Two World Visions: Emanating Circles or Spiral Evolution?[1]

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Introduction

'Bring out most of the academic potential from this artist', my former mentor Miklós Maróth said of me jocularly, with a mixture of hope and scepticism, to Marie-Thérèse Urvoy when her husband Dominique Urvoy officially began my doctoral supervision and she unofficially started mentoring me. The Urvoys' great care, thoughtfulness and dedication to both the academic and personal education of their students meant that they—and I can speak of my case in particular—were as supportive for the young artist as the potential academic. This paper is a modest expression of my immense gratitude to both of them.

Years before starting my university education I fashioned a sculpture of Ikaros, inspired by the first movement of the second concerto of Pietro Antonio Locatelli's (b. 1695, d. 1764) *L'arte del violino*[2]. Some years after, I formed another sculpture, inspired by the *Chaconne* attributed to Tomaso Antonio Vitali (b. 1663, d. 1745). Years later again, I looked at both these sculptures side by side, and discovered their structure was practically identical: each formed a spiral. During my doctoral years in Toulouse I also made sculptures on the *Chaconne*s of Giuseppe Tartini (b. 1692, d. 1770) and Francesco Geminiani (b. 1687, d. 1762), and their structure was also spiral, as dictated by the music.

Structures in art have different meanings depending on their setting, specific arrangement, proportions etc. Furthermore, the meaning of the same work of art

1. I would like to express my gratitude to Iván Szántó for his advice on a former, illustrated lecture version of this paper as well as Alex Mallett, John Cooper, Mustafa Baig, Leonard Lewisohn Camille Mulcaire and Omar Anchassi for considerably improving the written version.

2. Pietro Locatelli, *L'arte del violino*, Amsterdam, Le Cène,1733.

can be very complex and changing even for its author; the artists' intentions may be markedly different from those of their patrons. And neither the commissioners, nor even the creators themselves can fully control the effect of an artwork on their intended and unintended public, contemporary and future audiences. The multiplicity of possible meanings, however, does not mean meaninglessness. Art can be interpreted as a language, and its words and grammar can be spoken and understood, even unconsciously, by artists and audiences. The deepest layers of the elements of our communication are biologically wired into us.[3] But, when applied, even these elements are embedded in a given culture and context. Patterns in art—as well as their different uses and interpretations—express Patterns in thoughts and sentiments, which may also reflect those in wider society.

This paper will focus on two structures, which have been used in both Islamic and Western art, and can convey ideas about the ultimate goal of life:

1. Concentric circular and polygonal patterns.
2. Spirals, helices[4] and other twisted forms.[5]

The approach of this present study is transdisciplinary. Disciplinarity is an academic phenomenon reflecting the need for specialisation and providing methodological discipline. Such an approach is highly unsuited to the study of artistic creation, holistic understanding or premodern science, all of which have been nurtured by transdisciplinary sources and goals.

3. For instance the length and the pitch of non-verbal vocalisation indicate similar content in the case of both humans and dogs. See Tamás Faragó, Attila Andics, Viktor Devecseri, Anna Kis, Márta Gácsi, Ádám Miklósi, 'Humans rely on the same rules to assess emotional valence and intensity in conspecific and dog vocalizations', in *Biology letters*, Vol. 10, issue 1 (January 2014), available at http://rsbl.royalsocietypublishing.org/content/10/1/20130926.short. Another example is the use of the combination of black and yellow, or red; a colour code employed by a number of species waring potential predators about their real or "pretended" venom.

4. In this paper the term 'helix' and the adjective 'helical' is used in the sense of a three-dimensional curve that lies on a cylinder, to be distinguished from the 'spiral' that is used to indicate three-dimensional curve that lies on a cone.

5. The use of spiral in diverse cultural and religious traditions and forms of art is interpreted in Jill Purce, *The mystic spiral: journey of the soul*, London, Thames and Hudson, 1974.

An introductory chapter that offers a 'brief history of the spiral' is included in Nico Israel, *Spirals: the whirled image in twentieth-century literature and art*, New York, Columbia University Press, 2015, pp. 21-41.

Both of these monographs conflate works of spiral or helical with those of circular structure, such as the image of *Hell* as described by Dante Alighieri (b. 1265, d. 1321), and illustrated Sandro Botticelli (b. 1444–5, d. 1510), see ISRAEL, *Spirals*, pp. 25-26. Similarly, on the seven terraces of the Purgatory are also separate circles or rather cylinders on a painting depicting *Dante and his poem 'The divine comedy'* by Domenico di Michelino (b. 1417, d. 1491) for Florence Cathedral in 1465.

See also below, n. 33.

The Symbolism of Concentric Structures

Oscillating concentric circles and polygons form a key feature of iconic ancient buildings, such as the Pantheon in Rome.[6] They are ubiquitous in medieval Christian and Islamic decorative arts and architecture. They can be seen on gates, arches, domes and their ceilings, as well as bell towers and minarets, which rise from a quadric base, pass through several spherical or polygonal levels and end in a point at the top.

Neoplatonic philosophy sees the creation of the world as the result of emanation, or 'flowing-out', from the 'One'. This perfect being of pure substance, pure spirit, pure soul, happiness and love is identified in the monotheistic religions as the sole God. The ultimate desire of the believers' soul is to be re-united with that source. This return of the soul/spirit towards the final source of its light is imaged both as its rise above the material world and as its inwards motion to its deepest core/heart.

