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RESEARCH ARTICLE

Visual language in Mamluk architecture: A semiotic analysis of the Funerary Complex of Sultan Qaitbay in Cairo

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Abstract
Cultural background plays a significant role in the sphere of visual art. Semiotics as a discipline is recognized as a useful tool in gauging cultural background and identifying signs that might represent the message of a certain work. Given the rich cultural context of Mamluk architecture, this form of art can be used in studying semiotics. Semiotic tools were employed to interpret the expression of architectural forms and to formulate a subsequent understanding of these architectural forms by turning each element into a communication tool that elucidates meaning.

The Sufie tradition was the dominant Islamic practice during the Mamluk period, during which metaphysics, numbers, and geometry were regarded as indispensable tools in manifesting the nature of divinity and the order of being. A semiotic reading of the Funerary Complex of Sultan Qaitbay in Cairo, regarded as one of the perfect works of this era, was proposed to study the reflections of these notions on architectural works. Several messages were embodied in the building, such as functional or technical messages. The semiotic reading in this study is solely concerned with the spiritual message of the building.
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1. Introduction

Semiotics is defined as the “science of signs”. Semiotics generally involves the study of any medium as a “sign system”, and semioticians commonly refer to all types of medium as “texts”. Ferdinand de Saussure (1857–1913) and Charles Sanders Peirce (1839–1914) initially developed the principles of semiology for application to language.

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The semiotic theories of Roland Barthes (1915–1980), Algirdas Greimas (1917–1992), and Umberto Eco (b 1932) extended these ideas to different types of messages, including architectural works (Juodinytė-Kuznetsova, 2011).

Architecture can establish new sources of knowledge by shifting the focus from styles and techniques to content and meaning. Therefore, this paper aims to study the visual discourse created by the cultural dimension in architecture, particularly the use of space as a visual message. Semiotic tools were employed to demonstrate how the formal expression of architectural works formulates meaning to create corresponding readings of a reference object.

Tangible objects that imply a sense of divine presence, such as icons or statues, are forbidden in Islamic architecture. Therefore, other forms of visual engagement are necessary to create a suitable environment for prayers. The concepts of *paradise*, *cosmos*, and *creation*, which are based on the Hadith and the Koran, are the most probable sources of inspiration for Islamic artists. However, the fact that Islamic liturgy does not provide any hint on how prayer houses should be designed raises the question of how the architects assessed which concepts are suitable to be represented by mosques. This question is difficult to answer because of the lack of information concerning the procedures involved in the design process in Islamic architecture. Architects of this period did not leave textual references on rituals concerning the construction of buildings or any document to explain their work. Therefore, this study attempts to determine the purpose of these architects in creating these buildings. The hypothesis discussed herein consists of the following: first, the architects of this period used “language of architecture” to express certain ideas and second, given that Sufie tradition prevailed during this era, mosques were built as symbolic texts depicting the paradisal domain embodied in the Sufie tradition.

In this direction, the paper aims to employ semiotic tools to analyze the architectural language incorporated in the Funerary Complex of Sultan Qaitbay to determine how the architecture presents itself to be “read” by those who encounter it. Thus, the paper have the following goals: (1) to show that the architectural language used to comment on this building could be read as text; (2) to trace the cultural trends of this period and correlate them with the dominant modes of architecture; and (3) to explore the formal expression of the building from a semiotic perspective. In conclusion, the paper proves that semiotic analysis could be tested against the formal expression of Mamluk architecture to identify the patterns of meaning construction. A full reading of the architectural text of the example under study was introduced. This text depicts the two upper domains of the cosmos, including the heavens, the gardens, and the Throne, as described by Ibn Arabi.

This paper employed interdisciplinary methods crossed by several major areas: architectural theory and history on one hand, and semiotics and theories related to semiotics on the other. The following methods were used to deal with architecture as text: (1) a purposive study of the different models of semiology and their applications in visual communication; (2) a contextual study for a selected case that represents a rich cultural content; (3) a diachronic analysis of the Islamic cultural traditions, particularly the Sufie tradition, which was the dominant practice during medieval Islam; (4) a component analysis of forms, structures, and organization of the architectural forms included in the building; and (5) an adoption of a logical structure of the sign system within the selected case study.

Paper consists of the following: An introduction, two main parts, and a conclusion. In Section 1, an overall view of the notions of the paper is presented. In the first part, the concepts of semiotics as a tool for analyzing architectural works and architecture as a language are examined. In the second part, a semiotic analysis of the forms, structures, and organization of the selected case study is performed in two parts: first, a brief proposal is given on how the semiotic tools are employed to interpret the text in the building and second, these tools are applied on the building form. The findings and results of the research are summarized in Section 4.

2. Theoretical background

Ferdinand de Saussure and Charles Sanders Peirce are considered the fathers of semiotics. The primary concept in Saussure's semiology is the “sign”, which consists of a signifier and a signified; the former has a physical existence that carries the latter in an *arbitrary* relation that is characteristic of the *convention* of a community that shares the same culture.

Peirce offered another model comprising a representamen, an interpretant, and an object. According to Peirce, a sign has three modes: icon, index, and symbol. Saussure's system is generally appropriate to language and texts, whereas Peirce's model has a wide application, including different forms of media and visual arts. The semiotic theories of Roland Barthes, Algirdas Greimas, and Umberto Eco extended these ideas to all types of messages, including architectural works.

2.1. Semiotics as a tool for analyzing architectural works

Architectural forms have been subjected to semiotic research, albeit in quite limited attempts. Peter Kümmel's book was a pioneering step in this domain; however, his book is mostly regarded a catalog of visually conveyed phenomena. During the 1970s, a survey on the semiotics of architectural drawing was presented by Manar Hammad and Group 107 in Paris (Tasheva, 2012). Donald Preziosi argued that architecture is a type of visual semiosis, as opposed to linguistic meanings. Another prominent manifestation of the semantic tendency in architecture is the collection of essays entitled *Meaning and Architecture*, which was edited by Charles Jencks and George Baird and published in 1969. These essays eventually became the basis of what is now referred to as the “language of postmodernism in architecture” (Hale, 2000).

The semiotics of architecture developed by Algirdas Julien Greimas and the School of Paris considers any architectural work as a result of socio-cultural processes (Juodinytė-Kuznetsova, 2011). Another work worth noting is *The Architecture of the City* by Aldo Rossi during the early 1970s. In 1976, Gerard Lukken and Mark Searle of the Dutch group Semanet developed the Greimassian semiotic theory

into a usable method for analyzing the Church of Saints Peter and Paul in Tilburg (Lukken and Searle, 1993). The possibilities for readdressing the relations between form and meaning were explored with great interest around this time. Geoffrey Broadbent provided a good summary of this process in his essay published in *Architectural Design* in 1978 entitled "A Plain Man's Guide to the Theory of Signs in Architecture" (Hale, 2000). Nelson Goodman's book entitled *How Buildings Mean* and Martin Donougho's article entitled "The Language of Architecture" introduced further attempts in dealing with the notion of semiotics as a tool for understanding architectural expression (Donougho, 1987). Another major contribution to the field of semiotics is the introduction of the *Greimas and Courtés Dictionary* in 1982, which served as a helpful tool for scholars. A similarly helpful work is *The Glossaries of Symbols* by Chevalier and Gheerbant in 1988.

