De Stella Nova* appears the same names, but he mentions only Aristarchus as the precursor of Copernicus. Donne himself was familiar with all these old astronomers since his Ignatius in *Ignatius His Conclave* mentions their names. Donne takes the opportunity of describing the recent history through Ignatius where Ignatius is found to rebuke Copernicus:

“.....neither do you agree so wel amongst your selves, as that you can be said to have made a *Sect*, since, as you have perverted and changed the order and Scheme of others: so Tycho Brahe hath done by yours, and others by his.”^{vi}

Tycho Brahe, the friend of Kepler, was another astronomer who has influenced Donne. Tycho came shortly after Copernicus. But he could not accept all the arguments put forward by Copernicus. He opposes the evidence of Copernicus that the earth has three motions showing that earth is too heavy and clumsy to move. He formulated a system of eccentric orbits which was the combination of the five planets around the sun and the sun around the earth. It was also suggested by Apollonius. That is why Apollonius is considered to be the Tycho Brahe of the antiquity.

Nevertheless, the heliocentric view of Copernicus makes Donne to assume that God's essence is the center of the great orbit of man's experience. So God occupies the position of the sun at the center of the physical universe. The identification of the sun with God is analogous to Neoplatonic metaphysics. Kepler whole-heartedly supported the Copernican view of the sun occupying the position of dignity and exaltation. Kepler very confidently asserts that the sun is the most excellent "of all the bodies of the universe," that body "which alone we should judge worthy of the Most High God, should He be pleased with a material domicile and choose a place to dwell with the most blessed angels."^{vii} Donne is believed to have the clear idea of this view of Kepler.

It is true that Donne could not stick to one single theory - he constantly shifted from one theory to another. He remained under the spell of confusion as what to adopt. His poems, especially the *Anniversaries* are the perfect illustrations of his vacillating mind. He put forward his views for and against the doctrine of Copernicus. Moreover, as we have already discussed, he also read the works of Kepler, Galileo, Clavius and Gilbert who took the new philosophy much further. So the motion of the earth that Copernicus earnestly argued in *De Revolutionibus* is not the only thing that attracts the attention of Donne. Donne came across a lot of other ideas which enriched his horizon. In 1609 when Kepler published his greatest work, *De Motibus Stellae Martis*, another new fact was demonstrated that the planets move round the sun, not in circles, but in ellipses. On top of that, he formulates the law that regulates the elliptical motion. So Kepler corrected Copernicus's circular motion of the planets. The loss of the spherical, circular nature of the universe, according to Donne's *The First Anniversary*, is the outcome of sin. A sense of decay prevails throughout the poem. Under the veil of the death of Elizabeth Drury, Donne laments the decay of this world. The vanity and corruption of man are solely responsible for destroying the circular nature, which is considered to be the sign of immutable perfection:

We thinke the heavens enjoy their Sphericall,
Their round proportion embracing all.
But yet their various and perplexed course,
Observ'd in divers ages, doth enforce
Men to find out so many eccentric parts,
Such divers down-right lines, such overthwarts,
^{viii} As disproportion that pure forme:

"One of the most convenient Hieroglyphicks of God, is a Circle, and a Circle is endless,"^{ix} This is what Donne was preaching at St. Pauls. The figure of circle and the concept of circular motion had long been treated as divine by Nicholas of Cusa in Christian mysticism. But Donne shows that this particular circle becomes a symbol of man's sinful career at other place; Circles are but "poor types of God."^x

Geometrical figure attracts Donne's imagination more than anything else. Donne tries to apply them frequently in the description of the movements of heavenly bodies. Nowhere have we found a better illustration of the fascination of Donne towards astronomy as in the book of C.M. Coffin where he shows that Donne takes the opportunity of indicating 'the positions of the stars, the wheels and eccentrics on which the planets run their courses, and the great circles of the tropics, of the zodiac and of latitude and longitude'.^{xi}