Medieval Christian and Islamic geometric designs produce a vibrating, oscillating effect and radiate with light, love and serenity. On gates, domes, ceilings or towers, the concentric patterns link different spaces and different worlds: this humdrum world on the one hand, and the source of light and power on the other.[7] Zigzag, lobed, or foiled ornaments all symbolise rays of light, and light itself is a symbol of the divine. The goal of the pulsating circles of Sufi music and dance is also to achieve union with God.[8]

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6. Built by the emperor Hadrian between 118 and 125.

In this paper. unless otherwise indicated, all biographical and construction dates are based on the relevant entries of Grove Art Online, available through Oxford Art Online, or, in the case of Islamic buildings and their builders, the *Encyclopaedia of Islam 2*, available through BrillOnline, or, in the case of contemporary buildings, on their official websites or the websites of the architectural firms that created them. All the referred websites were accessed before the 7th of July 2016.

Ideally the text of this paper would be complemented with pictures (and soundtracks), but as the number of illustrations would be extremely high the reader's indulgence is requested.

7. The fact that domes and arches commonly represent the sky, and that the summit of a dome or arch can be linked to the One, who is the source and goal of all is rather obvious. This symbolism was beautifully analysed already in the chapters XXXIX-XLVI of René Guénon, Symboles fondamentaux de la science sacrée. Recueil posthume établi et présenté par Michel Valsân, Paris, Gallimard, 1962, reprinted in 1982 available at https://archive.org/stream/ReneGuenonFR/RenGunon-SymbolesFondamentauxDeLaScienceSacre#page/n0/mode/2up, pp. 226-273. See also Ananda K. Coomaraswamy's study, 'The symbolism of the dome', in Ananda K. Coomaraswamy, selected and with a preface by Rama P. Coomaraswamy, *The door in the sky: Coomaraswamy on myth and meaning*, Princeton, New Jersey, Princeton University Press, 1998, pp. 192-242, originally published in the *Indian historical quarterly*, March 1938.

8. On the symbolism of the Mawlawī dervishes' whirling, see Roderick Grierson, '"All the invisible kingdoms": Resuhi Baykara and the Mevlevi mukabele', *Mawlawuna Rumi review*, Vol. 5 (2014) [pp. 107-135], pp. 115-117, 125 and 131-133.

A circular plan was used for the design of entire new cities, such as Gūr (also called *Ardašīr-khorrah*,[9] founded by the first Sāsānian Šāhānšāh, that is 'King of Kings', Ardašīr I,[10] and Baghdad,[11] founded by the second ʿAbbāsid caliph al-Manṣūr,[12] who consolidated the dynasty. The centre of Gūr was probably occupied by Ardašīr's palace or a government building and the Fire Temple,[13] while the centre of Baghdad comprised al-Manṣūr's palace and his adjoining Ǧāmiʿ[14]. In both cases, the structure of the city emphasised the centrality of the role of the ruler as well as the unity of his religious and political leadership.

The Symbolism of the Spiral

The spiral is not a direct path but a twisted one. Its climax is reached by an evolution gyrating again and again on different levels. It does not follow the straight direction of light, but instead one of torrents, smoke and flames. It reflects tormented, turbulent and passionate times.

Columns

Columns support and symbolise verticality. The spiral is a key element of the Ionic and Corinthian columns, but, during periods that endeavoured to express rationality and order, such as Classical Greece, the Renaissance and Neo-Classicism, it appears only as the harmonious volute of the capitals. In the case of Hellenistic and Baroque columns, however, the grooves of the fluting covering the column often coil in effusive helices, as well the mosaic decoration of medieval columns, or, in the case of the 'Solomonic columns', the very shape of the body of the column and its common vine ornament.

Towers

Spiral minarets with a winding ramp appear in Islamic religious architecture. The origin and meaning of this structure remain mysterious. Ancient ziggurats and

9. 'Ardašīr's glory'.

10. Around 224. For different opinions on whether the foundation of the city take place before or after Ardašīr's decisive victory over the Parthian king, see C. E. Bosworth, 'Ardašīr-Ḵorra', in *Encyclopaedia Iranica* (this entry was originally published in 1986, and is accessible at http://www.iranicaonline.org/articles/ardasir-korra), and Dietrich Huff, 'Fīrūzābād', in *Encyclopaedia Iranica*, (this entry was originally published in 1999, and is accessible at http://www.iranicaonline.org/articles/firuzabad).

11. Also called *Madīnat al-salām*, 'The city of peace'.

12. In 762.

13. As the official religion was Zoroastrianism.

14. Congregational mosque.

Sāsānian constructions such as the central tower in Gūr,[15] and even stupas in the East were possible sources of inspiration for monumental minarets. These sources also include the *Pharos* of Alexandria[16] built by the Greek architect Sostratos of Knidos[17] and Roman lighthouses. The square-shafted '*Tower of Hercules*' built at the entrance of La Coruña harbour[18] is the only fully preserved Roman lighthouse. Though located inside the building, the line of the ramps of '*The tower of Hercules*' is visible from outside. Lighthouses needed a massive ascending ramp in order to bring cartloads of wood to fuel the light, and flames were often represented as spirals in Antique art,[19] but to my knowledge there is no evidence of any building being shaped in that form though the function of lighthouses and the symbolism of the flame they were bearing and feeding was calling for it.