Few studies have dealt with the explicit application of semiotics on Islamic art and architecture. Among which, Rudi Paret's *Symbolik des Islam* published in 1958 made a distinction between two types of symbols, which he described as primary and secondary symbols. Another important study is Jacques Waardenburg's "Islam Studied as a Symbol and Signification System" in 1974. In his two studies, namely, "Das Ornament in der Islamischen Kunst" in 1977 and "Symbols and Signs in Islamic Architecture" in 1983, Oleg Grabar distinguished a *symbol* from a *sign*. As an example, he said that the minaret is a sign that suggests a function of calling for prayer. However, the minaret becomes a symbol when it reminds someone of Islam or when it appears on stamps that identify a specific country, such as the spiral minaret of Samarra. Thus, the sign attribute is always fixed, whereas the symbol attribute is variable (Grabar, 1983). An equally valuable study is the "Cosmology and Architecture in Premodern Islam" by Samer Akkach, which provides an extensive insight regarding the expression of cosmological issues in Islamic art and architecture.

2.2. Linguistic properties of architecture

The linguistic properties of architecture have long been noted in a generalized metaphorical way. Each building can be seen as an occasion for the development and application of some new vocabulary of forms, and each architect is a potential inventor of a new language or dialect of formal expression (Claflen, 1992). As embodiments of wealth, poverty, authority, or captivity, buildings become signs in terms of Eco's definition because buildings do not stand for themselves, but for something outside themselves (Eco, 1984). Thus, each building reaches beyond the sphere of the practical into that of the semiotic. An example is Charles Jencks's reading of Gaudi's Casa Batllo. Jencks shows that such a building, with its complicated form signifiers, can have numerous possible signifieds, consequently resulting in several readings (Jencks, 1980).

Another example was provided by a team of archeologists who realized that most of the earliest cities used to be circular, which were then replaced by square or rectangular cities over time. By relating this observation to the semiotics of forms, in which circles have dynamic nature and squares and rectangles have static nature, we can assume that round cities were inhabited by nomads, whereas square or rectangular cities indicated a settled life (Barabanov, 2002).

The linguistic nature of architecture is recognized in a manner similar to that of words, i.e., similar to words, buildings and their parts change their meanings over time. For example, churches and state houses had grand plazas, entry halls, and ornate doors in earlier times. Currently, commercial buildings attract the most attention. Likewise, the Parthenon, which originally signified a place of worship, is now primarily a symbol of Greek civilization (Jencks, 1980). Architecture may sometimes have certain components that reflect *enunciation*, such as the manner of building, techniques that points to time, and climatic treatments (Stroker, 1985). The School of Paris enumerated three types of spatial disengagement of an *utterance*, namely, spatial localization, spatial programming, and spatial spectualization (Lukken and Searle, 1993).

As an acceptable architectural writing system, the linguistic properties of architectural graphics are easy to recognize, with its interpretation available only in construction or architectural design sphere (Tasheva, 2012).

In Eco's paper on architecture, he argued that the interpretation of buildings could never be controlled by the designer, just as the author cannot predetermine the reader's reading. He provided an example through Modernist architects who believed that they would find universal forms beyond cultural relativity. However, given that architecture is a language, no signifier could exist without a signified and even these buildings, which were meant to be meaningless, were still readable (Eco, 1986). For example, "the architecture of *pilotis*, white walls, and ribbon windows is inevitably read as *Le Corbusian International Style*" (Jencks, 1980). Therefore, reading architecture as text is both easy and difficult at the same time; easy because textual conditions are apparent in any building as an organization of space and materials, which are often understood as the work of some known individual; difficult because the reading activates a complex stream of significant areas, all of which are potentially addressable through semiotic analysis. The more obvious semiotic languages include use, movement, technology, and construction. The less obvious are languages of regulation, iconography, and symbolism. Each of these is regarded a language of its own and has its own mix of natural and arbitrary characteristics (Taurens, 2008). Therefore, architecture is not a linear text and is not dominated by the author's intent. Rather, architecture consists of several texts simultaneously written in multiple languages, which sometimes involve multiple authors, each of which is intelligible only in a certain context (Claflen, 1992).

Janis Taurens proposed two approaches on the semantics of architecture. The first approach involves considering buildings as the principal architectural expression, in which a separate building can be analyzed in smaller meaningful architectural expressions. In this approach, the elements of buildings are "incomplete expressions" that can be considered only from the point of view of the building as a complete architectural language expression. In the second approach, the meaning is understood as context-dependent; the term "context" can be understood not only as a spatial

context of a greater architectural expression, but also as a wider context. In this approach, a city would be considered "a great architecture", as suggested by Leon Battista Alberti (Taurens, 2008).

3. Case study: A semiotic analysis of the funerary complex of Sultan Qaitbay in Cairo

The Mamluks in Egypt originated from the Ayyubid Dynasty founded by Saladin in 1174. After Saladin's death, his sons attempted to surround themselves with larger expanded retinues of Mamluks and had them involved in the internal court politics of the kingdom, which allowed the Mamluks to succeed the Ayyubids as rulers of Egypt and Syria. The reign of the Mamluks (r. 648–692AH/1250–1517AD) marked a breathtaking flowering of Islamic art. Cairo, their capital, became one of the wealthiest cities in the Near East and the center of artistic and intellectual activity.

During this era, Sufie traditions, with their strong symbolic tendencies, had strong influence on religious rituals. This period is considered one of the most flourishing eras in the history of Sufism, which led historians to use the term "orthodox Sufism" in describing Mamluk Sufism. In his book *The Problem of Sufism*, Richard McGregor argued, "Although the Ottomans' patronage of the Sufis is better documented, Mamluk support for them did not lag far behind" (McGregor, 2009). The variety of associated institutions, texts, and practices prove the roles the Sufis played in Mamluk Egypt. One approach in studying these roles focused on the development of buildings dedicated to Sufism; other approaches considered the individual figures of the period. The most distinguished example among these figures is Ibn Khaldūn (d. 808/1406), who reached Cairo in the 1380s. He took the post of Grand Qadi of the Maliki School of Law and was later appointed as director of the Sufi Hospice (*khānqāh*) of Sultan Baybars El-Jashankīr, the most prominent official institution of its kind in this period. Ibn Khaldūn's detailed discussion of Sufism in *Muqaddimah* preserves a careful and nuanced presentation, with particular emphasis on the position of Sufism among the other religious sciences in this period. (McGregor, 2009).

Mamluk buildings are characterized by the high quality of their masonry work, monumental size, and carefully constructed façades. From the street, the buildings presented the viewer with high domes, often with incredibly elaborate carved surfaces, slender minarets ornamented with inscription bands, tall pointed arch windows, and enormous arched portals with muqarnas hoods.

The main goal of Islamic architecture is to create a space in which humans can experience the presence of God. Depictions in Islam are usually abstract or symbolic because iconography is forbidden. Therefore, Muslim artists use lights, colors, and forms to depict the notions of the Koran and induce a sense of divine presence. This paper assumes that the symbolic tendencies of Sufism were reflected on architectural works to create this divine presence.

