

The Centre of the Universe in Dante's Cosmology:

*Inferno* XXXIV, 76 and *Paradiso* XXVIII, 41.

**Abstract:**

Within the broader context of a discussion of visual images of Dante's Cosmology, an explanation is offered for Dante's selection of Lucifer's thigh (*Inferno* XXXIV, 76) as the central point of the earth and hence of the spherical, geocentric universe. This is considered in relation to the 'Point' which is the centre of the Empyrean (*Paradiso* XXVIII, 41).

The flat-earth view of the universe which was based on Biblical cosmology and reinforced by the writings of the Church Fathers<sup>1</sup> had come into question some time before Dante wrote the *Divina Commedia* in the early fourteenth century. The revival of the ancient idea of the spherical earth and the spherical universe had received increasing attention as early as the tenth century,<sup>2</sup> and the medieval view of the universe became characterized by adherence to the Aristotelian system in which the spherical earth was perceived as surrounded by 'nested' concentric Heavenly spheres bearing the stars and planets.<sup>3</sup> As is well known, Dante's universe, as expressed in the *Divina Commedia*, followed this general system and it is perhaps the detailed structure of the universe conveyed in the *Divina Commedia* itself which demonstrates most clearly the waning of the flat-earth theory and the gradual acceptance, amongst the educated classes, of the concept of the spherical earth within the spherical universe.<sup>4</sup> Apart from the *Divina Commedia*, in the *De Aqua et Terra*, Dante also clearly stated that the earth was the centre of the universe in the spherical system 'as we all know,' and of course he recognized the existence of the previously much debated antipodes where he located Purgatory.<sup>5</sup> In the *Convivio* Dante even considered the ancient idea of a moving earth, although he tended to reject it at this point.<sup>6</sup> Here, he commented on his reading of Plato's major work on cosmology, the *Timaeus*. Dante clearly understood Plato's universe as having a central earth which, however, rotated on its axis. He comments:

Plato adopted another opinion, and wrote, in a book of his which is called *Timaeus*, that the earth, with the sea, was really the centre of the whole, but that its whole globe turned round on its centre, following the primal movement of heaven, but very slowly, because of its gross material, and because of its extreme distance from that primal movement.<sup>7</sup>

Dante then follows Aristotle, his 'glorious philosopher,' in refuting these opinions as false. Aristotle, he says, has conclusively shown 'that the earth is fixed and revolves not, and that it, together with the ocean, is the centre of the heaven.'<sup>8</sup> Thus, although accepting the ancient ideas on sphericity, the idea of the earth's motion was ruled out.

In spite of the gradual acceptance of the idea of a spherical earth in a spherical universe during the later middle ages, the flat-earth concept did not, as Koestler demonstrates, altogether die out. Along with its associated Biblical notions of ascent to Heaven and descent to Hell, the idea of a flat earth did continue as a popular concept amongst the masses, alongside the growing realization that the earth resembled a globe.<sup>9</sup> The idea that the universe still possessed a 'top' and 'bottom' even in the spherical geocentric system is also alluded to in numerous places in Dante's *Divina Commedia*.<sup>10</sup> This seems to relate to the Scriptural concept as well bearing reference to the Aristotelian system of motion whereby heavy bodies like souls weighed down by sin move in a straight line towards the centre of the universe (that is, the centre of the earth); pure light bodies tend to move upward to the Heavens; and the heavenly bodies themselves were the only ones to move not in a straight line but in perfect, circular eternal motion.<sup>11</sup>

In addition to these concepts, it is also important to remember that by the time of Dante there was an extremely long tradition of symbolism of the circle and circular motion. This ancient tradition had been continually reinforced by the writings of the Church Fathers, especially St Augustine. In his *On the Magnitude of the Soul*, Augustine examines the symbolism of geometrical shapes, especially the circle (chapters 7–12). It is the perfect means of enclosing a space with one line (chapter 8) and is to be regarded as perfect, having 'no angle to break its equality'

(chapter 11). Since equal lines can be drawn to every part of the boundary from the one central point, then the 'most excellent of all' is the central point itself of the circle. 'Reason,' writes Augustine, 'has shown that the circle because of its equality surpasses all other plane figures.... what else is the regulator of this symmetry than the point placed in the centre? Much can be said of the function of the point...'<sup>12</sup> The continuation of this tradition beyond Augustine has been examined in particular by Poulet, who also comments on the famous definition of God as a sphere of which the centre is everywhere and the circumference nowhere, which first occurs in a twelfth-century collection of Hermetic writings.<sup>13</sup> In the *Vita Nuova* XII, the God of love appears to Dante, saying 'I am the centre of a circle to which all points of the circumference are equidistant,' which clearly echoes similar sentiment.<sup>14</sup> Thus the idea of the symbolism of the circle, together with the immense significance of its central generating point, where all 'rays' converge, seems to have been well established by the time of Dante.

