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Islamic Geometries: Spiritual Affects Against a Secularist Grid

Wendy M. K. Shaw[1]

Abstract

Discussions of surface pattern in Islamic art resonate within broader tensions about the role of figural representation in communicating meaning. The question of whether geometric pattern communicates—whether it functions as a language without a code—reflects broader tensions about the relationship between secular and spiritual communication. Poised between discussions of modernism and Islam, the attribution of linguistic capacity to geometry serves as a measure for the possibility of abstracting pure reason from the religious roots of representationalism. This paper explores this question in four parts. First, it examines the articulation of geometric meaning in Islamic discourses. It then explores European discussions of geometry between language and ornament poised between a search for universal reason and universal spiritualism, both in modernist painting and in modern exhibitions. The final section the expressive capacity of artistic responses to historical Islamic isometric geometries in the adaptive reuse of historical Iranian arts as contemporary abstraction in the sculptures of Monir Shahroudy Farmanfarmaian (1928–1919) and in the popular transformation prints of M. C. Escher (1898–1972). It argues that the frequent recognition of intrinsic meaning in geometry, expressed in both premodern Islamic and modern secular interpretations, undermines art historical expectations of theorization as a necessary intermediary for communication. Geometry thereby functions as a language without a code.

Keywords Islam · Abstraction · Modernism · Geometry · Monir Shahroudy Farmanfarmaian (1928–1919) · M. C. Escher (1898–1972)

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After the twelfth century in societies of Islamic hegemony, isometric polyhedral geometries appeared frequently on surface treatments of objects large and small, from architecture to metalwork, manuscript pages to tombs.[1] While explicit emic theorizations of such treatments are rare, literary references to surface treatments frequently infer relationships with the Divine.[2] Conversely, modern art historical accounts of these geometries insist on their decorative nature. This modern discussion of Islamic pattern as non-representational and non-meaningful coincides with increasing assertions of Islamic art as characterized by an absolute ban on images.[3] A parallel association of Islamic art with geometric pattern described as decorative suggested Islamic visual culture as superficially attractive but less intellectually evocative than that of the 'West,' associated with figural representation. Yet during the exact same era of this demotion from art to craft, modernist art was increasingly discovering meaning in geometric abstraction and veering away from pictorialism. Modernist abstraction frequently resembled Islamic pattern in its reliance on isometric (evenly spaced) grids, as well as the tension concerning its articulation of meaning. How could geometry be declared traditional and anti-intellectual in the Islamic context yet progressive and innovative in modern Europe? Does geometry convey meaning? If so, what is that meaning and how is it conveyed?

This paper first examines the articulation of geometric meaning in Islamic discourses. It then explores European discussions of geometry between language and ornament in relation to both Islamic and modernist art. Finally, it considers the expressive capacity of historical Islamic isometric geometries in their transfer into the idiom of modernism in the work of Monir Shahroudy Farmanfarmaian (1928–1919) and in the prints of M. C. Escher (1898–1972). Testing early Islamic theories of geometry as infusing the subject with meaning, these examples suggest how geometry induces similar responses in diverse subjects, suggesting that it communicates regardless of cultural context. Geometry emerges as a language without a code, peculiarly capable of articulating meaning without the linguistic properties of culturally informed encoding and decoding (Hall, 1973).

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[1] I use the phrase 'societies of Islamic hegemony' to recognize the large populations of non-Muslims, including (in various regions and times) Christians, Jews, Buddhists, Hindus, Zoroastrians, ancestor worshippers, and animists who shared languages and literary cultures with a hegemonic social orders, including visual and musical practices, established under Muslim dynasties.

[2] 'Allah' is the word commonly used by monotheists in Islamic hegemonic lands to refer to the Divine. Yet this Divine is defined differently in various religions, ranging from the anthropomorphic connotations of the English use of 'God' to the ninety-nine attributes indicating the Divine in Islamic tradition. Emerging in anthropological discourses in the mid-1950s, the term 'emic' refers to explanations derived from culturally intrinsic discourses. Its opposite, 'etic,' refers to culturally extrinsic discourses.

[3] The supposed Islamic image-ban, often mislabeled as 'iconoclasm,' has been disproven in many works that point to its occasional nature as well as the misapprehension of its logic, which expresses a concern with comparison of the artist with the capacities of the unique Divine (thus risking polytheism). See Gruber and Shalem (2014).