Donne's real tension lies in bridging the gap between natural philosophy and theology. Uncertainty looms large in the distant. Donne tries to console his troubled mind by utterances like:

... On a huge hill,
Cragged, and steep, Truth stands, and hee that will
Reach her, about must, and about must goe.^{xii}

Donne could never triumph over his restlessness and face the frowning of the new philosophy with the tranquility of mind like Milton:

To ask or search I blame thee not, for Heav'n
Is as the Book of God before thee set,
Wherein to read his wondrous Works, and learne
His Seasons, Hours, or Days, or Months, or Yeares:^{xiii}

In Milton the shifting of faith is not traceable. Rather he is confident in his belief of the order that the Elizabethan world has adored. Accordingly, he finds it of no importance to argue over the design of God which he believes should remain as a mystery for mankind.

This to attain, whether Heav'n move or Earth,
Imports not, if thou reck'n right, the rest
From Man or Angel the great Architect
Did wisely to conceal, and not divulge
His secrets to be scann'd by them who ought
Rather admire; or if they list to try
Conjecture, he his Fabric of the Heav'ns
Hath left to thir disputes, perhaps to move
His laughter at thir quaint Opinions wide
Hereafter, when they come to model Heav'n
And calculate the Starrs, how they will weild
The mighty frame, how build, unbuild, contrive
To save appearances, how gird the Sphear
With Centric and Eccentric scribl'd o're,
Cycle and Epicycle, Orb in Orb.^{xiv}

It amply demonstrates that Milton is aware of the recent discovery of astronomy. 'Star', 'sphere', 'centric', 'eccentric', 'cycle', 'epicycle', 'orbit'-all these images substantiate this idea.

Sollicit not thy thoughts with matters hid,
Leave them to God above, him serve and feare;^{xv}

Milton is echoing the traditional Elizabethan theology and urges the fellow mankind not to meddle with the activities of God.

... Heav'n is for thee too high
To know what passes there; be lowlie wise:
Think only what concerns thee and thy being;

Dream not of other Worlds, what Creatures there
 Live, in what state, condition or degree,
 Contented that thus farr hath been reveal'd
 Not of Earth onely but of highest Heav'n.^{xvi}

This confidence of faith in Milton between New Philosophy and theology is lacking in Donne. Galileo was a great inspiration for Donne. Copernicus made Donne inquisitive about the mysteries of the world, but Galileo took him to the ultimate solution. Galileo was the first scientist to make the experimental method popular. He taught to his students at the University of Padua that nothing in this world stands still. Every thing has its motion. This is contrary to the theory of Aristotle. He further showed the authenticity of the Pythagorean notion that the earth moves and this is not the center of the universe, rather one of the planets of one of the stars. Galileo invented the telescope and 'gave the loving name of "Old discoverer".'^{xvii} With this telescope Galileo proved that Copernicus was right as he announced in 1543 that the earth rotates daily on its axis and the planets move round the sun. In 1632 Galileo published his *Dialogues Concerning the Two Principle Systems*-the Ptolemaic versus the Copernican. The book was banned and Galileo was punished and was forced to "confess" that the Copernican theory was a gross falsehood. But no pressure could stop him from publishing the next book *Dialogues Concerning Two New Sciences*. Galileo had strong faith in science. He believed that God is revealed through this natural science. The advancement of science as declared by Galileo will never stop. The discovery of moon is referred to in *The Second Anniversary* by Donne and so its extension, or spatiality. Here Donne is talking about the flight of the Elizabeth Drury's soul to heaven:

... she stayes not in the ayre,
 To looke what Meteors there themselves prepare;
 She carries no desire to know, nor sense,
 Whether th' ayres middle region be intense;
 For th' Element of Fire, she doth not know,
 Whether she past by such a place or no;
 She baits not at the Moon, nor cares to trie
 Whether in that new world, men live and die.^{xviii}