The original Arabic form of the word minaret is *manāra*, 'the place of fire', referring to a lighthouse. The minaret of the Ǧāmiʿ al-Mutawakkil, which is the congregational mosque of Sāmarrāʾ built by the tenth ʿAbbāsid caliph al-Mutawakkil,[20] was constructed in spiral form. This is also the case for the minaret of the Ǧāmiʿ (congregational mosque)[21] of a city founded by the same caliph,[22] and named al-Jaʿfariyya or al-Mutawakkiliyya.[23] Al-Mutawakkil had desper-

15. On the tower of Gūr and some ziggurats as possible sources of inspiration for the Islamic spiral minarets, see Robert Hillenbrand, *Islamic architecture: Form, function and meaning*, Edinburgh, Edinburgh University Press, 1994, pp. 144-146. See also, however, Dietrich HUFF, 'Fīrūzābād', in *Encyclopaedia Iranica*, accessible at http://www.iranicaonline.org/articles/firuzabad.

16. For the Pharos as a possible inspiration, see K. A. C. Creswell, 'The Evolution of the Minaret, with Special Reference to Egypt—II', *The Burlington magazine for connoisseurs*, Vol. 48, No. 278 (May, 1926), pp. 252+256-259. A reprint of the entire study, 'The Evolution of the Minaret, with Special Reference to Egypt', originally published in three consecutive volumes of *The Burlington magazine for connoisseurs*, April, May, June 1926, is available at https://archive.org/details/evolutionofminar00cresuoft. See particularly the pp. 8-10 of this reprint.

17. Between 299 and 279 B.C.

18. In the late 1st century A.D.

19. An example linking the Persian and Roman worlds is presented by the flames of the torches of Cautes and Cautopates, the two torch-bearers of Mithras. See for instance the marble sculptures representing them discovered in Sidon (late 2nd century or 389 AD) and exhibited in the Louvre, AO 22259 http://cartelen.louvre.fr/cartelen/visite?srv=car_not_frame&idNotice=37408 and AO 22260 http://cartelen.louvre.fr/cartelen/visite?srv=car_not_frame&idNotice=37435, or the pair NI 1541 and NI 1540 in the Museo archeologico regionale "*Antonino Salinas*" in Palermo. For an interpretation, see Abolala Soudavar, *Mithraic societies: From brotherhood ideal to religion's adversary*, Houston, Soudavar, 2014, accessible at http://www.soudavar.com/MITHRAIC-SF2.pdf, pp. 273-275.

20. Between 849 and 851.

21. This latter mosque is less than twenty kilometres to the north of the former and is known today confusingly as the Ǧāmiʿ or congregational mosque of Abū Dulaf.

22. In 859-60.

23. After his personal and regnal names.

ately attempted to ensure the survival of central authority in his realm before he was murdered[24], after which the dynasty's power declined. These minarets are the most monumental visual symbols of his plan. It is possible that the practical reasons for building a ramp took a symbolic turn. While in the case of lighthouses a ramp was required to enable fuel to reach the fire, in the case of these minarets the spiral structure with winding ramps might symbolise flame and light. On the top, the place of the fire is taken by the muezzin who calls for prayer, guiding the Believers to the way to Heaven.

In the symbolism of both Christianity and Islam, light is generally connected with Heaven, wisdom and purity. Fire, on the other hand, is associated with Hell, tormenting desires, punishment and/or purification. Light is seen as the source of vision and delight, while fire evokes burning pain. Light is, however, difficult to separate from fire, and it applies also to everything light and fire can symbolise, such as wisdom and pride, joy and pain, etc. This ambiguity is expressed in such archetypical figures as Lucifer, whose name means the 'Light-bringer'. The Arabic language also reflects the connection between fire and light: both the word *nūr*, 'light', and *nār*, 'fire', derive from the same root.[25] In arts and literature, when a tool or building that holds fire is looked at as a source of light—as in the case of a torch or a lighthouse—it is naturally regarded as a positive symbol.[26] Thus an upward spiral can symbolise light, though its form evokes that of fire, while the rays of light are normally seen as straight, or zigzag.

The only known minaret to follow the above model of the two congregational mosques built for al-Mutawakkil's consecutive capitals was that of the congregational mosque built by the first virtually independent ruler of Islamic Egypt, Ibn Tūlūn.[27] Though the minaret that we can see today was reconstructed during the reign of the sultan Lāǧīn,[28] given the short interval between the construction of al-Mutawakkil's congregational mosques and that of Ibn Tūlūn we can suppose that the original minaret had a similar form.

Helical exterior decoration also appears on minarets of Saljūq and Ottoman congregational mosques, such as the *Burmalı Minare Camii* at Amasya,[29] the

24. In 861.

25. ر و ن

26. See below, n. 84.

27. Between c. 876 and 879. See Mathieu Tillier, 'L'étoile, la chaîne et le Jugement. Essai d'interprétation d'un élément de décor dans la mosquée d'Ibn Ṭūlūn', *Der Islam*, 92/2 (2015) [pp. 332–366], p. 332.

28. R. 696–698/1296–1299. See ibid, p. 333.

29. C. 1242-3.

Üç Şerefeli Camii built in Edirne,[30] and the *Burmalı Minare Camii* in Istanbul[31]. Helical and spiral Islamic minarets were known in Europe[32] and their forms appear in Renaissance (and later) European paintings. A tower with an external helical staircase is depicted on Gentile Bellini's (b. 1429, d. 1507) *St. Mark preaching in Alexandria*, which was completed[33] by his brother Giovanni (b. 1431–6, d. 1516). Several artists such as Amico Aspertini (b. 1474–5, d. 1552) in his sketch-book,[34] Giulio Clovio (b. 1498, d. 1578) in his *Book of Hours*,[35] and Cornelis Anthonisz (b. c. 1505, d. 1553) in his etching the *Fall of the Tower of Babel*[36] represented the Tower of Babel in a form highly similar to the minarets of Sāmarrāʾ and al-Jaʿfariyya/al-Mutawakkiliyya.[37] Due to their location, the ruins of these mosques and their impressive towers were easily connected to the biblical story of the Tower of Babel. Pieter Breughel the Elder (b. c. 1525–30, d. 1569) alone produced at least three versions of *The Tower of Babel*.[38] The first of these is lost, but the two extant versions show a spiral tower with an external ramp.[39] A similar tower also