Islamic Articulations of Geometric Meaning

In 1976, the influential Islamic art historian Oleg Grabar responded to discussions associating Islamic geometries with spirituality as misguided, arguing that without a universally acknowledged theorization attributing meaning to geometry, it would be impossible to affirm doctrinal meaning in Islamic cultures (Grabar, 1992, p. 51). Under the de Sausseurian postulate of the arbitrary nature of the sign, he assumed that the attribution of value to a signifier depends on a shared code. For example, the cross symbolizes Christianity because its repetition under cultures of Christian hegemony gives it meaning beyond two short intersecting lines. Grabar is right to observe that geometry in Islamic cultures communicates differently: there is no well-circulated, universally acknowledged text articulating geometry as representing the Divine. Nonetheless, his assertion depends more on the dominant model of communication than on the capacity of geometry to communicate.

Modern and historical theories of affectivity suggest non-semiotic modes through which geometry might convey meaning. Anthropologist Alfred Gell recognizes 'affective' objects as agents of their own meaning through enchantment (Gell, 1998). Similarly, the tenth-century Islamic scholars known as the Brethren of Purity explain that the physical study of geometry enables the mind to recognize abstraction, training the senses to move from appearance to structure and serving as an initial step towards the study of theology.[4] Liberated from its slumber in the physical world, the soul comes to recognize all forms of sensory data, like those of heavenly bodies and music, in its own essence. They promote geometry as a secret agent converting pragmatists into spiritualists through a natural and inevitable psychological process:

> … the soul abandons the use of the sensory faculties in grasping data when being self-reflective, since it finds all the forms of the sense data in its own essence. It is therefore in no need of the body, and is ascetic while dwelling in the world with it. It is alert to the slumber of inattentiveness and wakeful in the slothfulness of ignorance. It rises up by its own potency and is autonomous by itself. It departs from the body and exits the ocean of matter, and is saved from being captivated by nature. It is freed from slavishness to its bodily desires, and it is delivered from the pain of missing its corporeal pleasures. It is elevated higher as He said: *Good words rise up to Him and He lifts up the righteous deed* [Q35:10]… This is the ultimate aim behind the studying of the propaedeutic sciences that the sons of the philosophers and the pupils of

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[4] A secret organization of theologian-philosophers seeking reconciliation between Platonism and Islam under political doctrinal pressure in Basra and Baghdad, the Brethren of Purity anonymously authored fifty-two epistles for lay people about how to be Muslim. Their interpretations of music and geometry draw heavily on the Pythagorean tradition attributing divinity to proportionality, already well-incorporated into Islamic philosophy.

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the ancients graduated from. This is the credo of our righteous and esteemed brethren. (El-Bizri, 2012, p. 159)

A subject thus acquires knowledge not through analysis, concentration, or theorization, but through distraction and soaking in the 'ocean of matter,' articulated through the experience of geometric surfaces, which informs a habitus of recognition of the similitudes between geometric order and the order of divine creation.

Grabar's assumption that knowledge requires theoretical mediation or doctrinal universalism reflects a modernist Eurocentric understanding of how images communicate meaning, closely tied to much earlier Christian debates about images (Elias, 2012, pp. 43–83). In contrast, the Brethren consider geometry as instructing without theorization in a manner resembling Gell's theory of affect. They understand geometry as articulating a language already within the 'essence' of soul and heavens alike, thus communicating without any representational intermediary. Recognition of this communication relies not on the propagation of doctrine so much as abduction by the trained internal eye. As Lisa Golombek and Annemarie Schimmel point out, focusing less on history or moralization than representational Christian counterparts, 'Islamic art does not teach the glory of God by admonition but rather through example or imitation.' (Golombek & Schimmel, 1975, p. 89). This does not preclude the existence of visual representations of religious histories and devotional manuals, or any of a myriad of historical and devotional works that relied on pictorialism as part of their expressive programs (Gruber, 2018). However, the aesthetic evocation of the Divine easily occurred without pictorial representation through geometric pattern on Qur'anic pages and calligraphic panels, as well as in mosques, shrines, tombs, and ritual often incorporating trance-inducing music and heady scents.