Donne here shows us how an innocent girl successfully incorporates in her own nature the qualities that can preserve the natural creation. Her death eventually stands against the general lapse toward chaos: "Be more than man, or thou art less than an ant" (*The First Anniversary*). Such poems as the two *Anniversaries* and *To the Countess of Salisbury* record a speedy decline of our nature and condition in a cosmos that is itself disintegrating. In *The First Anniversary* the poet declares,

Mankind decays so soon,
 We're scarce our fathers' shadows cast at noon.^{xix}

A fine notion of unambiguous intellectual despair is evident in the following lines of *The*

First Anniversary:

And new Philosophy calls all in doubt,
 The Element of fire is quite put out;
 The Sunne is lost, and th' earth, and no mans wit
 Can well direct him, where to look for it
 And freely men confesse, that this world's spent,
 When in the Planets, and the Firmament
 They seek so many new; they see that this
 Is crumbled out againe to his Atomis.
 't is all in pieces, all cohaerence gone.
 All just supply, and all Relation.^{xx}

The above lines are perfect evidence of the strong influence of scientific rationalism on the medieval world picture and the consequent unsettling of the Renaissance mind. “Donne,” according to Douglas Bush, “is wandering between two worlds, that of cosmic unity and that of meaningless disorder and decay, and he cannot resolve the conflict.”^{xxi}

When Donne was struggling to get a patron who would help him to some state employment he came into contact with Sir Robert Drury (1575-1615), and when Drury’s daughter died in 1610, Donne took the advantage of the occasion to write a funeral poem on her, published in 1611. *The First Anniversary* illustrates the anatomy of the world as well as the anatomy of the self while *The Second Anniversary* proposes a countering force to resist the world’s rush toward its own ruin.

The death of Elizabeth Drury has shown us how to resist the corrupting force of the world. Elizabeth Drury’s departure from the world left us dying but also better aware of our true state, as depicted in *The First Anniversary*:

This world, in that great earthquake languished,	For in a common bath of tears
it bled,	Which drew the strongest vital
spirits out	But succoured them with a
perplexed doubt,	Whether the world did lose, or
gain in this, ^{xxii}	

When Galileo’s theory was established Donne attached himself with the new philosophy more strongly than ever before. His reference to the “Moon” and a “new world” reminds us of his adherence to this new discovery. Here the cosmic journey is not what Donne’s aspiration is. Rather he looks for the communion with God by creating a relation between one and many through the use of the words “heaven” and “earth”. This poem, no doubt, lays bare the sincere religious feeling of Donne against a background of the new philosophy. Nevertheless, Donne’s mind is always preoccupied by the new philosophy. Even when he wrote the satire *Ignatius his*

Conclave ventilating his grievance against the Jesuits, he had in mind the brewing of the new astronomy.

Finally, from the above discussion we can come to a conclusion that we cannot associate Donne with any stipulated norms or school of thought. The cross-current ideas and thoughts bewildered Donne at times. The dichotomy sometimes tore him apart as to cling to which particular belief. Moreover, Donne's vast reading and the frowning of the divinity came in the way of his final resolution. He could neither be Galileo shrugging off the dictum of the theology and the authority of the old philosophy, nor be Clavius, leaving no stone unturned to prove the futility of the new astronomy. He strongly relied on human experience, never letting any of this experience to go beyond the skepticism. Disbelief with Donne is not something which should be condemned; rather it allowed him to move forward allowing him to unravel the mysteries of life. T. S. Eliot is absolutely right when he says in *The Metaphysical Poets*: "A thought to Donne was an experience; it modified his sensibility. When a poet's mind is perfectly equipped for its work, it is constantly amalgamating disparate experience;"^{xxiii}

Copernicus was a major source of inspiration for Donne. The rise of Copernican theory is important in the study of Donne's philosophy, because it is the most important turning point which gives way to the empirical science. Man could now realize his huge potentialities which ushered in the concept of humanism. It fortified the relation between man and God because man is fallible but God is perfect and absolute.