30. In the mid-15th century.

31. In 1550.

32. Wolfgang Born, 'Spiral towers in Europe and their oriental prototypes', *Gazette des beaux-arts*, 24 (1943), pp. 233-248. Bart Ooghe, 'The rediscovery of Babylonia: European travellers and the development of knowledge on Lower Mesopotamia, sixteenth to early nineteenth century', *Journal of the Royal Asiatic Society*, Third Series, Vol. 17, No. 3 (Jul., 2007), pp. 231-252.

33. In 1507.

34. Dated between 1530 and 1540. See http://www.britishmuseum.org/research/collection_online/collection_object_details.aspx?objectId=1490692&partId=1&searchText=babel&page=1.

35. Known as the *Farnese Hours*, completed for the cardinal Alessandro Farnese in 1546. New York, Pierpont Morgan Lib., MS. M. 69.

36. Produced in 1547.

37. See http://www.britishmuseum.org/research/collection_online/collection_object_details.aspx?objectId=1457133&partId=1&searchText=Anthonisz&page=1.

38. Between 1553 and 1568.

39. Joanne Morra, 'Utopia lost: allegory, ruins and Pieter Bruegel's Towers of Babel', *Art History*, Vol. 30, No. 2 (April 2007) [pp. 198-216], p. 200.

See also Thomas Derek Fawcett, *The large Tower of Babel by Peter Bruegel: its precedents and antecedents in the artistic imagination and in archaeology*, unpublished BA thesis, University of Saskatchewan, 1971.

For the picture of the Tower of Babel in a reprint of the *Grimani Breviary* (Venice, Bib. N. Marciana, MS. lat. I. 99), an illuminated manuscript of the Ghent–Bruges school of book illustration, dating from c. 1510–20, see https://archive.org/stream/lebreviairegri00onga#page/122/mode/2up. For an even earlier European illustration of the Tower of Babel with external winding stairs or ramps see the *Bedford Hours* made in several stages between c. 1410 and 1430, produced probably for a member of the French royal family and reworked for John, the duke of Bedford. The image of the tower is on f.17v and is accessible at http://www.bl.uk/manuscripts/Viewer.aspx?ref=add_ms_18850_f013r.

appears in an engraving[40] made[41] by Étienne Delaune (b. 1518/1519, d. 1583)[42]. Engravings made by Philips Galle (b. 1537, d. 1612) following Maarten[43] van Heemskerck's (b. 1498, d. 1574) designs present different versions of the spiral-tower structure. External helical stairs winding around a column that supports a flaming torch can be seen in the foreground of *The destruction of the Tower of Babel*,[44] while the upper part of the tower itself is shown as a set of cylinders struck by lightning and collapsing in flames as they are destroyed by God.[45] The tower is represented as a spiral spire erected over a polygonal tower in the engraving of the *Walls of Babylon*, which is part of the series *The eight wonders of the world* by van Heemskerck and Galle.[46] The same series also included a depiction of the *Pharos* of Alexandria as consisting of a helical base and a spiral tower emitting meandering smoke.[47] Countless variations of these illustrations were produced in the following decades and centuries.

Staircases

While some Renaissance painters and engravers discovered and revived these exotic models, architects produced a decisive step in the development of helical and double helical staircases. In these structures again, the practical and the representational function are intertwined. A staircase in the form of a double helix is ingeniously practical as it allows people (and animals) to move up while others are going down without crossing each other's path. Architects and their patrons also knew that stairs stand as an ideal symbol of verticality, which reflects divine and human power. As architecture is an art of space and rhythm, the extravagance of the innovative design and monumental size of stair-

40. See http://www.britishmuseum.org/research/collection_online/collection_object_details.aspx?objectId=1418799&partId=1&searchText=babel&page=1.

41. Between 1550 and 1572.

42. For biographical data, see http://www.vam.ac.uk/blog/engraved-ornament-project/life-and-work-etienne-delaune-1 and http://www.vam.ac.uk/blog/engraved-ornament-project/life-and-work-etienne-delaune-1.

43. Also known as Maerten or Martinus.

44. Which is one of the 22 engravings included into their book titled *Clades, or disasters of the Jewish Nation* published in 1569. See http://www.gallery.ca/en/see/collections/artwork.php?mkey=98994 and http://www.gallery.ca/en/see/collections/artwork.php?mkey=98858.

45. See http://www.gallery.ca/en/see/collections/artwork.php?mkey=98997 or http://www.harvardartmuseums.org/art/255432.

46. Published in 1572, see http://www.britishmuseum.org/research/collection_online/collection_object_details.aspx?assetId=380238001&objectId=1527461&partId=1.

47. See http://www.britishmuseum.org/research/collection_online/collection_object_details.aspx?objectId=1592511&partId=1&searchText=van+Heemskerck&page=4.

For a summary of sources and studies on the real *Pharos*, see Judith McKenzie, *The architecture of Alexandria and Egypt: 300 BC – AD 700*, Yale University Press, 2011, pp. 45.

cases emphatically exhibited the creative virtuosity of the artist and the wealth and influence of the patron.