Dante's detailed spherical system of the universe has been illustrated by many commentators, from almost contemporary accounts up to the present day. Hell is divided into nine distinct zones, descending in a cone like formation into the centre of the earth. Size, shape and exact location are specified in a detailed layout of the physical structure. Similarly, the corresponding 'Heavenly' zones are also presented in detail. Yet the combination of the idea of the spherical earth in the spherical universe with the theological notion of ascent to Heaven and descent to Hell was to result in a major conceptual problem. When the earth is viewed as a globe in the centre of the universe, and Hell is still located beneath the earth's surface, then the resultant spherical universe would necessarily be 'haidocentric' with Hell assuming the all important 'point,' in position at the centre of the concentric spheres of the universe.

The 'haidocentric' nature of Early Renaissance cosmology, which resulted from the juxtaposition of the flat-earth 'Up for Heaven and Down for Hell' with the known sphericity of the earth, has been discussed particularly by Lovejoy in *The Great Chain of Being*. Lovejoy commented on the way in which the centre of the

world was less a position of honour in the medieval mind, than the 'bottom of creation,' the farthest removed from the Empyrean. The precise centre of the system was Hell and 'in the spatial sense the medieval world was literally diabolocentric.'<sup>15</sup> Koestler takes up Lovejoy's discussion on 'the Great Chain of Being,' showing how the Chain of existence runs, especially in Dante's cosmology, from God's throne in the Heavens down through the various circles of Hell to the very centre of the earth. The hierarchies of devils, duplicating the heavenly hierarchies, extend downwards to Lucifer in Hell. Occupying the apex of the cone in the precise centre of the earth, this marked 'the bitter end of the chain.'<sup>16</sup> The centre of the spherical universe is occupied by Hell.

This system seems to concur with the medieval idea of the universe as 'a golden apple with a rotten core,' and especially when Hell becomes the precise centre, as in Dante's system. As Boyde puts it, Lucifer in Hell is fixed in the centre of the earth, 'like a worm in the core of an apple.'<sup>17</sup> Visual material which reflects the geocentric view of the universe in the Later Middle Ages and the Early Renaissance is discussed by Heniger,<sup>18</sup> but the exact placement of Hell itself appears to be studiously avoided in such diagrams. Images frequently omit the problem of the position of Hell by simply going as far as placing the earth at the centre of the concentric spheres without locating Hell itself (fig. 1). Early diagrams, like the so-called T and O maps, often give Jerusalem the central position on the earth's surface, according to Ezekiel 5:5, 'Thus saith the Lord God; This is Jerusalem: I have set it in the midst of nations and countries that are round about her' (see fig. 2).<sup>19</sup>

In the medieval system, the spherical universe had thus become less 'geocentric' than 'haidocentric', but Dante's system in the *Divina Commedia* goes one step further, since it is more precisely, 'diabolocentric.' That is, not just Hell, but the devil himself sits at the very central point. In Dante's *Inferno*, the conic cavity of Hell extends by degrees through the nine different circles until Lucifer himself is found occupying the precise centre of the earth, 'That is the deepest and the darkest place,/ the farthest from the heaven that girds all,' (*Inferno* IX, 28)<sup>20</sup>

and the bitter end of the hierarchical 'Chain of Being' – at the directly opposing location to God in the Empyrean, the metaphysical and symbolic antithesis. In the final lines of *Inferno*, Dante's cosmology and his view of the composition of the universe is thus clarified. Lucifer himself is placed in the deepest point of Hell in the very centre of the earth, the three mouths of his three-faced figure holding the three worst sinners: Brutus and Cassius, betrayers of the empire and earthly monarchy, and Judas, betrayer of the spiritual saviour (*Inferno* XXIV, 38–67). Early manuscripts of Dante's *Divina Commedia* amply demonstrate this (fig. 3).<sup>21</sup>