One test for the Brethren's promise of geometry communicating beyond mathematical prowess emerges through poetic evocations of geometry, particularly in architectural descriptions. For example, this segment of the Persian-language epic poem about the love of Zuleikha for the Prophet Joseph by the theologian and poet Nur ad-Din Abd ur-Rahman Jami (1410–1492) hinges on the capacity for architecture to articulate erotic and ultimately divine desire:

She took by the hand the master artist:
From his hand's every finger, a hundred arts and more! Accomplished in architect's rule,
A guide in astronomy's laws.
His figuration made easy the Almagest's toil And his doubt might cause Euclid to fear;
If his grip lacked a compass,
He traced its work with two fingers;
When he wished a line's mark, of a sudden,
From his innermost nature, drew he straight – and without ruled paper! He might leap far as high as the satin-dark arch.

And fix corbelations upon Saturn's own vault! When his hand took a turn to the chisel,
The very stone turned softer than the rawest wet brick; When he set his mind on to design,
Lovely traces in thousands sprang up there in tendrils; The world's structures, and all without zenith or base, Might he show, all of them, on the nail of his finger;
Through the painting he wrought, when so cast he his glance, From his pen-brush, adorned he the Tablet of Being;
In figuration, whatsoever from his pen-brush he drew, From its flow, every soul sprang alive!
Upon a stone, if he traced a bird's figure,
The very stone turned weightless – flew forth from its place! (Barry, 2004, p. 204)

This is clearly not any old love shack. Rather, the only fitting enticement for a prophet is the world redrawn, not as it appears in nature, but in its cosmic dimensions. This artist who articulates the universe with a compass and then imbues the resulting figurations with life can be none other than the Divine. The world is a palace of seduction in which the underlying order revealed by compass and ruler (the standard means of drawing geometries) causes befuddlement, wonder, and awe in the Divine akin to the transgressive and transcendent moment of sexual union approached, if not realized, in this setting.

The poem reflects and informs an experience of architectural awe. Geometric forms do not represent the Divine so much as remind human subjects to recognize the Divine agency structuring everything, including art, nature, and ourselves. The ease with which poetic metaphors confuse substance resembles the allusions between forms, where a vessel may also be a house or a bird in a realm where all forms are manifestations of a Divine will. The sage Jalal al-Din Rumi (1207–1273) thus explains, 'The mystics' words appear in a hundred different forms, but if God is one and the Way is one, how can their words be other than one? They do appear in different guises, but in substance they are one. Variety occurs in form; in substance all is unified" (Thackston, 1994).

From Etic to Emic Art Historical Explorations of Meaning in Islamic Geometry

Since the nineteenth century, art historical interpretations of Islamic geometries have reflected shifting interests of art history as a discipline that organizes aesthetic artifacts towards one that uses art to elucidate lived culture (Fig. 1). The architects

and art historians first brought the isometric pattern of the Islamic world to European attention did through compendia copying, collecting, and categorizing surface treatments that 'cleaved objects from the third dimension' to produce abstract patterns devoid of context, enabling their industrial and architectural deployment to express both newly defined regional identities and exoticism.[5] Applying the colonial logic of mining global resources for European industrial development, these albums rendered the aesthetic visual cultures of the planet as mutually equivalent, potentially interchangeable formal units. Peeled from their original substrates and contexts, forms lost existing intracultural significations and became signals of regional identity within a globalizing order.

Conceived as *grammars* rather than as *dictionaries*, these compendia avoided attributing semiotic meanings to geometric patterns. They considered how forms might best be placed in relation to each other to formally articulate meanings unique to the modernity that brought them together. Emphasizing structural logic through terminologies like 'architecture' (Jones), 'techtonic' (Jacobsthal), 'aesthetic geometry' (Bourgoin), and 'graphic alphabet' (Blanc), European grammars of ornament established the isometric polyhedral geometries of Islamic hegemonic cultures as decorative forms useful for a modern, secular, rational world of manufacture (Labrusse, 2016).