The development in the design of staircases reflects altering social attitudes to hierarchy and power. Medieval churches and castles could reach vertiginous height, demonstrating both divine and human, ecclesial and seigneurial power. They meant to guide the gaze and the souls of commoners to their pinnacles and the sky above. But they did not invite them at all to walk up there. Their staircases were mostly functional and hidden. The new space and light given to the staircase, mirrors space and ascent granted to the individual and to rationality. The monumentality of the staircase and its decoration shows the power of its owner (and builder) and the limits of the viewer-visitor. The evolution towards staircases that in themselves symbolise elevation starts in the 13th century, for example that of the *Campanile di S. Nicola*[48] in Pisa built and attributed by Giorgio Vasari (b. 1511, d. 1574) to Nicola Pisano (b. 1470, d. 1538?). The loftiness of a helical structure[49] can be also seen, but still only from inside, in the bell tower of Pietrasanta the design of which is attributed to Donato Benti (b. 1470, d. c. 1537) or Michelangelo Buonarrotti (b. 1475, d. 1564).[50]

The double helix staircase built by Donato Bramante (b. 1443–4?, d. 1514) as part of the construction of the *Cortile del Belvedere*[51] for Pope Julius II in the Vatican Palace[52] and the well of the castle of Orvieto the *Pozzo della Rocca* (or *Pozzo di San Patrizio*)[53], the design of which Pope Clement VII commissioned[54] from Antonio da Sangallo the Younger (b. 1484, d. 1546), were monumental pieces of engineering. The full splendour of the double helical structure was achieved in the sumptuous staircase of the *Chateau of Chambord*. The construction of the castle started in the year of the death of Leonardo da Vinci (b. 1452, d. 1519), who had been in Francis I's service. The staircase was possibly built following a design by Leonardo, who was deeply interested in the spiral form

48. The bell tower of the St Nicolas Church.

49. Constructed between 1518 and 1520.

50. See Barbara Aterini, Geometria e misura nella torre campanaria di Pietrasanta: una conferma dal rilievo tridimensionale (Geometry and measures in the bell tower of Pietrasanta: a confirmation by the three-dimensional survey), *DISEGNARECON*, Vol. 8, No. 15 (2015), accessible at http://disegnarecon.univaq.it/ojs/index.php/disegnarecon/article/view/114 [pp. 17.1-17.14], p. 17.2. The article argues for the latter attribution. See also Barbara Aterini, 'Il campanile del Duomo di Pietrasanta: dalla complessità alla semplicità dell'idea progettuale / The bell tower of the Cathedral in Pietrasanta: from the complexity to the simplicity of the design concept', *Disegnare. Idee immagini / Drawing. Ideas images*, No. 47 (2013), pp. 12-23.

51. Belvedere courtyard.

52. Between 1505 and c. 1565.

53. 'The well of the citadel', or 'St Patrick's well'.

54. In 1523.

both as artist and engineer.[55] The *Palazzo Farnese* in Caprarola[56] designed by Jacopo Vignola (b.1507, d. 1573)[57] and his successors also includes a magnificent helical *Scala regia*[58]. These Renaissance models developed further in later periods and still remain influential today.

Spires

Following a widespread medieval tradition of twisted spires, and the appearance of the spiral spire in late Renaissance paintings and engravings, the structure was also revived in architecture. The Danish king Christian IV commissioned the sculptor and architect Hans van Steenwinckel the younger (b. 1587, d. 1639) to build the *Børsen* 'Stock Exchange' in Copenhagen.[59] At the top of its spire,[60] four entwined dragons form an extravagant spiral.

Francesco Borromini's (b. 1599, d. 1667) church of *Sant'Ivo alla Sapienza*, was built for the complex of *La Sapienza*[61] *University* in central Rome.[62] A spiral crowns the lantern built over the dome[63] for Pope Innocent X.[64] Here the spiral clearly relates to fire. On the dome of *Sant'Ivo* there are also stone torches and stone flames, all in spiral form, in the same spirit as an illustration of the *Iconologia* of Cesare Ripa (b. c. 1555, d. 1622). A highly popular handbook amongst artists in the 17th century, this represents the allegorical figure of *Sapienza* (Wisdom) with a torch burning with whirling flames in her hand.[65] The spiral itself ends in a circular laurel wreath with six triple sets (clearly referring to the Trinity) of tongues of flame (that are bending two dimensional spirals) and a (flame?) crown

55. Jean Guillaume, 'Léonard de Vinci et l'architecture française, I, Le problème de Chambord', *Revue de l'art*, No. 25 (1974), pp. 71-84.

56. Constructed between 1559 and 1583 for Cardinal Alessandro Farnese.

57. Jacopo [Giacomo] (Barozzi da) Vignola.

58. 'Royal staircase'.

59. The king originally commissioned Hans brother Lourens (also known as Lorenz, Lorentz and Lauritz) (b. 1585, d. 1619) to design this building, but Lourens died just as the planning began. http://english.borsbygningen.dk/hist.htm

60. Built in 1625, see http://english.borsbygningen.dk/hist.htm.

61. 'The Wisdom'.

62. Between 1642 and 1660.

63. Between 1652 and 1653.

64. Joseph Connors, 'Borromini's S. Ivo alla Sapienza: the spiral', *The Burlington magazine*, Vol. 138, No. 1123 (Oct., 1996) [pp. 668-682], p. 671; Julia M. Smyth-Pinney, 'Borromini's plans for Sant'Ivo alla Sapienza', *Journal of the Society of Architectural Historians*, Vol. 59, No. 3 (Sep., 2000) [pp. 312-337], p. 322.