The centre of the earth, and hence the sphere of the universe surrounding it is thus depicted as Lucifer himself, but Dante then pins down the central point of the universe even more specifically. Dante and Virgil, his guide, continue their descent down Lucifer's body until they reach 'the point at which the thigh/revolves, just at the swelling of the hip' (*Inferno* XXXIV, 76–77).<sup>22</sup> At this point they become 'reversed' as, now climbing upwards, they begin to make their way out towards Purgatory, which is situated in the southern hemisphere, also demonstrated by early visual interpretations (as in fig. 4, fourteenth-century) as well as in Botticelli's drawing of the theme (fig. 5, late fifteenth-century).<sup>23</sup> The precise point chosen by Dante for the very centre of the universe is thus the 'middle' of Satan's body, as in Botticelli's drawing (fig. 5) where the centre of Satan's body is placed in a circle with the figures of Dante and Virgil shown in ascent and descent. The even more specific reading of the central point chosen by Dante of Satan's thigh ('coscia') is also confirmed by visual material in an early manuscript of the *Divina Commedia*. In the fifteenth-century version in the Biblioteca Nazionale, Florence, the point on Satan's thigh has clearly been used by the artist as the central point of construction by means of the point of the pair of compasses in the drawing of the circle of the universe (fig. 6). But, in spite of its importance as the central point of the geocentric universe, it seems strange that no explanation for Dante's choice of Lucifer's thigh seems to have been put forward. While most commentaries tend to overlook the significant detail and comment only on the use of the word 'coscia',<sup>24</sup> it seems reasonable to assume that Dante's selection of this point of the 'thigh' for the centre

of the spherical universe must have deep underlying significance.

It might, of course, be possible to argue at this point that the word 'coscia' really refers to the 'loins' or even the genitalia of Lucifer, the 'thigh' being the nearest exterior point anatomically where Dante and Virgil could climb. This thinking might relate to a general mood in *Inferno* that there is something derisive and humiliating about the whole representation of Satan. However, this does not seem to be the case since this meaning does not really concur with either the contemporary or modern usage of the term 'coscia.' Dante is very specific in his choice of words, 'at the point at which the thigh revolves, just at the swelling of the hip,' which cannot be read as the genitalia. Also, the interpretation of 'coscia' as 'thigh' seems clear in contemporary visual images (such as fig. 6).

Conscious of the problems attached to the haidocentric nature of the spherical system and in order to avoid, it seems, the dependence of the entire universe on such an infamous 'point' as Lucifer, Dante introduces, in *Paradiso* XXI, his famous concept of the idea of a specific 'Point of Light' in the Empyrean around which the Heavens revolve (independently of the geocentric system) in perfect, eternal circular motion. Just as the circle is dependent upon the 'point' which generates it – a notion emphasized, as mentioned, by Augustine<sup>25</sup> – so 'On Yonder Point depend the Heavens and the whole of nature,' (*Paradiso* XXVIII, 41).<sup>26</sup> This point, a point of light symbolising <sup>the</sup> Godhead, is even interpreted as the sun by Botticelli in his drawings for *Paradiso* (fig 7), owing, it seems to the traditional Sun–Deity analogy which is also emphasized throughout *Paradiso* by Dante.<sup>27</sup> In view of Dante's introduction of this central 'Point of light' in the Heavens and his emphasis on it as the central pivot of the celestial realms, what, may we ask, could be the reason for his selection of Satan's thigh as the central point of Hell and the terrestrial regions – in fact of the geocentric system?

In his analysis of Dante's innermost circle, and indeed of the *Divina Commedia* in general, Singleton emphasizes the importance of opposites and contrasts between Dante's descriptions of Heaven and Hell, God and Lucifer. As part of the major theme of contrast between Good and Evil, Heaven and Hell, the