The Funerary Complex of Sultan Qaitbay in the Northern Cemetery in Cairo (1472–1474) is the most admired structure of the Mamluk architecture. This structure is not as monumental as other Islamic edifices are; rather, it focused on the refinement of proportions and details. In the subsequent sections, the attempt to read the symbolic messages embodied in this building by using semiotic tools is presented. This reading is concerned only with the spiritual message of the building, i.e., the "meaning" of the building and not the other messages included in the building by nature, such as function, technical, or economical messages.

3.1. Elements and tools of semiotic analysis

The following is a brief overview of the basic elements of semiotic analysis applied on the building under study to enable the reading of its architectural language.

3.1.1. Signs

Charles Peirce distinguished three types of signs (Chandler, 2002):

- *Iconic*: a sign that resembles the signified in appearance or possesses its character (e.g., a portrait or a diagram);
- *Symbolic*: a sign that does not resemble the signified, but which is arbitrary or conventional (e.g., languages); and
- *Indexical*: a sign that is connected to the signified by a certain cause and effect relationship (e.g., smoke or footprint)

The three models are not necessarily mutually exclusive, i.e., a sign can be an icon, a symbol, and an index, or any other combination. Table 1 shows that the sign system in the studied building contains all the three types of signs and that some of these signs bear dual or triple nature. In classifying these signs, only the most evident mode of signature was referred.

3.1.2. Codes

Signs must be organized into meaningful systems according to certain conventions, which semioticians refer to as *codes*. Such conventions represent the socio-cultural dimension in semiotics (Fiske, 1989). Members of a particular culture understand the code of their culture. For example, non-architects often do not understand the originality in modern architecture because they do not know the code of modern architecture, i.e., rationality, efficiency, and functionalism. Without knowledge of the architecture code, the non-architects saw cold, alienating forms instead of functional forms (Hattenhauer, 1984).

The wide framework of the Islamic culture and the Koranic texts could be used as a sufficient code for reading most of the text of the Funerary Complex of Sultan Qaitbay. However, a more specific code is still needed to provide a more accurate reading. Being dominant in medieval Islamic culture, Sufie traditions, particularly the cosmological conceptions in the writings of one of the most influential Sufie masters, Muhyi Al-Din Ibn Arabi, were used for this purpose. These writings were used to understand the cultural and religious background of the author of the text, i.e., the architect was helpful in providing a narrower range of synonymies for the "vocabularies" of the formal language of the building.

Table 1 Summary of the semiotic system included in the Complex of Sultan Quitbay.

	Signifier	Signified	Mode of sign	Denotation/ connotation	Paradigms/ syntagms	Metaphor/ metonymy	Articulation	Notes
The exterior								
1	Multiple vertical axes: minaret, soaring dome, and lofty entrance portal	Ascension	Indexial first order	Denotation	Paradigm	Metonymy	Double articulation	
2	The geometry of pointed arches	Arrow-like referring to the sky	Iconic first order Third order	Denotation	Paradigm Syntagm	Metonymy	No articulation	The whole arrangement of the levels of façade symbolizes the grades and the residences in the paradise
3	The two cubes of the elevation	The *Gardens* and the footstool	Indexial second order	Connotation	Paradigm	Metaphor	No articulation	
4	The compositional division of the façade into three levels	The three types of Gardens	Indexial second order	Connotation	Paradigm	Metaphor	Single articulation	
5	The dome with six transitional steps	Seven heavens	Symbolic second order	Connotation	Paradigm	Metaphor	Single articulation	
6	The minaret dominates the whole composition	The Throne	Symbolic second order	Connotation	Paradigm	Metaphor	Double articulation	
7	The minaret penetrating the whole composition	The overall existence of the Throne	Indexial second order	Connotation	Paradigm	Metaphor	Single articulation	Absence
8	The Cubical form of the building and the mausoleum	Stability and perfection +Combined with a sphere, they symbolizes the union of celestial and earthly	Indexial first order +Second order Third order	Denotation	Paradigm Syntagm	Metaphor	No articulation	
9	Bandings of stone "*Ablaq*"	The stones of the Garden, one of silver and one of gold	Indexial first order	Connotation		Metaphor	Single articulation	
10	Horizontal lines, multiplied from the base lines to the top	Solidity	Indexial first order	Denotation	Paradigm	Metonymy	Double articulation	
11	The "*shorafat"* or "*a'reyes"* cresting.	The angles surrounding the throne		Connotation	Syntagm	Metaphor	Single articulation	

			Iconic second order						
	The sameness, metric rhythm and symmetry of these figures	Equality	Indexial first order		Denotation			Metonymy	Double articulation
12	The eight parts of the minaret topped by an onion dome	The eight Gardens surmounted, and surrounded, by the Throne	Symbolic second order		Connotation	Paradigm	Syntagm	Metonymy	Single articulation
13	The geometry of parts of the Minaret:	The Throne	Symbolic second order		Connotation	Syntagm		Metaphor	Single articulation
	The square	The four corners of the seat	Symbolic second order		Connotation			Metaphor	
	The octagon	The shape of the throne	Iconic second order		Connotation			Metaphor	
	The circle	The Infinity and the endless power of God	Symbolic first order		Denotation			Metaphor	
	The eight columns	The eight holders of the Throne	Indexial second order		Connotation			Metaphor	
	The onion dome	The individuality of the only one God	Symbolic first order		Denotation			Metaphor	
	The point	The beginning and the end of all things, concentration of maximum energy and center of universe (GOD)	Symbolic first order		Denotation			Metaphor	
	The hollowness of the minaret	The Throne containing the earths and the heavens.	Indexial second order		Connotation			Metaphor	Double articulation
	The eight-point star patterns	The form of the Throne	Iconic second order		Connotation			Metonymy	No articulation
14	The dome raised with six levels	The domical seven skies rising without support	Symbolic second order	Third order	Connotation	Syntagm		Metaphor	Single articulation
	The numbers three, four, and 12 used in openings and decoration	The order of paradisiacal domain	Symbolic second order		Connotation			Metonymy	Single articulation

Table 1 (*continued*)

	Signifier	Signified	Mode of sign	Denotation/ connotation	Paradigms/ syntagms	Metaphor/ metonymy	Articulation	Notes
15	Multiple combinations of triangles, circles, and tripled elements.	The order of the paradisiacal domain	Symbolic second order				Single articulation	
	The light that penetrates the dome through 12 small windows	The initiation of the sky+Reflections of the Throne					Double articulation	
	The ornaments on the surface of the dome	Star-filled sky+Gardens	Iconic first order	Denotation		Metaphor	Single articulation	Absence
16	The allover decorative circles	Infinity	Symbolic first order	Denotation	Paradigm	Metaphor		
The interior								
17	The *octagram* or eight-pointed star with a point at the center	The link with both square and circle connotes wholeness, and eternity +The concept of *Tawheed*, the central point, is sometimes said to referred to *Ka'aba*	Iconic second order	Connotation	Paradigm	Metaphor	No articulation	The hexagon, which stands for the death is completely absent in all ornaments (absence)
18	Cruciform plan	The four elements/four sides of earth (material world)+the four rivers of esoteric knowledge (paradise)	Indexial second order Third order	Connotation	Paradigm Syntagm	Metaphor	No articulation	A double coded *sign*
19	The central court with a raised lantern	The tree of *tuba*+the Pillar of Light	Symbolic second order	Connotation	Paradigm	Metaphor	No articulation	
20	The square shape in plans of the court, the *Iwans* and the mausoleum,	A terminal standing.	Indexial first order	Denotation	Paradigm	Metaphor	No articulation	A double coded *meaning*
21	This *Qibla* niche	A gateway to Paradise	Symbolic second order	Connotation	Syntagm	Metaphor	Single articulation	
	Albaq inlaid patterns around the niche	The stones of the Garden	Indexial second order	Connotation		Metaphor	Single articulation	
	The nich being blocked	The hardship to enter	Indexial first order	Denotation		Metaphor	Single articulation	