The attribution of a linguistic term like *grammar* to visual forms encouraged an organizational scheme favoring tropes like transcultural progressive movement traceable to unified origins. In the 1850s, Gottfried Semper had paved the way 'for a methodic parallel between linguistics and the science of form,' while Max Müller had established language as a scientific endeavor that used forms to excavate origins (Labrusse, 2016, p. 323). Alois Riegl recognized the problem of interpreting ornament: 'the innate arbitrariness of the relation between signifier and signified in the linguistic sign is not encountered in the relationship between a viewer and an ornament, a relationship in which the subjective—that is, also bodily—involvement of the viewer plays a primary role' (quoted in Labrusse, 2016, p. 324). His *Stilfragen* of 1893 incorporated historicized the grammars of a previous generation, attributing extrinsic meaning to style as evidence of cultural interaction. His framing assertion—that Hellenistic naturalism followed a Hegelian

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[5] These include Claude-Aime Chenavard (1836) *Album de l'ornemaniste, recueil compose de fragmens d'ornemens dans tous les genres et dans tous les styles*; Pascale Xavier Coste (1837–1839) *Architecture arabe, ou monuments du* Kaire; Girault de Prangey (1846) *Monuments arabes d'Égypte, de Syrie, et d'Asie Mineure, dessinés et mesurés de 1842 à 1845*; Jules Goury and Owen Jones (1842 and 1845) *Plans, Elevations, Sections, and Details of the Alhambra: From Drawings Taken on the Spot in 1834*; Owen Jones (1856) *The Grammar of Ornament*; Auguste Racinet (1869–1873) *L'Ornament Polychrome*; Osman Hamdi and Marie de Launey (1873) *Usul-i Mi 'mari-i 'Osmani/ L'Architecture ottomane*; Léon Parvillée (1874) *Architecture et decoration turques au XVe siècle*; Johann Eduard Jacobsthal (1874) *Grammatik der Ornamente*; Charles Blanc (1880), *Grammaire des Arts decoratifs;* Jules Bourgoin (1880) *Grammaire elementaire de l'ornement*; Heinrich Dolmetsch (1887) *Der Ornamentenschatz: ein Musterbuch Stilvoller Ornament aus allen Epochen*; Imperial Archaeological Commission (1905), *Les mosquées de samarcande*. For further information on these texts, see Labrusse (2016) and Graves (2021).
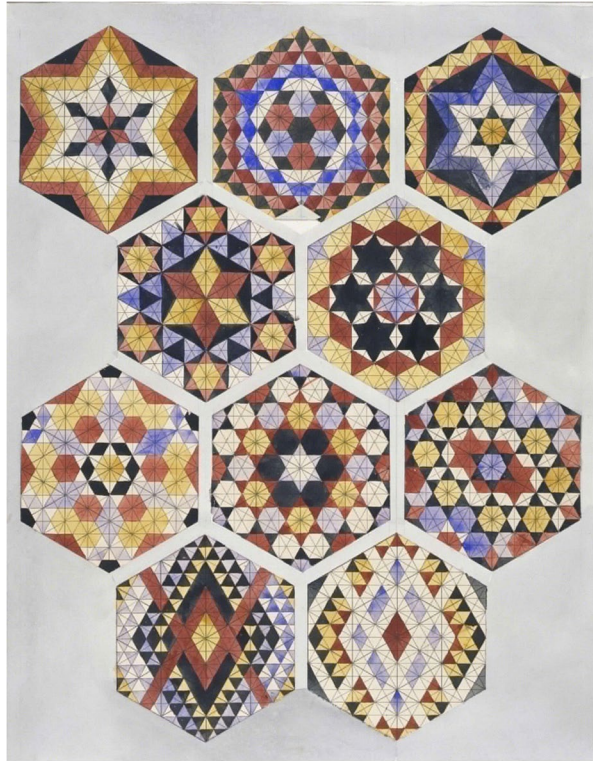
'forward-oriented march' towards Islamic abstraction—produced an allegory of cultural difference that considered emic meaning irrelevant to the study of a history of forms (Flood, 2016a, p. 83). Relieved of its intellectual heritage, Islam was reformulated as a category indicating identity and tradition. His association of subjectivity with purely individual experience excluded it from his understanding of scientific knowledge, in sharp contrast to the Brethren who described such subjectivity as the vessel of Truth. Some critics even interpreted geometry as reflecting a racialized (and even demonic) Semitic aversion to images, going so far as to attribute Picasso's engagement with Cubism to his Andalusian roots (Flood, 2016b, p. 46). As Margaret Graves points out, reductive approaches to Islamic pattern during this formative era 'minimized the cognitive dimensions of Islamic ornament and obscured the extent of the craftsmen's achievements,' establishing 'a modernist paradigm of two-dimensionality for ornament' (Graves, 2021, p. 21). Associations with Islam were often framed as restrictive rather than affirmative, exemplified by Racinet's comment that the interdiction against figural imagery in Islam led to the construction of 'ornament, the framing of which was an amusement to their geometrical minds' (quoted in Graves, 2021, p. 39). The insistence on Islam as characterized by an intrinsic lack of figuration, articulated by Hegel as reflecting an insufficient balance between transcendence and immanence achieved

in Christian representations of the Divine, foreclosed the possibility of Islamic thought reflecting on aesthetic meaning in a mode distinct from that of European interlocutors (Flood, 2016b, p. 49).