figure of Lucifer in Hell is presented as the antithesis or antitype of the Christian God.<sup>28</sup> Dante's Satan is presented as an allegory, 'the image of sin, the principle of evil, the negative counterpart of God, who is the principle of good. As the Godhead comprises three persons...so Lucifer is pictured three-faced.'<sup>29</sup> According to Singleton, the three aspects which in the Trinity represent Power, Wisdom and Love here represent Hate, Ignorance and Impotence; the six wings of Lucifer correspond to the 'beasts' at God's throne in Revelations 4:8 and so on.<sup>30</sup> Mandelbaum also states that Satan's three faces are a 'grotesque counterversion of the three persons of the Trinity.'<sup>31</sup> And Boyde also comments on Lucifer as 'a terrible parody' of the Trinity. The terrible wings seem to contrast with the angels; the wind produced creates a parody of the Holy Spirit. 'Everything is charged with negative symbolism,' he writes,<sup>32</sup> so it does seem highly possible that, just as the terrestrial sphere counterbalances the celestial, the negative counterpart of Lucifer's thigh might be that of Christ Himself. The choice of Satan's thigh is thus utilized as the obvious antithesis of Christ's thigh.

It is well known that Dante made extensive use of Revelations as a source,<sup>33</sup> and here we find a unique reference to the thigh of Christ. According to Revelations 19:16, Christ's thigh is the ultimate symbol of His role as both spiritual and temporal ruler of the entire universe. At the moment of Judgment, Christ the Rider on the White Horse appears and 'he hath on his vesture and on his thigh a name written, KING OF KINGS AND LORD OF LORDS.'<sup>34</sup> According to most commentators, Christ's thigh is chosen in Revelations 19 as the place to bear the all-important inscription, because of its associations with truth and power. In the scriptures, the thigh was a symbol of truth used in the swearing of an oath<sup>35</sup> as well as a symbol of strength as the place which customarily bore the sword, as in: 'gird thy sword on thy thigh O most mighty.'<sup>36</sup> As a warrior goes into battle with his sword on his thigh, so Christ's 'weapon' is His spoken word and in this way the thigh epitomizes the Godhead.<sup>37</sup> So, according to Dante, while the 'King of Kings' (in *Paradiso* XXVIII) is the centre of the celestial regions or spiritual universe, Lucifer's thigh is the centre of the earthly or physical universe. While Christ's thigh

symbolizes all that is good in the universe, the devil's thigh is the final antithesis of this – the absolute nadir.

The above explanation of Dante's selection of Lucifer's thigh (*Inferno* XXXIV, 76) as the significant antithesis to Christ in His role as King, might cause one to expect or look for some reference to its opposing notion – to Christ's thigh or to the notion of his temporal and spiritual Kingship (Revelations 19:16) – in the final sections of *Paradiso*. If as seems possible, Lucifer's thigh is chosen as the central point of the terrestrial regions because it is the antithesis of Christ as King, then one might suppose an association between the latter and the 'point in the Empyrean' as the centre of the celestial universe. This must remain a topic for further research and discussion but a possible explanation or answer might be proposed with reference to Dante's well known use of symbolic numerology.

Since reference to Christ's thigh, or His role of Kingship is not at once evident in the last cantos of *Paradiso*, and being aware of Dante's fascination with numerology and its importance in the *Divina Commedia*, a cryptic reference may be argued. It is also well known that numerology plays a very major role in the book of Revelations itself, from the Seven Stars and Candlesticks in chapter 1, to the numbers of elders and beasts (chapter 4), the Seven Seals (chapters 5–8), and the numbers of angels, years and so on.<sup>38</sup>

Some skepticism has been expressed concerning numerological interpretations of medieval and Renaissance texts. Gilson comments on the symbolic value of numbers, while warning of the dangers of taking any number and 'making it signify what one wishes.' He applies these principles himself to the *Divina Commedia* and the *Vita Nuova*, examining 'the bemusing influence of numbers.'<sup>39</sup> Umberto Eco, in *Foucault's Pendulum*, also tends to poke fun at the system whereby numerology is taken to extremes, where 'with numbers you can do anything you like.' But the idea that 'the universe is a great symphony of numerical correspondences,' where 'numbers and their symbolisms provide a path to special knowledge,' is also expressed.<sup>40</sup> The origins of medieval and Renaissance numerology in the writings of



the ancient Greek Pythagoreans is demonstrated by Guthrie, and in particular the symbolism attached to numbers which by continuously adding the integers produce the number one, which is the Divine symbol of God.<sup>41</sup> Numerology, when not distorted to extremes, thus appears to be a reasonable and acceptable procedure to many authors.<sup>42</sup>