Donne lived in an age of skepticism as Thomas Docherty puts it in this way that "Donne, like Montaigne, produced texts which are radically unstable, open to change, critically skeptical: fundamentally historical."^{xxiv} Change is thus the very condition of the revolutionary status of Donne's poetry. So, 'Good-Morrow' itself is a revolution - the waking from a kind of dream or illusion to the new historical eventuality. There is a sense of discovery - the two lovers have found together what real love is, and the poet suggests that only true love will survive in a world dominated by change. Donne's poem transcends from mere personal feelings to a greater universality. So both 'The Sunne Rising' and The Good-morrow' are the poet's earnest invitation to create a beautiful tomorrow. Donne's poem, on the other hand, is the clear projection of his inner conflict with history. It incorporates the revolutionary seeds, as Docherty shows, of the post-Copernican philosophy. Docherty's analysis of the submission of Donne to history is very interesting. The text can not be recreated. Re-reading of the text will be the deviation or the 'eccentricity', 'displacement' of the model. So the text is a model which constantly demands changes or deviation for fixing a new historical truth.

Reference

- Bloom, Harold (1973). *Anxiety of Influence*, Oxford: Oxford University Press.
- Blumenberg, Hans (1983). *The Legitimacy of the Modern Age* (1966). (trans. Robert M. Wallace), Cambridge, Mass.: MIT Press.
- Burke, Kenneth (1941). *Philosophy of Literary Form*, Berkeley and Los Angeles: University of California Press.
- Carey, John (1981). *John Donne: Life, Mind and Art*. London: Faber and Faber Limited.
- Coffin, C.M. (1958). *John Donne and the New Philosophy*. New York: The Humanities Press.
- Copernicus, Nicholas (1976). *On the Revolutions of the Heavenly Spheres* (trans. A.M. Duncan) Newton Abbot, David and Charles.
- Docherty, Thomas (1986). *John Donne, Undone*. London and New York: Methuen.
- Donne, John (1952). *The Divine Poems*. Ed. Helen Gardner. Oxford.
- Donne, John (1965). *The Elegies and the Songs and Sonnets*. Ed. Helen Gardner. Oxford.
- Donne, John (1978). *The Epithalamions, Anniversaries and Epicedes*. Ed. W.Milgate. Oxford.
- Donne, John (1952). *Essays in Divinity*. Ed. Evelyn M. Simpson. Oxford.
- Donne, John (1912). *The Poems of John Donne*. Ed. H.J.C. Grierson, 2 vols. Oxford.
- Donne, John (1969). Ignatius His Conclave. T.S. Healy, S.J. Oxford.
- Eliot, T.S. (1962). 'The Metaphysical Poets', *English Critical texts*, Ed. D.J. Enright & Ernst De Chickera. London: Oxford University Press.
- Fantoli, Annibale (2003). *Galileo—For Copernicanism and the Church*, 3rd English edition, tr. George V. Coyne, SJ. Vatican Observatory Publications, Notre Dame.
- Gadamer, Hans-Georg (1980). *Dialogue and Dialectic* (trans. P. Christopher Smith). New Haven, Conn.: Yale University Press.
- Heath, T.L. (1981). *Aristarchus of Samos, the Ancient Copernicus: a History of Greek Astronomy to Aristarchus*, Oxford, Clarendon; (1913). reprinted New York, Dover.
- Heilbron, J. L. (1999). *The Sun in the Church: Cathedrals as Solar Observatories*. Cambridge, MA.: Harvard University Press.
- Hoyle, Sir Fred (1973). *Nicolaus Copernicus*, London: Heinemann Educational Books Ltd.
- Howell, Wilbur Samuel (1956). *Logic and Rhetoric in England, 1500-1700*. New Jersey: Princeton University Press.
- <http://www.en.wikipedia.org/wiki/heliocentrism>,
- <http://www.muslimheritage.com>
- <http://www.1001inventions>.
- Johnson, Barbara (1980). *The Critical Difference*, Baltimore: John Hopkins University Press.
- Joseph, George G. (2000). *The Crest of the Peacock: Non-European Roots of Mathematics*, 2nd edition. Penguin Books, London.
- Selin, Helaine (2000). *Astronomy Across Cultures: The History of Non-Western Astronomy* (303-340). Kluwer, Boston.
- Kermode, Frank (1979). *The Genesis of Secrecy*. Mass. Harvard University press.
- Koestler, Arthur (1959). *The Sleepwalkers: a history of man's changing vision of the universe*. Hutchinson, London.
- Mahood, M. M. (1950). *Poetry and Humanism*. London: Jonathan Cape.