65. Cesare Ripa, *Della novissima iconologia*, Padova, Pietro Paolo Tozzi, 1624, p. 455, available at https://archive.org/stream/novaiconologia18ripa#page/454/mode/2up.

of six gilded wrote iron ribs.[66] These ribs support a globe and dove with the olive branch and a cross the branches of which ended in the *fleur de lis*, taken from the coat of arms of Innocent X who was from the Pamphili/Pamphilj family. The representations of the Tower of Babel and of the Pharos by Alexandria Maarten van Heemskerck and Philips Galle correspond closely to the design of Borromini's spiral. For this reason the latter has been interpreted as a new Tower of Babel that gained positive meaning, but the emphatic presence of spiral symbols for fire on and around the spire rather indicates that it is the vertex of a new Pharos, and in Christian symbolism the Pharos became an established symbol of guiding light.[67] Another attractive theory sees the spire rather as 'a flaming tiara',[68] and its erection might reflect Innocent X's concern 'with imprinting his image on the skyline',[69] as well as the competition between the *La Sapienza University* and the Jesuits' *Collegio Romano*.[70]

The representation of the flame as a spiral is commonplace in art. Only a few architects, however, followed the model of a spiral spire. One of them was Lauritz de Thurah, who designed the spire of the *Vor Frelsers kirke*[71] in Copenhagen, where one finds winding stairs that lead around to a sphere carrying a statue of Christ.[72]

Baroque phoenix. Light reborn in whirling fire

Spirals are all-pervading in Baroque decorative and fine arts, as well as in music: in follias, chaconnes and passacaglias a melody is repeated again and again, travelling through a number of variations until reaching a finale of higher intensity. Are they conveying the flame of tormented and scattered souls longing for the 'Paradise lost' of unity and harmony with God and within society in a period of radical transformation?

66. Today only the globe is gilded, but see Joseph Connors, 'Borromini's S. Ivo alla Sapienza: the spiral', p. 671 supported by a document cited on p. 681.

67. See William Hauptman, '*Luceat Lux Vestra coram Hominibus*: a new source for the spire of Borromini's S. Ivo', *Journal of the Society of Architectural Historians*, Vol. 33, No. 1 (Mar., 1974), pp. 73-79. For a list of the different studies and theories about the meaning of the structures and symbols used in the church see Joseph Connors, 'Borromini's S. Ivo alla Sapienza: the spiral', Appendix 'B. Partial bibliography of interpretations of the spiral of S. Ivo alla Sapienza', pp. 861-2.

68. John Beldon Scott, 'S. Ivo alla Sapienza and Borromini's symbolic language', *Journal of the Society of Architectural Historians*, Vol. 41, No. 4 (Dec., 1982) [pp. 294-317], p. 311.

69. Julia M. Smyth-Pinney, 'Borromini's Plans for Sant'Ivo alla Sapienza', p. 322.

70. See Joseph Connors, 'Borromini's S. Ivo alla Sapienza: the spiral', pp. 687-680.

71. 'Our Saviour's church'.

72. The spire was consecrated in 1752.

My understanding of the reason of the axonometry used by medieval artists is that their aim was to represent the world objectively, as they thought God saw it Humanism introduced individualism and the Renaissance brought perspective, representing the world from the individual's point of view.

The Baroque was the artistic expression of the Counter-Reformation. It was not possible, however, to restore medieval society. After such radical alterations in their perspective of the world and themselves, Western people could no longer look at their own souls as undefined points on a circle emanated from the One and turning back to Him, dissolving into what was both their ultimate source and goal while losing all individuality—as suggested by medieval mystics and philosophers such as Ibn Rušd (Averroes, b. 1126, d. 1198). Baroque souls had to find their way in the Church, but as individuals, passing through cycles of extreme despair and extreme delight, in the spiral.

Romantic and Eclectic spirals

After being neglected in the angular and rationalistic style of Neoclassicism, the strong symbolic force of the spiral was rediscovered by artists of the Romantic Age, such as William Blake (b. 1757, d. 1827). His *Jacob's ladder*[73] presents a staircase with no need for support, spiralling in Jacob's dream, from the Earth through star-lighted night to the supreme Sunlight of God. Blake also included the spiral into his illuminated poem *Milton*.[74]

73. See http://www.britishmuseum.org/research/collection_online/collection_object_details.aspx?objectId=7233&partId=1&searchText=Jacob%27s+Ladder+by+William+Blake&page=1.

74. 'Onwards his Shadow kept its course among the Spectres; call'd
Satan, but swift as lightning passing them, startled the shades
Of Hell beheld him in a trail of light as of a comet
That travels into Chaos: so Milton went guarded within.
The nature of infinity is this! That every thing, has its
Own Vortex; and when once a traveller thro Eternity,
Has passd that Vortex, he percieves it roll backward behind
His path, into a globe itself infolding: like a sun:
Or like a moon, or like a universe of starry majesty.
While he keeps onwards in his wondrous journey on the earth
Or like a human form, a friend with with whom he livd benevolent,
As the eye of man views both the east & west encompassing
Its vortex: and the north & south, with all their starry host;
Also the rising sun & setting moon he views surrounding
His corn-fields and his valleys of five hundred acres square.
Thus is the earth one infinite plane, and not as apparent
To the weak traveller confin'd beneath the moony shade.
Thus is the heaven a vortex passd already, and the earth
A vortex not yet pass'd by the traveller thro' Eternity.'