From *Paradiso* XXX, Dante's view of the Empyrean is gradually directed towards his conception of Christ, the Son of God. Dante's final revelation of understanding is preceded, in the very last lines of the *Paradiso*, by a reference to the ancient geometrical problem of how to square the circle (*Paradiso* XXXIII, 133–141) which appears somewhat incongruous. The sudden, unexpected mathematical reference may be explained as a symbol for the ultimate insoluble problem but has also been read as a reference to the interlinking of the human and divine, where the square symbolizes the earthly – the circle the perfection of the Divine. These two aspects of the Godhead are, of course, combined in the person of Christ Himself. And the concept of Christ as ruler or Lord in both Earthly and Heavenly realms is exactly that which is epitomized by the phrase 'King of Kings and Lord of Lords.' Applying the principles of Dantean-type numerology, these concepts may be traced in the proposed Biblical reference (Revelations 19:16) since '16' is an obvious 'square' and 19 may be read as 1+9 equalling 10, then  $1 + 0 = 1$  which is the universal symbol for perfection or Godhead.

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#### Dante and Michelangelo

Dante's great importance lies not only in his own achievement but also in the enormous influence which he exerted on subsequent writers. Not least of the many figures who were subsequently influenced by Dante was the artist Michelangelo, who was renowned as a Dante scholar by his contemporaries.<sup>43</sup> Dantean influence has often been claimed on specific works by Michelangelo, and in particular in his fresco of the *Last Judgment* in the Sistine chapel (painted 1536–1541). Here, the figures of Charon and Minos are included and specifically depicted according to Dante's descriptions in *Inferno* III and V.<sup>44</sup> Recently, an even greater influence of the

*Divina Commedia* on Michelangelo's *Last Judgment* has been claimed in the form of a relationship between the depiction of the beardless Apollonian Christ in the centre of a circular 'cosmological' format and sources for Sun—symbolism and Cosmology in Dante's *Paradiso*.<sup>45</sup> Sources for the theme of Sun—symbolism and Cosmology in Michelangelo's *Last Judgment* have been traced to scriptural sources, literary sources and philosophical sources in the writings of the Florentine Neoplatonists. A case has even been made for the direct influence of the scientific theory of heliocentricity as put forward by Nicholas Copernicus, since Christ appears to be depicted like the Sun in the centre of the circular universe.<sup>46</sup>

More importantly for the present discussion on Dante's use of Lucifer's thigh and the light symbolising Godhead, as the central points of respectively the terrestrial and celestial universe, is the observation that Michelangelo used a *single* central point in the construction of his fresco. It has been demonstrated that, just as visual images of Dante's cosmology actually utilized Lucifer's thigh and the Sun—Deity or Point of light in their construction (respectively figs. 6 and 7), so Michelangelo also seems to have used a particular central point in the construction of the circular composition of his fresco of the *Last Judgment* (fig. 8). By the manipulation of marked transparencies on a large scale reproduction, the central point of the construction of Michelangelo's view of the Universe in the *Last Judgment* the fresco is found to be situated on the drapery across Christ's thigh, corresponding exactly with the text of Revelations 19:16, cited above.

An understanding of Dante's universe may therefore lead to a reinforcement of this recent interpretation of Michelangelo's Cosmology. At the end of *Inferno*, references to 'thigh symbolism' are made in a specifically cosmological context. In Dante's spherical, geocentric view, when he was faced with the problem of finding an exact centre for the terrestrial spheres of the universe, Dante selected Lucifer's thigh as the 'haidocentric' point of the terrestrial part of the universe. In terms of the antithesis between the earthly and celestial areas, Dante's choice of Lucifer's thigh was almost certainly chosen as the antitype in meaning of Christ's thigh as described in Revelations. It therefore seems entirely possible that Michelangelo who

was so imbued with the ideas of Dante, had logically transferred the idea of the central point of the universe from Lucifer, not only to the Deity in the form of the Sun, but even more precisely to the symbolic thigh of Christ Himself. Dante's images of Lucifer's thigh as the centre of the terrestrial system and the 'Point of Light' of the Sun—Christ as the centre of the celestial system were thus able to be combined. Precipitated, it seems, by the knowledge of Copernicus' idea of the Sun-centred universe (known in the Vatican by 1533) Michelangelo's fresco offered a far more logical solution to the cosmological arrangement of the universe than Dante's system — because the centre of both celestial and terrestrial regions were fused in a single point in Christ, the King.