	The radiating arrangement of the stones and the centrality	The unity and the one origin	Iconic first order		Denotation			Metonymy	Double articulation	
	This Qibla niche and the four niches leading to the *iwans* (triumphal arches)	Victorious passage of heroes	Iconic first order		Denotation			Metaphor	No articulation	
	The round arches of *Iwan El Qibla*	The original plan of El Ka'ba including the *"hejr"*	Iconic second order		Connotation			Metaphor	No articulation	Absence
	Multiple recesses within the *"Mehrab"* and two arches on both sides of it	Ibn Arabi's idea of the 'multiple gates'	Indexial second order		Connotation			Metaphor	No articulation	
22	The spiral decorations on the floor	The demons that will sink in Hell	Iconic second order		Denotation	Paradigm			No articulation	
23	The wood casing of the *minbar*	Unity of small units in one+the symbol of divinity+the geometry of the Throne	Iconic second order		Connotation	Paradigm		Metonymy	No articulation	
24	Stalactites or *honeycomb* decorations	The honey of the paradise	Iconic second order	Third order	Connotation	Paradigm	Syntagm	Metaphor	No articulation	
25	The vegetal and floral decoration	Paradise vegetations	Iconic second order		Connotation	Paradigm		Metonymy	Single articulation	
26	The playful use of lights/shadows and colors	Shadows of trees and colors of flowers and precious stones in the paradsise	Iconic second order		Connotation	Paradigm		Metonymy	Double articulation	

3.1.3. Denotation and connotation

Denotation is described as the "literal" or the obvious meaning of a sign, whereas connotation refers to the socio-cultural and personal associations of a sign, in which meanings move toward a subjective interpretation (Chandler, 2002). In his essay entitled "Function and Sign: The Semiotics of Architecture," Umberto Eco considered how an architectural element signifies its function. He provided an example with round arches, pointed arches, and ogee arches, all of which function in the load-bearing sense and denote this function; however, they connote diverse styles of conceiving this function (Eco, 1986).

Roland Barthes introduced the notion of the *orders of signification* (levels of meaning). According to Barthes, denotation is a *first order of signification*, whereas connotation is a *second order of signification* in which the simple motivated meaning meets an entire range of cultural meanings derived not from the sign itself but from the way society uses and values it. The range of cultural meanings generated in the second order coheres in the *third order of signification* into a full cultural picture (Seiler, http://people.ucalgary.ca).

Most of the signs in the complex under study are connotative. In a direct denotative reading concerning the obvious functions of these elements, most of these functions will be found functionless. The meaning that the elements connote is the real issue behind their existence. The sign system of the complex depends mainly on connotative signs. Each part of the edifice, i.e., the dome, the minaret, and the mausoleum, consists of a number of connotations of second-order signification, which, as a whole, comprises a third-order system that bears a specific signal of its own. As a whole, the building introduces a full cultural picture of the paradisal domain, as seen in the Sufie tradition, which will be subsequently discussed.

3.1.4. Paradigms and syntagms

Signs are organized into codes in two ways: by paradigms and by syntagms. A paradigm is a set of units that are all members of some defining category, from which the required unit is selected. A syntagm is the chain into which units are linked to make a meaningful whole. In written language, the letters of the alphabet are paradigms arranged in syntagms called words, which can be formed into other syntagms called phrases or sentences (Chandler, 2002). Semioticians often focus on the issue of why a certain paradigm instead of another alternative was used in a specific context, or what is often referred to as absences (Fiske and Hartley, 1978).

The syntagmic arrangement of the signs used in the building under study is remarkable. For example, the minaret illustrates two chains of signs that refer to the eight celestial gardens surrounded by or wrapped with the Throne. The paradigms used in each syntagm were carefully selected to convey a message. For example, using a hexagon instead of an octagon in the minaret would have destroyed the notion of the Throne.

3.1.5. Metaphor and metonymy

A *metaphor* expresses the unfamiliar in terms of the familiar through an imaginative interpretation (a throne communicates a status rather than a comfortable place to sit on). Metonymy involves the invocation of an idea or object by using associated details without imaginative interpretations (the crown invokes monarchy) (Hayward, 1996). In his model of postmodernism, Michael Graves opted for such semantic solution, consequently offering familiar forms as historical references regardless of their actual functions.

Most of the signs used in the Funerary Complex of Sultan Qaitbay are metaphoric, such as those referring to the skies and the Throne. Nevertheless, some of the signs involve metonymy, such as the floral patterns and colors in the inner decorations.

3.1.6. Articulation

Semiotic codes vary in terms of structure complexity or "articulation", which determines the rules of combining the paradigms. These codes have either *single articulation*, *double articulation*, or *no articulation*. A semiotic code that possesses double articulation can be analyzed in two abstract structural levels (Nöth and Santaella, 1999). At the level of *first articulation*, the system consists of the smallest meaningful units available (e.g., morphemes or words in a language). At the level of *second articulation*, a semiotic code is divided into minimal functional units, which lack in meaning by themselves but are recurrent features in the code.

The code used in the Funerary Complex of Sultan Qaitbay has single or no articulation in most cases. Double articulation appears rarely, as do the shadows in the interior, which are meaningless on their own, but connote the shadows of the trees and shrubs in paradise when added to the overall ornamentation program.

3.2. Semiotic reading of the text included in the funerary complex of Sultan Qaitbay in Cairo

With regard to the symbolic dimension in Islamic architecture, Loai Dabbour stated that, "Islamic architecture is created based on the essential harmonies of nature together with various symbolic meanings and theories of perfect proportions" (Dabbour, 2012). In an attempt to understand this symbolic dimension in the Funerary Complex of Sultan Qaitbay in Cairo, a semiotic reading of the formal expression of the complex was performed. This reading reveals that the building was perhaps meant to depict the two eternal upper domains of the cosmos, which include the heavens, the gardens, and the Throne, as described by Ibn Arabi.

3.2.1. Exterior

In his *hadith-based*[1] cosmology (Fig. 1), Ibn Arabi argues for the existence of the eight gardens located in a cosmic domain that will not be subjected to destruction and recreation. Seven of these gardens are hierarchically ordered in seven levels[2] with an eighth superior garden cutting across them (Fig. 1a). This domain is bounded by two spheres within the divine Footstool (Fig. 1c): the sphere without stars (*atlas*) is its upper limit, and the sphere with

[1] As based on speeches and preaches by the prophet on several occasions.

[2] The eight Gardens are Adan, Al-Firdaws, Al-Na'im, Al-Ma'wa, Al-Khuld, Dar Al-Salam, Dar Al-Maqama, and Al-Wasila.