Subsequent Islamic art historians divested themselves of such demeaning inferences by avoiding the attribution of meaning entirely. In 1949, Ernst Kühnel (1882–1964) underscored the 'obviously decorative intention' of isometric geometries, in which 'the eye of the viewer is not arrested by the pleasant detail, but … by the kaleidoscopic passing of an ever-changing and disappearing harmony of unreal forms … decisive is a decorative intent which is devoid of a meaningful purpose.'[9] Following disparaging French Orientalist evaluations of Islamic art as rigid, joyless, and sterile that emerged under colonial regimes of the 1930s, in 1979, Richard Ettinghausen attributed the extensive use of pattern to a culturally essentializing psycho-pathology of *horror vacui*, using the word 'syntactic' to consider the integrated totality or *Gestalt* of patterned form (Flood, 2016b, p. 52; Ettinghausen, 1979). In 1983, Oleg Grabar defined ornament as 'any decoration that has no referent outside of the object on which it was found, except in technical manuals.' He distinguishes this from 'decoration,' defined as 'anything applied to a structure or an object that is not necessary to the stability, use, or understanding of that structure or object.'[4] In 1988, Lisa Golombeck suggested a 'textile mentality' (Golombek, 1988). In 2006, Jonathan Bloom and Shiela Blair put a positive, but equally essentializing, spin on *horror vacui* by renaming it 'Cosmophilia,' or love of ornament (Blair et al., 2006).

In contrast, Gülru Necipoğlu and Yasser Tabbaa have considered geometries as Neoplatonic inheritances and as political signifiers, suggesting that initial intrinsic doctrinal meanings probably dissipated over time (Necipoğlu, 1995; Tabbaa, 2001). Such signifiers are often magnified in the modern period, where geometry can indicate regional affiliation, through use in modern art or institutions like airports, or a broader connotation such as 'Islamicity' itself, as with its frequent use in museums and galleries of Islamic art. Such interpretations conceive of the meaning of geometry in a semiotic framework, such that particular forms gain meaning when they denote specific entities, such as a dynasty or a nation.

A third approach associates geometry with mystical practices grouped as 'Sufism.'[6] In 1973, architects Nader Ardalan and Laleh Bakhtiar expressed this approach in *The Sense of Unity: The Sufi Tradition in Persian Architecture*.[7] Referring to the similar effort at the 1976 Festival of Islam in London, Grabar belittled such tactics as coming from a 'curious mixture of Western orientalists and Islamic fundamentalists' (Grabar, 1992, p. 51). Ironically, in compiling the book, Ardalan expressed the modernist goal of recognizing Sufi texts and poetry as a national Persian inheritance while marginalizing their Islamic context, a goal fitting for a

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[6] Diverse and historically commonplace within more legally oriented interpretations of Islam, these practices aim to guide the individual towards a personal union with the Divine.

[7] Chicago and London: University of Chicago Press.

work whose dedicatory page announces that it was 'published on the occasion of the twenty-fifth centenary of the foundation of the Persian Empire, with the assistance of The Ministry of Science and Higher Education of Iran.' The disassociation of Sufism from Islam enabled its inclusion within a secular national program in Iran and was designed to appeal to a Western audience already primed to discover secularized, West-washed spirituality via the East through the legacies of Theosophy, Perennialism, Zen Buddhism, and Yoga.

Bridging the 'neoplatonic' and spiritualist approaches to meaning, recognition of the mathematics of Islamic geometries during the 1980s and 1990s enabled a more thorough understanding of the intellectual sophistication of patterns, as well as modes of their intellectual transmission, previously understood as manifestations of non-intellectual artisanry (Chorbachi, 1989; Bier, 2012; Lu & Steinhardt, 2007; Özdural, 1995, 1996). Neither formalist nor spiritualist, it suggests mathematics as producing meaning through technical aptitude rather than through articulating experience beyond the quiddity of form itself. Scholarship engaging with tessellated calligraphy enables this association without addressing the semiotic agency of geometry (Ahuja & Loeb, 1995).