#### Notes.

1. The well known links between theology and cosmology are examined, for example, by A. O. Lovejoy, *The Great Chain of Being. A Study of the History of an Idea*, New York: Harper, 1960 (1st ed. 1936) and, more recently, W. Yourgrau and A. D. Breck, *Cosmology, History and Theology*, New York: Plenum, 1977 and A. Koestler, *The Sleepwalkers. A History of Man's Changing Vision of the Universe*, Harmondsworth: Penguin, 1984. Biblical allusions to the flat-earth with the associated 'Up for Heaven' and 'Down for Hell' concepts are numerous from Genesis I onwards, but see for example Isaiah 40:22; Psalms 104. The writings of Church Fathers like St Augustine (*City of God*) and Pseudo-Dionysius the Areopagite (*On the Celestial Hierarchy*) confirmed such notions — as well as the early Christian cosmologies of men like Lactantius and Cosmas Indicopleustes, which ridiculed the concept of the spherical earth (see J. L. E. Dreyer, *A History of Astronomy from Thales to Kepler*, New York: Dover, 1953, pp. 208f; Koestler, *Sleepwalkers*, p. 93).
2. Koestler, *Sleepwalkers*, p. 94ff; Dreyer, *Thales to Kepler*, p. 226. Pope Sylvester II (999–1004) contributed to the recognition of the earth as a sphere and had constructed terrestrial globes.

3. C. H. Grandgent, *Companion to the Divine Comedy*, (as edited by C. S. Singleton), Cambridge: Harvard University Press, 1975, pp. 24–25; P. Boyde, *Dante Philomythes and Philosopher. Man in the Cosmos*, Cambridge: Cambridge University Press, 1981. Part 1 'The Cosmos.'; M. A. Orr, *Dante and The Early Astronomers*, New York: Kennikat, 1969 p. 147; J. G. Demaray, 'Dante and the Book of the Cosmos,' *Transactions of the American Philosophical Society*, vol. 77, Part 5, 1987, p. 2ff.
4. The sphericity of the earth was finally confirmed by such phenomena as the shadow cast by the earth on the moon during an eclipse and the disappearance of ships prior to their masts on the horizon, discussed by Dante in *De Aqua et Terra*, section 23. Later, it was confirmed by the voyages of discovery and circumnavigation. In the scientific interpretations of Dante, Peterson has argued that Dante's universe really represents 'a cosmological solution of Einstein's equations in General Relativity theory' (M. A. Peterson, 'Dante and the 3–sphere,' *American Journal of Physics*, 47 (12) 1979, pp. 1031–1035).
5. Dante, *De Aqua et Terra*, chapter 3. This view of the spherical, geocentric system and Dante's placing of Purgatory in the antipodes (southern hemisphere), may be compared with the earlier tradition and comments of Lactantius, Cosmas, and Augustine, mentioned above, who agreed that the antipodes could not possibly exist (eg *City of God*, Book 16, chapter 9). Dante's writings may thus here be used to clarify certain general beliefs.
6. Dante, *Convivio*, Book 3, chapter 5 (ed. London: Dent, 1903, p. 158). See also Orr, *Dante and the Astronomers*, p. 164.
7. Dante, *Convivio* 3, 5 (ed. cit. p. 158), referring to Plato's *Timaeus*.
8. Dante, *ibid.*, pp. 158–159, referring to Aristotle's *De Caelo*. Dante's understanding of this is discussed by G. Poulet, 'The Metamorphoses of the Circle,' in J. Freccero, *Dante. A Collection of Critical Essays*, Englewood Cliffs: Prentice Hall, 1965, pp. 151–169.
9. Koestler, *Sleepwalkers*, p. 102f.