- Mehlman, Jeffrey(1977). *Revolution and Repetition*. Berkeley and Los Angeles: University of California Press.
- Peattie, Donald Culross. ‘Bold Discoverer’, *Great Lives Great Deeds*. London: The Reader’s Digest Association Limited. p.84
- Stimson, Dorothy (1917). *The Gradual Acceptance of the Copernican theory of the Universe*. New York: Baker and Taylor.
- Teresi, Dick (2002). *Lost Discoveries: The Ancient Roots of Modern Science - from the Babylonians to the Maya*. New York: Simon & Schuster.
- Thurston, Hugh (1994). *Early Astronomy*. New York: Springer-Verlag.
- Tillyard, E.M.W. (1960). *The Elizabethan World Picture*. London: Chatto & Windus

Endnotes

-
- i Du Bartas, *His Divine Weekes and Workes*, trans. Joshua Sylvester (1605), Week 1 Day 4, lines 155-9, 182-3.
- ii John Donne, *Poems of John Donne*. vol II.E. K. Chambers, ed. London: Lawrence & Bullen, 1896. 37-40
- iii Edmund Gosse, *The Life and Letters of John Donne*, I, pp 218-20
- iv John Donne, *A Sermon vpon the xv. Verse of the xx. Chapter of the Booke of Ivdges* (London, 1622), p. 44.
- v John Donne, *A Sermon vpon the xv. Verse of the xx. Chapter of the Booke of Ivdges*, (London 1622) p. 44
- vi John Donne, *Ignatius his Conclave*, p. 366.
- vii Johannes Kepler, *Joannis Kepleri Astronomi Opera Omnia*, ed., Dr. Christian Frisch, VIII, 267
- viii John Donne, *The first Anniversary*, Arthur L. Clements 251-257, (New York; W. W. Norton & Company 1992
- ix John Donne, *LXXX Sermons*, 2, fol.13
- x John Donne, *To the Countesse of Bedford*, Grierson, I, 220, I. 46.
- xi C.M. Coffin, *John Donne and the New Philosophy*, (New York, 1937) p.179.
- xii John Donne, *Satyre III*, Grierson, I, 157, II. 79-81.
- xiii John Milton, *Paradise Lost*, VIII,II.66-69
- xiv John Donne, *Paradise Lost*, VIII, II. 70-84
- xv John Donne, *Paradise Lost*, VIII, II. 167-168
- xvi John Donne, *Paradise Lost*, VIII, II. 172-78
- xvii Donald Culross Peattie, ‘Bold Discoverer’, Great Lives Great Deeds, The Reader’s Digest Association limited, London. p.84
- xviii John Donne, *The Second Anniversary*, 189-196
- xix John Donne. *An Anatomy of the World: The First Anniversary*, 143-144
- xx John Donne. *An Anatomy of the World: The First Anniversary*, 205-214
- xxi Douglas Bush, English Literature in the Earlier Seventeenth Century, 1600-1660 (Oxford, 1945), p.132
- xxii John Donne, *An Anatomy of the World: The First Anniversary*, 11-15
- xxiii T.S. Eliot, ‘*The Metaphysical Poets*’, English Critical Texts, ed. D.J. Enright and Ernst De Chickera, Oxford University Press, London, 1962.
- xxiv Thomas Docherty, ‘Displacement and Eccentricity’ *John Donne, Undone*, p.47