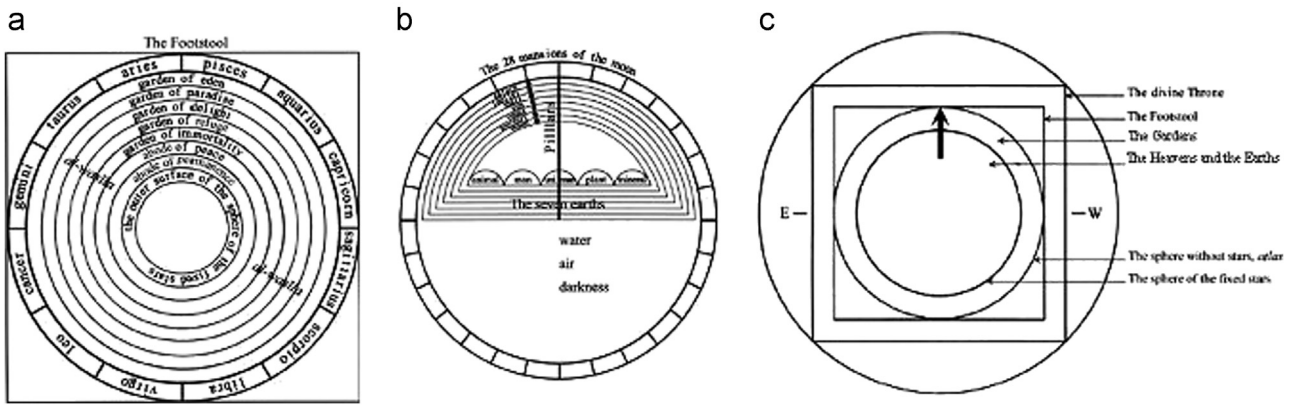

Fig. 1 The hierarchical order of the cosmos according to Ibn Arabi. (a) the Gardens within the Footstool, (b) the Heavens and the Earths and (c) the one the Footstool.

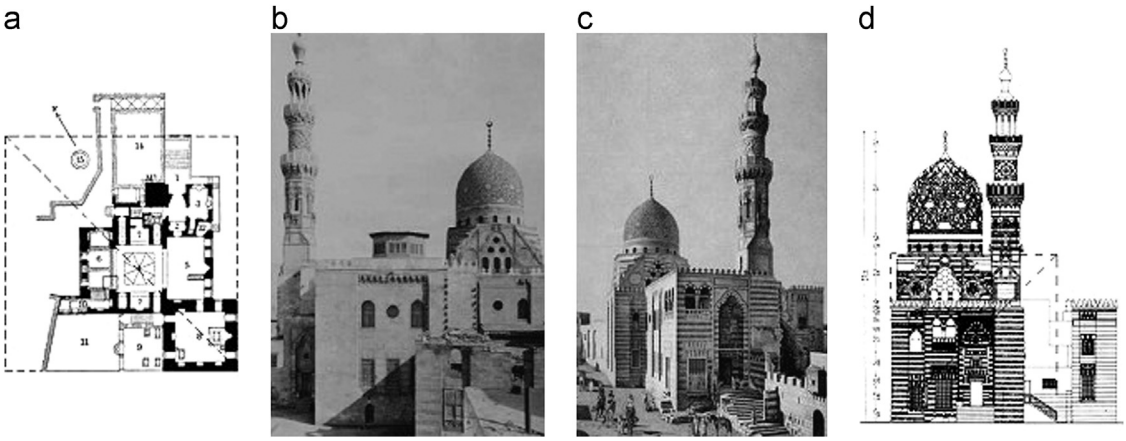

Fig. 2 The funerary Complex of Sultan Quitbay in Cairo.(a) Plan, (b) view form south, (c) view from north and (d) the northern facade.

fixed stars (*falak*) is its lower limit. The latter sphere instantly forms the ground of the gardens, whereas the upper limit forms the planetary skies, encompassing seven heavens resting on seven earths in the form of domed structures (Fig. 1b). In addition, he distinguished three types of gardens: Gardens of the Elites (Jannat Al-Ikhtisas), Gardens of Inheritance (Jannat Al-Mirath), and Gardens of Deeds (Jannat Al-A'mal), which are also hierarchically ordered in three levels (Akkach, 2005).

An observation of the façades of the complex (Fig. 2) reveals a double articulated message of *ascension* or aspiration to God. The second level of this message is formulated by the multiple vertical axes of the first level, which consists of a graceful minaret, a soaring pointed dome, and a lofty tri-lobed pointed arch of the entrance portal. The arrow-like pointed arches, which point to the sky, accentuate the idea.

The entirety of the building was divided into three particular syntagms to read the semiotic messages embodied in this exterior composition in detail: the main body of the Madrasa, the minaret, and the domed mausoleum. Each of these syntagms coheres multiple connotations in the third order of signification, which results in a full picture of a certain cosmic element.

The body of the Madrasa has three prominent paradigms: the cubical form, the tripartite horizontal division, the alterations of the horizontal bandings or the Ablaq pattern of red and beige masonry. The latter is a common reference to the stones of the Garden Jennah, which are "one of silver and one of gold." The horizontal multiplication of these lines from the base to the top represents solidity, which is emphasized by another powerful horizontal line of cresting Shorafat or Arayes.

Placing these three paradigms into one syntagm and interpreting the syntagm according to the code of Ibn Arabi's writings, the Madrasa is likely to represent the three gardens, namely, the Elites, the Inheritance, and the Deeds, hierarchically ordered in three levels. Given the static character of the cube in the first paradigm, the cubical form of the two masses of the Madrasa and the mausoleum conveys a feeling of stability and moral perfection. Combined with the sphere of the dome, these structures connote celestial and earthly oneness (Chevalier and Gheerbrant, 1988). Considering the plan and the façade of the complex (Fig. 2a–d), an imaginary cube defined by the outer walls of the mausoleum and the stairs surrounding the cube of the Madrasa can be easily recognized. In reference to Ibn Arabi's cosmic scheme (Fig. 1c), this imaginary outer

cube probably connotes the Footstool. As the name Arayes (meaning dolls) suggests, the upper cresting of the first cube might be a representation of the good people in the highest level at the Garden of the Elites or the angels surrounding the Footstool. A second level of articulation, which conveys an idea of equality, is found in the sameness, rhythm, and symmetry of these figures, thereby making the latter interpretation more likely. The decorative circles all over the building symbolize the infinity of these gardens.

The dome above the mausoleum, with its six transitional steps included in the imaginary lines defining the Footstool (Fig. 2d), most likely connotes the domical seven heavens. Similarly, the minaret, which dominates the entire composition, possibly represents the Throne. However, unlike the dome, the minaret does not rest on the roof, but rather penetrates the entire composition with its foundation starting from under the ground in reference to the overall existence of the Throne, which penetrates the seven earths and the seven heavens.