10. Related to Aristotle, *De Caelo*, IV, i. See for example, *Inferno* IV, 13; *Paradiso* XXI, 7f. and 24f; and Dante, *De Aqua et Terra*, especially chapters 12 and 16. [All references to Dante's *Divina Commedia* are derived from the new edition, text and translation A. Mandelbaum, *The Divine Comedy of Dante Alighieri*, 3 vols., *Inferno, Purgatorio, Paradiso*, New York: Bantam, 1982–86]
11. Aristotle, *De Caelo*, II, xiv. See Orr, *Dante and the Astronomers*, p. 83. Aristotle's theory of motion, and its allegorical correspondence with metaphysical concepts is also discussed by Orr, *ibid.* p. 324f.
12. St Augustine, *On the Magnitude of the Soul*, (ed. L. Schopp) New York: Catholic University of America Press, Fathers of the Church Series, 1947, chapters 7–12, especially pp. 75–80, 85 and 89.
13. Poulet, 'Metamorphoses of the Circle,' especially pp. 151ff.
14. Discussed by Poulet, *ibid.*, p. 154.
15. Lovejoy, *Chain of Being*, pp. 101–102. Lovejoy also cites Montaigne, who described man's dwelling place as 'the filth and mire of the world, the worst, lowest, most lifeless part of the universe.'
16. Koestler, *Sleepwalkers*, p. 99.
17. Boyde, *Dante Philomythes*, especially pp. 68–71.
18. S. K. Heniger, *The Cosmographical Glass, Renaissance Diagrams of the Universe*, San Marino California: Huntington Library, 1977.
19. *Ibid.*, especially chapter 2, 'The Geocentric Universe,' pp. 31–44. Dante places Jerusalem in the centre of the northern hemisphere, according to this Biblical reference. Similar ideas are discussed by L. S. Dixon, 'Giovanni di Paolo's Cosmology,' *Art Bulletin*, 67 (4) 1985, pp. 604–613, especially pp. 612–613 where Dante's Cosmology is discussed.
20. 'l più basso e 'l più oscuro/ e 'l più lontan dal ciel che tutto gira.'
21. P. Brieger, M. Meiss and C. S. Singleton, *Illuminated Manuscripts of the Divine Comedy*, 2 vols. London: Routledge and Kegan Paul, 1970. See also modern diagrams of Dante's system, e. g. Mandelbaum, vol. 3, p. 305 or

- Dante Alighieri, *La Divina Commedia, Paradiso* (ed. D. Provenzal), Vicenza: Mondadori, 1980, p. 930.
22. 'là dove la coscia/ si volge, a punto in sul grosso de l'anche...'. See C. S. Singleton, *Dante Alighieri, The Divine Comedy: Inferno*, vol. 2, Commentary, London: Routledge and Kegan Paul, 1971. Singleton emphasizes the way in which Dante and Virgil start to turn at Satan's thigh, 'i. e. at the exact center of Satan's body, also at the exact center of the earth and of the universe in the Ptolemaic system,' (p. 633), but he does not give a reason for the choice of this part of the devil's anatomy. (cf also Mandelbaum, *Inferno*, n. for lines 78–93 on p. 393).
  23. For Botticelli's drawings to the *Divine Comedy* (usually associated with Landino's first printed version and commentary), see K. Clark, *The Drawings by Sandro Botticelli for Dante's Divine Comedy*, London: Thames and Hudson, 1976 and R. Lightbown, *Sandro Botticelli*, 2 vols. London: Paul Elek, 1978, vol. 2 pp. 172–205.
  24. The *Enciclopedia Dantesca* (ed. U. Bosco, Rome, 1970–1978), vol. 2, p. 230 gives other references to 'la coscia' in Dante's writings but does not explain its use in the context of *Inferno*, XXXIV.
  25. Augustine, *On the Magnitude of the Soul*, as already cited above.
  26. 'Da quel punto/ dipende il cielo e tutta la natura.' Mandelbaum points out that these lines 41–42 recall Aristotle's *Metaphysics*, XII, 7, (quoted by Mandelbaum, *Paradiso*, p. 411).
  27. For Sun and light symbolism in Dante, see especially J. A. Mazzeo, *Structure and Thought in the Paradiso*, New York: Greenwood, 1968 and H. Flanders Dunbar, *Symbolism in Medieval Thought and its Consummation in the Divine Comedy*, New York: Russell and Russell, 1961.
  28. Grandgent/Singleton, *Companion to the Divine Comedy*, p. 110.
  29. *Ibid.*, pp. 110–111.
  30. *Ibid.*
  31. Mandelbaum, *Paradiso*, n. for line 39 on p. 393.