Similarly to Blake, Gustave Doré (b. 1832, d. 1883) was also a printmaker and illustrator, as well as a sculptor. In contrast to Blake's *Jacob's ladder*, his *La confusion des langues*[75] shows the Tower of Babel as a tall coil, with the top of the picture and the vertex of the tower covered by a dark cloud, while light hits the ground and the foreground.[76]

In architecture, the Romantic style was followed by the different neo-styles of Historicism, and their elements were blended in Eclecticism, both of which produced countless spirals and helical staircases. This melding of styles was not restricted to Europe and it did not involve only European forms. The exuberant exterior helical staircases on the minarets of the *Mahabbat maqbara* complex in Junagadh, Gujarat,[77] fuse past flamboyant currents of Indian, Islamic and European architecture.

Revolution and evolution in spirals in the 20th and 21st centuries

Due to the accelerating development of technology, buildings have been rising higher and higher. Staircases still serve auxiliary or representative purposes, but in general, elevators have reduced both their practical and emblematic use. However, the same technological progress brought a new turn in the evolution of the spiral: monumental buildings can still convey messages and their shape more and more freely formed. In 1920, Vladimir Tatlin, a Soviet constructivist artist, presented his first model of a project that was never realised, but nevertheless has, since its first presentation, been a symbol of boldly modern architecture, and can be also considered an abstract (and mobile) sculpture. It was the *Monument to* (and headquarters of) *the Third International*[78], and was designed as a huge spiral both to commemorate and promote world revolution. The design has its axis twisted by a violent angular line, and is thus a perfect symbol of the forced evolution that was a central tenet of Communism.

The author & printer W Blake, *1804*, *Milton: a poem in 12 books: to justify the ways of God to men*, *Book the First*, p. 14 accessible at http://www.blakearchive.org/blake/copy/milton.a?descId=milton.a.illbk.14.

For the symbolism of the vortex in Blake's poetry see, S. Foster Damon, A Blake dictionary: The ideas and symbols of William Blake, updated edition, Hanover, New Hampshire, Dartmouth College Press, 1988, p. 440.

75. 'The confusion of tongues'.

76. Doré also used concentric circles illustrating the scenes of Dante's *Paradise*. See also above, n. 4.

77. The *Mahabbat* (or commonly spelt *Mahabat*, or *Mohabbat*) *maqbara* was completed in 1892. See http://www.atlasobscura.com/places/mahabat-maqbara.

78. That is the *Communist International*, or *Comintern* whose founding congress took place in Moscow in 1919.

Since the end of the *Art Nouveau*, art and architecture have been dominated by rectangular shapes that celebrate, more or less consciously, the triumph of a technocratic utilitarian order over the nature that is both around and within us. This arrogant conceit has partly fallen into nihilist disillusion and cynical relativism, but has also been calling for more organic ways and forms. The spiral is a natural form that expresses organic evolution. Its new ascendancy in the arts mirrors the subconscious of our period, which is flamboyantly ambitious, but also multifaceted, unpredictable, hesitating and self-conscientiously complex.

Spiral forms appear on all scales and media of modern art: from paintings by Paul Klee (b. 1879, d. 1940), jewellery, paintings and sculptures by Alexander Calder (b. 1898, d. 1976), and paintings by the latter's friend Joan Miró (b. 1893, d. 1983), sculptures and architectural designs by László Moholy-Nagy (b. 1895, d. 1946) to the *Spiral Jetty*, an 'Earthwork' by Robert Simson,[79] and his 32 minute colour film with the same title[80].

The spiral is also a prominent pattern in contemporary fractal art.[81] In New York, Frank Lloyd Wright's (b. 1867, d. 1959) *Guggenheim Museum*[82] is an extremely sophisticated modern version of the theme of the spiral.[83] Following Gottfried Böhm's idea,[84] Norman Foster and Ken Shuttleworth designed the dome of the Reichstag in Berlin[85] with a spiral ramp leading to its top. In London, the Spiral Extension to the Victoria & Albert Museum proposed by Daniel Liebeskind was never built,[86] but Foster and Shuttleworth created a design similar to the dome of Reichstag for the City Hall of London,[87] which includes a spectacular coiling ramp that allows one to go all the way up in a wheelchair.[88] They also designed London's 'Gherkin',[89] which has spiralling external decoration. The

79. Constructed on the shore of the Great Salt Lake, Utah, in 1970.

80. Produced in the same year, see http://www.robertsmithson.com/earthworks/spiral_jetty.htm.

81. See for instance the 'Harriss spiral', https://www.theguardian.com/science/alexs-adventures-in-numberland/2015/jan/13/golden-ratio-beautiful-new-curve-harriss-spiral.

82. Completed in 1959.

83. https://www.guggenheim.org/the-frank-lloyd-wright-building.

84. 'Soll der Berliner Reichstag als Prunkstück seine alte Kuppel wiederhaben?', *DER SPIEGEL* 43/1991, accessible at
http://www.spiegel.de/spiegel/print/d-13491893.html.

85. Completed in 1999.

86. See http://www.vam.ac.uk/content/articles/d/study-guide-daniel-libeskind/.

87. Opened in 2004.

88. Marcus Fairs, 'Ken the Pen', *The Guardian*, 22 January 2003, accessible at
https://www.theguardian.com/artanddesign/2003/jan/22/architecture.artsfeatures.