The tower reveals its primary meaning as an arrow-like vector-oriented structure that breaks boundaries to reach the infinite. The minaret in this building (Fig. 3) is a strong visual element that bears the most significant message. The minaret is a syntagm of its own, yet is a paradigm on the overall syntagm of the exterior form. With its eight layers (square, transition, octagon, balcony, circle, balcony, columns, and balcony) topped by an onion dome, the minaret bears a strong reference to the abovementioned eight gardens of the paradisiacal domain surmounted and surrounded by the Throne. In Sufie tradition, a point, as that at

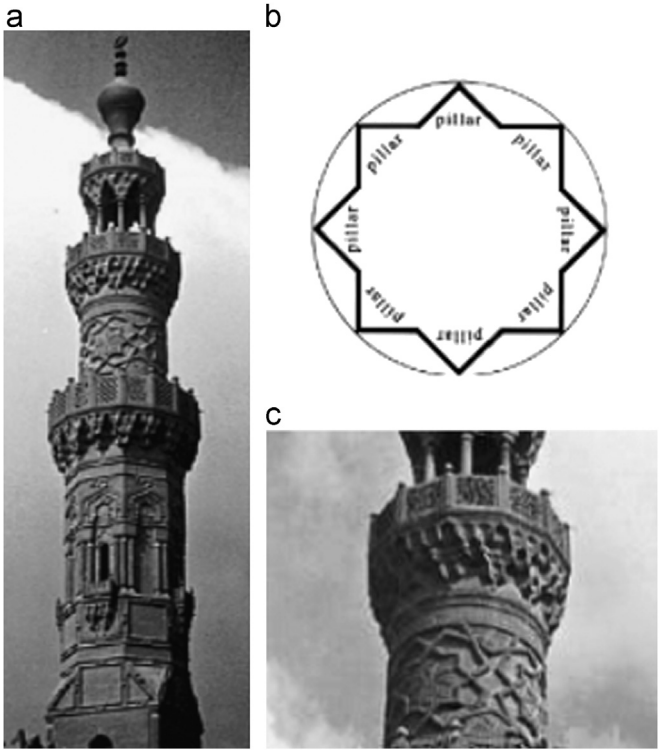

Fig. 3 The minaret. (a) View from south, (b) the form of the Throne according to Ibn Arabi and (c) details of the ornaments.

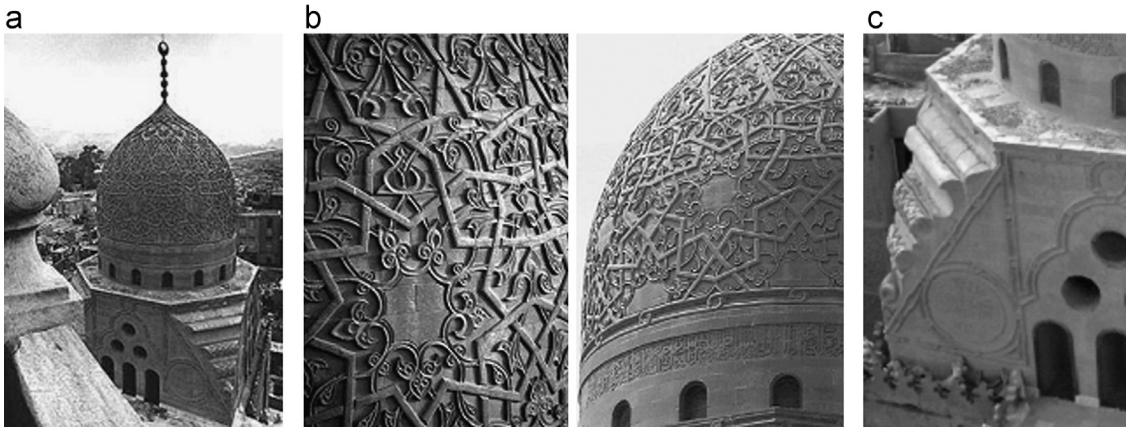

Fig. 4 The dome. (a) View of the dome, (b) the pattems on the dome and (c) the 6 steps of the base.

the end of both the minaret and the dome, symbolizes the beginning and the end of all things, a place of concentration of maximum energy, and the center of the universe and the sky.

Ibn Arabi describes the Throne as "a seat with four corners and four faces". "In each of the four faces of the Throne", he adds, "there are many pillars equally distributed". The Throne is also made hollow to contain the earths and the heavens. He explains that the bearers of the Throne are four pairs of archangels and companion prophets (Akkach, 2005).

By reading the component of the minaret and the geometry of these components, the signifiers for the characteristics included in this description were found: the square representing the four corners of the seat, the octagon referring to the form of the Throne (Fig. 3b), the circle representing infinity and the endless power of God, the eight columns referring to the eight holders of the Throne, and the point in the onion dome representing the individuality of the only one God. Thus, the minaret as a whole is a syntagmic architectural expression that connotes the Throne. The fact that the eight gardens are symbolically included within the upper part of the minaret supports this assumption. This idea is supported by a second level of articulation, in which patterns identical to the form of the Throne, as Ibn Arabi puts it (Fig. 3b and c), are used to decorate the shaft of the minaret.

Rising from the structure on the southeast side is a small but magnificent mausoleum dome (Fig. 4). According to the cosmological understanding of Sufism, the seven skies are domical in shape and are raised without support (Akkach, 2005) (Fig. 1a). Therefore, this dome signifies a direct iconic connotation to the sky.

According to Ibn Arabi, the numbers that underlie the order of the paradisal domain are three, four, and 12 (Akkach, 2005). Moreover, he related the triplicity of the divine creative act with reference to the circle (Akkach, 2005). Considering the base on which the dome rests, two signs can be recognized: first, the dome raised on a base with six steps (Fig., 4c) is an indexical connotation to the seven skies and second, the dome contains multiple combinations of triangles, circles, and tripled elements that signify Ibn Arabi's order of paradisal domain. The light that penetrates the dome through 12 small windows is a second-order of articulation for these two signs. Similarly, the ornaments on the surface, which are of two separate designs (Fig. 4b), namely, a straight-lined star pattern and an undulating lacework of floral arabesque, are direct denotations to a star-filled sky and garden. Thus, the dome bears both physical and spiritual meanings of the sky. A fact worth noting is that the stars on the dome, unlike those on the shaft of the minaret, are nine-point stars, which allude to the difference in meaning.

Fig. 5 Floors of Qibla Iwan.

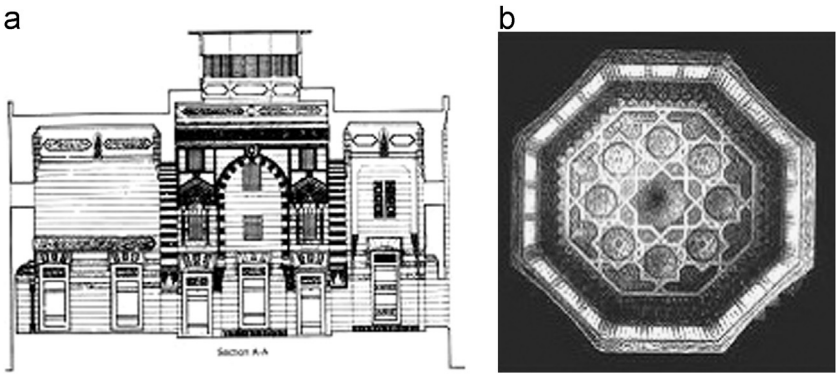

Fig. 6 Central court.(a) Section through the court and (b) The wooden lantern.