32. Boyde, *Dante Philomythes*, p. 70.
33. References to, or paraphrases of, Revelations in the *Divina Commedia*, especially in *Inferno*, are far too numerous to mention, see Grandgent/Singleton, *Companion to the Divine Comedy*, *passim*.
34. The Vulgate reads: 'in femore suo scriptum: Rex regem, et Dominus dominantium.' According to Singleton, several precise references are made to Revelations chapter 19, including Revelations 19:1 (*Purgatorio* XXX, 15), Revelations 19:9 (*Purgatorio* XXXII, 75 and *Paradiso* XXIV, 2) which indicate that Dante must surely have been familiar with this chapter of the Bible and hence the symbolism of Christ's thigh.
35. Genesis 24:2–3, compare Jeremiah 31:19; Ezekiel 21:12.
36. Genesis 32:25–32; also Psalms 45:3; Song of Solomon 3:8.
37. For commentary, see for example, G. B. Caird, *A Commentary on the Revelation of St John the Divine*, London: Black, 1984, pp. 246–47; R. C. H. Lenski, *The Interpretation of St John's Revelation*, Minneapolis: Augsburg, 1963, p. 556; H. Hailey, *Revelation. An Introduction and Commentary*, Michigan: Baker, 1979, p. 386; W. Barclay, *The Revelation of St John*, Edinburgh: St Andrews Press, 1960, p. 235.
38. Examined recently by G. Strachan, *Christ and the Cosmos*, Dunbar: Labarum, 1985, especially chapter 3.
39. E. Gilson, *Dante and the Philosophers*, Gloucester, Mass.: Peter Smith, 1968, pp. 18–19.
40. U. Eco, *Foucault's Pendulum*, London: Secker and Warburg, 1989, pp. 88–289.
41. Its origins lie in ancient Greek numerology, for which see W. C. K. Guthrie, *A History of Greek Philosophy*, Cambridge: Cambridge University Press, 1985, vol. 1, especially chapter 4, section D.
42. Gilson, *Dante and Philosophy*, pp. 172–175, 179; Guthrie, *Greek Philosophy*, vol. 1, p. 248. H. Flanders–Dunbar, *Symbolism in Medieval Thought and its Consummation in the Divine Comedy*, New York: Russell and Russell, 1961,

- pp. 501–6.
43. Ascanio Condivi, *Life of Michelangelo*, (ed. H. Wohl), Oxford: Phaidon, 1976, (1st ed. 1553) p. 103; Giorgio Vasari, *Lives of the Artists*, (ed. G. Bull), Harmondsworth: Penguin, 1971 (1st ed. 1568), pp. 333, 422.
  44. Modern discussion of the influence of Dante on Michelangelo includes E. Wind, *Pagan Mysteries of the Renaissance*, (revised ed.) Oxford: Oxford University Press, p. 188; E. Panofsky, *Studies in Iconology, Humanistic Themes in the Art of the Renaissance*, New York: Harper and Row, 1972, p. 179. Mention of Dante occurs frequently in modern works on Michelangelo.
  45. Condivi, *Life of Michelangelo*, p. 84; Vasari, *Lives*, pp. 380–381. Also D. R. de Campos, *Michelangelo. The Last Judgment*, New York: Doubleday, 1978 pp. 59–60f.; C. De Tolnay, *Michelangelo*, vol. 5, Princeton: Princeton University Press, 1960, pp. 34 and 38.
  46. V. Shrimplin–Evangelidis, 'Sun–Symbolism and Cosmology in Michelangelo's *Last Judgment*,' *Sixteenth Century Journal*, 21 (4) 1990, pp. 607–643. Also in PhD thesis of same title, submitted March 1991, University of the Witwatersrand, Johannesburg.
  47. *Ibid.*, and see especially chapter 6 on Dante.
  48. For details of practices of fresco construction, using cords, plumb-lines etc., see Cennino Cennini, *The Craftsman's Handbook*, New York: Dover, 1933 (reprint of fifteenth-century edition), especially pp. 42–57; and modern discussion in E. Borsook, *The Mural Painters of Tuscany*, London: Phaidon, 1967. For formal analysis of Michelangelo's fresco leading to these conclusions see Shrimplin–Evangelidis, 'Sun–Symbolism,' especially p. 642–644 and unpublished PhD thesis, chapter 9.

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1. Johannes de Sacrobosco, *Textus de Sphaera*, ed. Jacques le Fèvre d'Étaples, Paris 1500, (1st ed, 13th century), Santa Barbara, Huntington Library



(Heniger, p. 37).

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3. Dante's Cosmology with Satan at centre, c. 1385, Altona Museum (Brieger, Meiss and Singleton, p. 32).
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