89. Opened in 2004.

second tallest residential building in Europe, the HSB Turning Torso in Malmö,[90] designed by the Valencian architect, sculptor and structural engineer Santiago Calatrava, twists 90 degrees around its axis. A taller version of this building, the *Infinity Tower*/*Cayan Tower*[91] designed by Skidmore, Owings & Merrill LLP rises in Dubai. The hyperboloid *Canton Tower*,[92] designed by the firm Information Based Architecture (Mark Hemel and Barbara Kuit) with Arup Group Limited, is a curvilinear twisted structure. It is the world's highest TV tower and also contains the longest spiral staircase (the open-air Sky Walk). It was the tallest structure in China until the construction of another curved and twisted building, the *Shanghai Tower*, designed by the architectural firm Gensler and Design Director Jun Xia. Completed in 2015, it is the third-tallest building in the World. The tallest building in the world, the *Burj Ḫalīfa*, designed by Skidmore, Owings & Merrill LLP as an abstraction of an organic spiral, opened in Dubai in 2010. A new interior but glass-walled spiral staircase from level 124 to 125 was added to the building in 2016.[93]

The *Temple* of the Community of Christ in the town of Independence, Missouri, designed by Gyo Obata,[94] is an example of the spiral structure in contemporary Christian religious architecture. The spiral of the minarets of congregational mosques built under the reigns of al-Mutawakkil and Ibn Tūlūn is revived in Doha's Qatar Islamic Culture Center 'Fanār' (Lighthouse)[95]. The spectacular spiral design for the Mosque of Copenhagen by Bjarke Ingels Group[96] was not realised, but two recently built mosques also feature spiral forms. The Mosque of Rijeka, Croatia, officially opened in 2013. Its original design was outlined by a Croatian sculptor, Dušan Džamonja (b. 1928, d. 2009) and the building was realised by architects Darko Vlahović and Branko Vučinović.[97] It combines a dome constructed of spherical segments and a spiral minaret. With the dynamic incorporation of the spiral, Muharrem Hilmi Şenalp, the architect of *Marmara Üniversitesi İlahiyat Fakültesi Camii* (The congregational mosque of the Faculty

90. Opened in 2005.
91. Completed in 2013.
92. Completed in 2010.
93. http://www.khaleejtimes.com/nation/general/burj-khalifa-unveils-a-new-attraction.
94. Dedicated in 1994.
95. Opened in 2008, see http://articles.islamweb.net/media/index.php?id=142422&lang=A&page=article.
96. Opened in 2008, see http://articles.islamweb.net/media/index.php?id=142422&lang=A&page=article.
97. See Kenan Šurković, 'The Mosque in Rijeka – a masterpiece of contemporary architecture', *Islamic arts magazine*, 11 May 2013, accessible at http://islamicartsmagazine.com/magazine/view/the_mosque_in_rijeka_a_masterpiece_of_contemporary_architecture/.

of Theology of the Marmara University),[98] revived the language of the light composed in architecture by triangular, zigzag, polygonal and spherical motives, in an unusually successful way.

Modern and contemporary spiral buildings have their origins in the similar designs of the pre-industrial past and can echo them as symbols for spiritual ascent, but they can also reflect ideas and ideals of biological, scientific, economic, technological and social evolution.[99] Most of the above mentioned new 'Towers of Babel' in our 'New Babylons' strive for conceptual purity and aesthetic perfection, ultimately mirroring the infinite 'polishing work' of evolution. The messy, accidental and chimeric character of the latter is also demonstrated, however, by such experimental constructions as the *ArcelorMittal Orbit*, designed by Anish Kapoor, Cecil Balmond, and Arup Group Limited for the 2012 London Olympics.

Conclusion

This paper intended to investigate some general trends and changes in the use of two structures in Western and Islamic art: oscillating concentric circles and the spiral. They both reflect the belief or desire that the individual, his/her community, humanity, life in general and ultimately, existence has (or at least can be given) an ultimate goal and reason; it is not merely cyclical or unstructured change. The unity of the origin and of the end of everything is a principle that is fundamental for monotheist philosophy and mysticism (but is by no means exclusive to it). It entails that the history of both the universe and the individual consists of a cycle (including numberless, but not infinite sub-cycles) from creation to salvation.

At the level of the history of mankind, the ultimate cycle of divine eschatology is mirrored in the idea of a 'golden age' and a desire to return to it. This idea allowed the promotion of the interests of establishments and anti-establishments alike. While establishments presented themselves as representatives of the divine order they maintained on Earth, and their rule as a golden age or a period leading to it, the anti-establishments claimed the need for reform or revolution to

98. Completed in Üsküdar (Istanbul) in 2015. See http://www.arkiv.com.tr/proje/marmara-ilahiyat-fakultesi-camii-ve-kultur-merkezi/5664. I am very grateful to Nur Kayar for bringing my attention to this extraordinary building.

99. According to an interview with Bill Baker, chief structural engineer of Burj Khalifa, the building was aimed to look 'like a torch in certain times of the day' and its design was 'derived from the geometries of the desert flower and the patterning systems embodied in Islamic architecture', see:
http://gulfnews.com/business/property/burj-khalifa-towering-challenge-for-builders-1.561802.

return to a ‘lost’, ‘original’ golden age. Even such an extremely future-oriented ideology as Communism maintained the idea of a golden age in the past, in the form of ‘primitive Communism’.

In Islamic and Western art and architecture, the oscillating concentric circles pattern concentrates on the creation and suggests that salvation is part of the same divine flow or breath as emanation. It presents the universe in a harmonious hierarchy. The spiral pattern indicates that though the direction towards the goal, and perhaps the goal itself, is not evident any more, it is hoped to be reached in a circumvoluted way, with focussed determination, overcoming the constantly deviating centrifugal drive. Revivals of the spiral in art and architecture reflect belief in a tortuous but fundamentally or potentially meaningful evolution.