3.2.2. Interior

The paradise described in the Koran is a walled garden that has an orthogonal geometric plan (Ardalan, 2002). The plan for the main space of the complex, which is the Madrasa, is that of a modified cruciform (Fig. 2a). Within this cruciform are two unequal Iwans on the east and west and two smaller Iwans on the north and south, with a courtyard in the middle covered by a wooden lantern. In ancient cultures, the cross was used to depict the unity of the four elements of the material world, or the earth with its four sides (Barabanov, 2002; Chevalier and Gheerbrant, 1988). Accordingly, the cross plan adopted here probably marks the place of the material world underneath the structure (the domain under the ground of the gardens that will be consumed by the fire of Hell in the hereafter). The spiral decorations on the floor (Fig. 5) probably represent the demons and evil spirits who will sink in Hell.

With reference to the repeated Koranic imagery of the "gardens underneath which four rivers flow", Ibn Arabi stated that these four rivers represent the main sources of esoteric knowledge: the science of life, the science of spiritual states, the science of divine revelation, and the science of secrets (Akkach, 2005). Considering that these four Iwans in the Madrasa were meant as "sources of knowledge", the four Iwans could likely symbolize the four rivers.

Considering its anti-dynamic nature, the square shape in the plans of the court, the Iwans, and the mausoleum is a possible reference to a terminal standing (Barabanov, 2002) of paradise. The cross is also a familiar symbol of the tree of the universe or the tree of life (Barabanov, 2002). In addition, Ibn Arabi talks about the tree of *tuba* (penitence), which stands at the center of the gardens. This tree rises above the fence of the Garden of Eden, with its roots in the soil of the world and its fruits in paradise (Akkach, 2005). Considering that the central area of the court is covered by a lantern that rises to the level of the heavens between the dome and the minaret (Fig. 6a), the notion of the tree of *tuba* can be easily "read" in this court. Therefore, the cross-shaped plan is assumed to be double coded, referring to both the material domain downward and the paradisal domain upward.

Additionally, in Muslim traditions, God has a pillar of light whose base is below the seventh earth and whose top is below the Throne. Penetrating the seven layers of the earth and the seven vaults of heaven, this pillar acts as the *axis mundi*, around which existence revolves (Akkach, 2005). By considering that the light comes from the lantern and encompasses this area (Fig. 6b) and that both elements are in the "center of the world," we can create a whole concept of the court because the tree of *tuba* dominated by the pillar of light can be read. The Throne-shaped star in

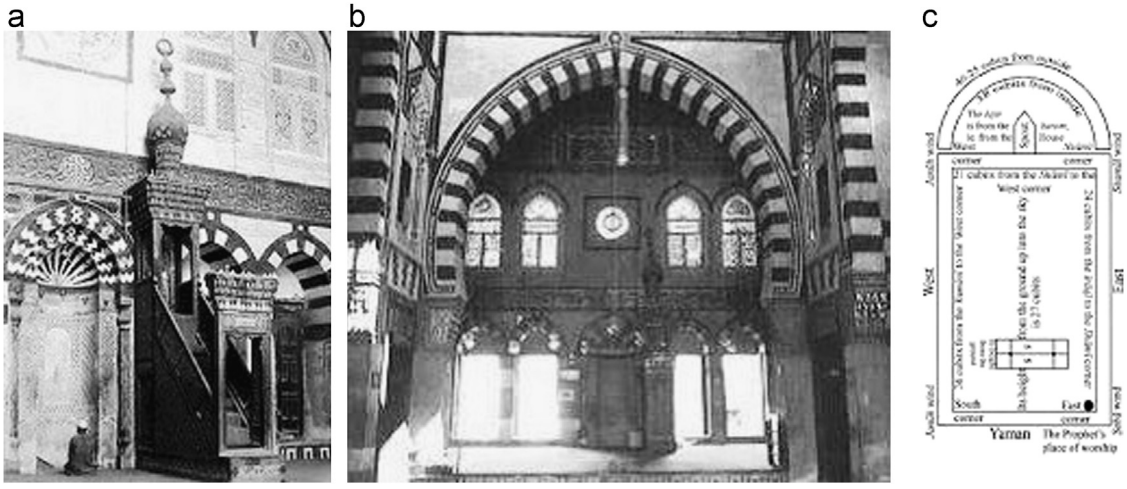

Fig. 7 Qibla wall. (a) The juggled voussoirs around the Mehrab, (b) View of the Qibla wall from the court and (c) The plan of Ka ba according to a medieval manuscripts [Akkach, 2005].

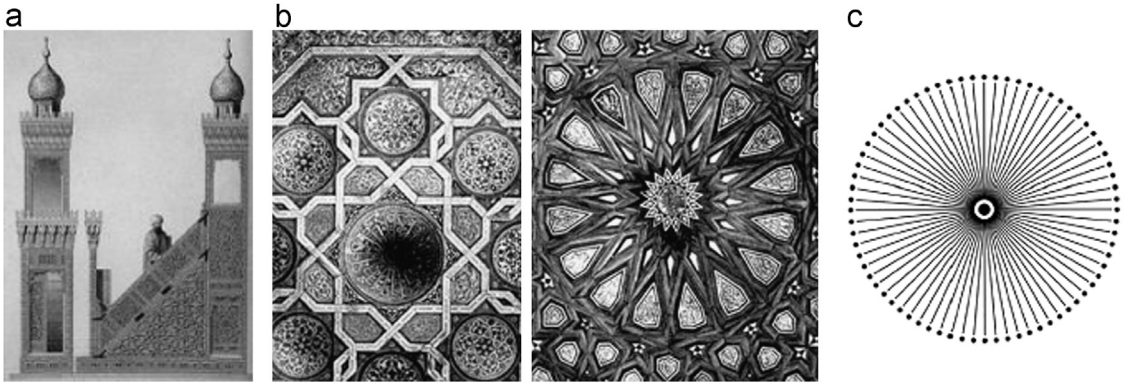

Fig. 8 The Minbar. (a) Elevation and side view (b) Detail of geometric decorations and (c) Symbol of divinity by Ibn Arabi.