Recent scholarship has again challenged exclusively secularist approaches to Islamic arts. Art historian Samer Akkach engages the thought of the influential visionary Muhyi ad-Din ibn Arabi to explain how multiple manifestations of mathematics express a 'sense of integrated spatiality that brings cosmology, geography, the human body, and architecture together, allowing them to be seen in terms of one another without need for theoretical mediation' (Akkach, 2005, p. 36). Carol Bier suggests an 'algorithmic aesthetic' that depends on the segregation of pattern from material form, allowing geometry to function as a form of parable (*mithal*) for the supra-visual realm. 'If each geometric pattern itself serves as a *mithal*, an exemplar, each offers a likeness to the other, but also a resemblance to something else' (Graves, 2018, p. 508). Susan Yalman's intricate analysis of the theology and politics underlying the use of solar imagery under the Seljuk Dynasty in thirteenth-century Anatolia underscores the intertwined nature of these supposedly contrasting categories (Yalman, 2012). Similarly, Margaret Graves undermines the binarization of concept of form, arguing that separating surface treatment from associated forms misconstrues the structure of geometric practices. She suggests that the interaction between three-dimensional, everyday objects and the mathematical structures of surface treatment that invite the subject to move between the realms of materiality and immateriality, rendering the objects allusive in relation to their everyday presence (Graves, 2018).

The meaning of geometry mattered little in a field emphasizing the categorization of aesthetic objects over their emic meanings. Yet the increased instrumentalization of art history as cultural ambassador after World War II placed the question of geometric interpretation within the tension between secularism and religion in the interpretation of Islamic culture. Supporting visions of national

progress rooted in secularizing Westernization, many historians developed interpretations of the Islamic world segregating culture from religion, while others sought a role for Islam within dominant secular, Western-oriented models of culture. The recent emic turn challenges universalist translations of geometric meaning, considering instead how the idea of meaning itself is culturally determined.

Geometry and the Spirituality of Modernism

Far from unique to the consideration of Islam, the tension between secularist art history and spiritual interpretations of geometry emerges as well in relation to the modernist grid. Contrasting rationalism with spiritualism, art historian Rosalind Krauss begins by articulating the apparent lack of meaning in modern geometries.

> The grid announces… modern art's will to silence, its hostility to literature, to narrative, to discourse… walling the visual arts into a realm of exclusive visuality. The arts, of course, have paid dearly for this success, because the fortress they constructed on the foundations of the grid has increasingly become a ghetto… development is precisely what the grid resists… It is what art looks like when it turns its back on nature. (Krauss, 1979, p. 50)

Absent of pictorialism, she assumes that paintings lack language, lose audience, and exit history in a manner parallel to the judgements of an a-historical, inarticulate realm of Islamic 'ornament.' She understands this grid to have no precedent: 'the form that is ubiquitous in the art of *our* century while appearing nowhere, nowhere at all… in a place that was out of reach of everything that went before' (Krauss, 1979, p. 52).

Nonetheless, as she associates modernist grids with the Renaissance perspectival legacy, her assertion of meaninglessness breaks down. She conceives of pictorialism as a language naturally and transparently binding signifier and signified, 'the science of the real' (Krauss, 1979, p. 52). The grid, in Krauss' analysis, broke with this truth both by introducing a purely mathematical form and, through it, inviting spirituality—as expressed in numerous modernist manifestos. 'The grid is a staircase to the Universal,' she explains, straddling the 'secular form of belief' allotted to art in the nineteenth century. 'The peculiar power of the grid, its extraordinarily long life in the specialized space of modern art, arises from its potential to preside over this shame: to mask and to reveal it at one and the same time… the grid's mythic power is that it makes us able to think we are dealing with materialism (or sometimes science, or logic) while at the same time it provides us with a release into belief (or illusion, or fiction)' (Krauss, 1979, pp. 54, 55). Analogously with Levi-Strauss' structuralist interpretation of myth, Krauss posits that the grid enables modern society to maintain and repress a contradiction between the values of science and those of spiritualism.