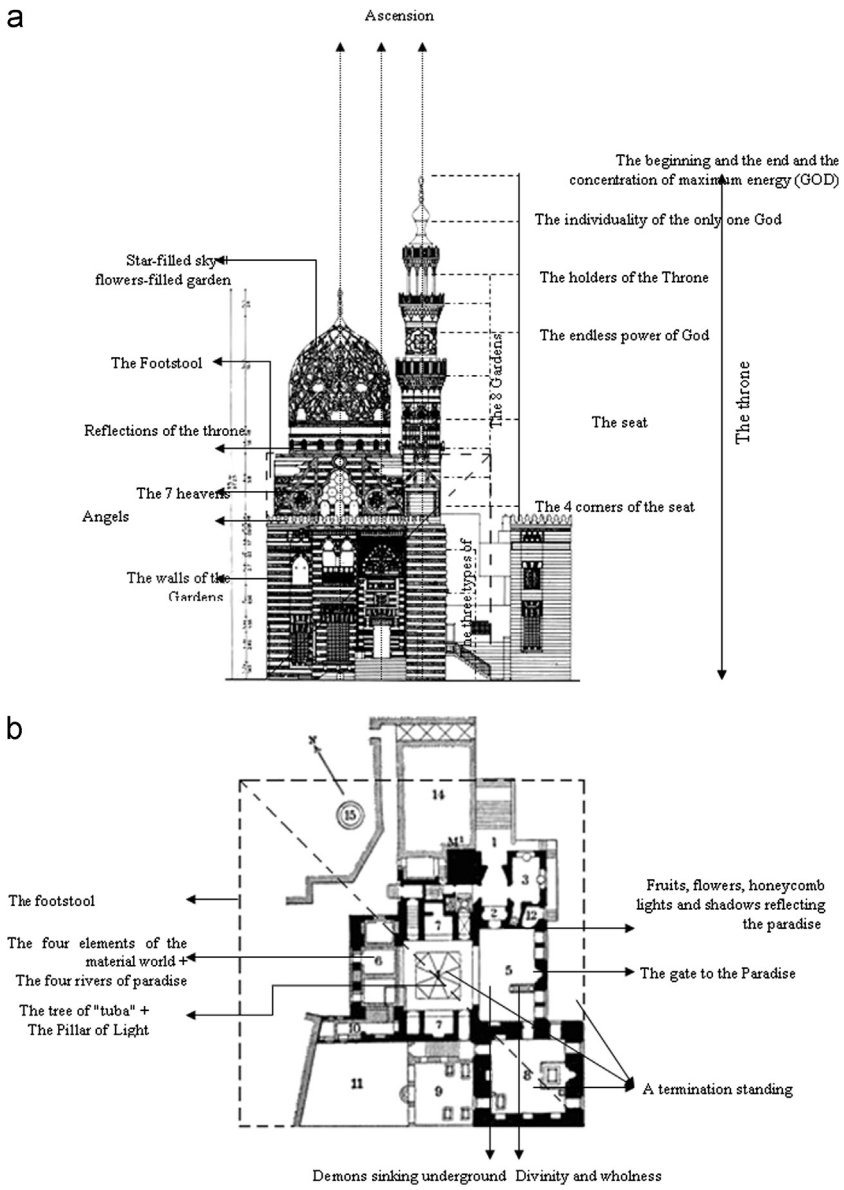

Fig. 9 Interpretation diagram (a) façade and (b) plan.

the inner part of the lantern works as a second level of articulation for the notion of holiness.

As in all mosques, the Mihrab niche, which defines the Qibla in Mecca, is the most essential feature and is a probable connotation to the gateway to Paradise. The juggled voussoirs (Fig. 7a) with Albaq inlaid patterns, similar to those on the façade, support this assumption. By being blocked, this hypothetical gateway evokes the image of the real gates of paradise, which are hard to enter (Dickie, 1995). The radiating pattern and centrality of the composition connote a concept of directional movement into this one point and add a second level of articulation. A fact worth noting is that only the niche of the Mihrab and the four niches leading from the courtyard to the Iwans are framed by squares (Fig. 7b). In traditional cultures, the form of the arch inside the square connotes the triumphal arch, which personifies the victorious passage of heroes and winners (Chevalier and Gheerbrant, 1988). The message here is double coded with Koranic text (37:3) around the Mehrab, referring to the rations coming from God to Maria.

The Rasa'il by the Ikhwan El-Safa Sufie group articulates a five-fold structure of the Qibla: the niche of a mosque, the Ka'ba, the Frequented House (Al-Bayt Alma'mur), the Footstool, and the Throne (Akkach, 2005). The reference to the Ka'ba is in the shape of the niche. Unlike the arches of the façade, this arch is almost round that the entire niche resembles the original plan of the Ka'ba including the Hejr, as illustrated in the manuscripts of this period (Fig. 7c). The idea of the "multiple gates" is echoed in two directions, namely, multiple recesses within the niche itself and two arches on both of its sides, so that the total number of niches is five (Fig. 7b).

In the Rasa'il, geometry was conceived as being based on the imaginary movement of the point. The point is viewed as the principle of dimension while having no dimension itself, which is the same as the number "one" being seen as

the principle of numbers while not being a number itself (Akkach, 2005). This concept is evident in all the geometrical motifs of the decoration of the Minbar or the pulpit (Fig. 8). The sides of the stairs of the Minbar are decorated with carved polygonal stars in reference to the concept of "El Tawheed" (oneness) and the symbol of divinity in Ibn Arabi's writings. Patterns of the Throne-like octagram stars decorate the balustrade and the sides of the pulpit. Through links with both squares and circles, the octagram connotes wholeness, stability, and eternity.

As described in the Koran, paradise is a pavilion with rows of flowers, trees, and shrubs (Ardalan, 2002). A powerful image of paradise is concretely expressed in the heavy use of colors and ornamentation, both floral and geometric. Paradise is also a place of wealth, joy, and comfort, which are reflected by the use of precious materials (Ardalan, 2002). Stalactites or honeycomb decorations, as well as the decorative motifs depicting fruits and grapes, are features referring to the food of the paradise. The playful use of light and shadow adds a second level of articulation to the ornamentation program, in reference to the shadows of the paradise trees.

The hexagon shape, which stands for the figure of death and is usually connected with an image of burial in ancient culture (Chevalier and Gheerbrant, 1988), is completely absent. The absence of this paradigm supports the introduced reading of the text and supports the assumption that the entire composition was meant to depict a death-free domain.

4. Conclusion

Architectural works depicting a message communicate beyond their functional purposes and contain inspirational and expressive values that are rooted in historical, cultural, and social contexts. Semiotic analysis of architectural works aims to identify the principle behind the message or text included in such works, i.e., to determine the idiom tying together all of the elements of an architectural work.

A message easily decoded by a medieval person is possibly inaccessible to a modern person because even though we can always claim that a certain meaning behind all the historical monuments remain, we can no longer assure which meaning was retained. Similar to certain verbal languages that died, the languages of some architectural works/styles can die. Semiotics, which tends to "focus on synchronic rather than diachronic analysis" (Fiske and Hartley, 1978), is helpful in understanding cultural myths, which the signs embodied in a certain architectural work might allude to.

In this study, semiotic tools were employed to interpret the architectural message of the Funerary Complex of Sultan Qaitbay. Semiotics help realize the meaning of architectural text, which was created based on a complex interplay of codes or conventions that people of the present time are unaware of. The messages incorporated within architectural works consist of signs that are understood only through certain codes. These codes are used to organize these signs. These signs can be read by using semiotic tools.

By analyzing the overall composition of the Funerary Complex of Sultan Qaitbay, as well as each element thereof (Fig. 9) (e.g., location of the elements, relations of the elements, and arrangement of the elements), we can prove that the building contains a symbolic text that depicts the two upper domains of the cosmos, which include the heavens, the gardens, and the Throne, as described by Ibn Arabi. The claim that the architect used the language of architecture in expressing this notion has been proven.

Table 1 summarizes the interpretation of the vocabularies used in this language, as well as the grammar ruling the language. Semiotic tools help explore the formal composition of this architectural work on the basis of a certain cultural code, which is the Sufie cosmic model in this case. Semiotic tools could help identify the patterns of meaning construction contained in this work.

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