Emphasizing the nineteenth century progressive historiography of modernism, Krauss ignores the intervention of Islamic art on the work of several modernists claiming spiritual meanings for abstraction. Wassily Kandinsky travelled to Tunisia in 1905 and visited the 1910 exhibition of Masterpieces of Muhamaddan Art

at the Munich World Exposition in 1910, a year before writing his *Concerning the Spritual in Art*. He inspired Paul Klee, August Macke, and Louis Moilliet to also visit Tunisia in 1914 (Troelenberg, 2011; Schafroth, 2015). Rather than recognizing the colonial, extractive relationship with Islamic pattern at the genesis of European abstraction, Krauss cleaves to a myth of a linear history of art emerging through the progressive call and response of male geniuses.

Her observations about the function of windows in spiritualist paintings resembles religious interpretations of Islamic pattern the cited above. She explains, 'the bars of the window – the grid – are what help us to see, to focus on, this matrix… they function as the multilevel representation through which the work of art can allude, and even reconstitute, the forms of Being' (Krauss, 1979, p. 59). Likewise, she notes that the grid extends in all directions, rendering all boundaries arbitrary, enabling them to point to infinity, while at the same time introjecting 'the boundaries of the world into the interior of the work; it is a mapping of the space inside the frame onto itself' (Krauss, 1979, pp. 61, 62). For her these two functions oppose each other, with the former pointing to the science of optics, and the latter pointing to the dematerialization of the surface that enable symbolic, cosmological, spiritual, and vitalist interpretations that oppose science and materialism. She pathologizes this conflict as schizophrenic, much as Ettinghausen pathologized Islamic pattern the same year. Nonetheless, Kraus interpreted the antihistorical, antidevelopmental, and antihistorical paradigm she attributed to the grid as enabling an unprecedented intermediality between music, dance and visuality.

Much as Islamic discourses, like Jami's poem cited above, often rely on kaleidoscopic intermediality, several scholars who claim that abstraction has no meaning nonetheless employ intermedial metaphors to evoke their encounters with Islamic pattern. Describing a ceiling in the Alhambra Palace, Jones likens the seven patterns to the seven notes in the musical scale.[86] Similarly, Kühnel draws on the synesthetic terms of music to suggest that the rhythmical alternation of movement enabled geometry to render a harmonious effect.[87] Ettinghausen used the analogy of polyphonic European music to understand the complexity of Islamic pattern, opining that excess made it collapse in the same manner as choral music gave way to opera in Europe (Ettinghausen, 1979, p. 18). Likewise, Grabar suggests that the ambiguity and ambivalence of arabesque give the viewer subjective freedom. 'Like the beads of the holy man, the meditation it suggests is not in itself but in the mind of the beholder.'[88] Just as the Brethren would have predicted, without any theoretical intermediary, it would seem that geometry itself does a tidy job of communication.

Amy Goldin's 1976 review of the new Galleries of Islamic art at the Metropolitan Museum in New York exemplifies such permeability between spiritualist interpretations of modernist and Islamic art. Her engagement with modernist art primed her to recognize meaning in form, in a manner denied by art historians of the same generation—even Oleg Grabar, writing in the same issue of *Artforum*.

Islamic artists…. see [surface] as a physical rather than a purely visual entity. Western attention to pattern emphasizes its mathematical principles and sees its salient characteristics in abstract process: pattern is a self-generating, infinitely extendable form. But equally vital to artists is the Islamic conception of

the surface as dimensionally ambiguous, that is, as simultaneously pointing to the extension and the particular density of the material being worked. Surfaces are permeable, vulnerable matter. Grillwork and openwork are visually analogous to the modulation of the surface by light and dark, … Here it would be very difficult, if not impossible, to derive a mathematical formula to account for the pattern. Its regularity is unmistakable, but flowing and organic…

Islamic art seems to me to be deeply concerned with visual density, an esthetic element that has only very recently been identified and stressed in the West. We arrived at it by way of tactility or texture, which became a radical 'issue' with the work of Morris Louis and its interpretation by Clement Greenberg in the '60s. Greenberg saw Louis's saturated surfaces as a mark of historically progressive form, a logical development of Cubism's explosion of plastic form into shallow, surface-hugging fragments. The canonically modern 'preservation of the picture plane' that every art student learned in the '40s required close attention to the interactions of figure and ground, lest the activity of the former destroy the continuity or 'integrity' of the latter. By the '60s, this concern became even more stringent. The surface was drawn into ever greater tautness, until the abstract picture plane dropped out of artists' conversations, to be replaced by the color-saturated physical surface itself (Goldin, 1976, p. 47).

Her knowledge of the formal discourses of modernist abstraction informed her understanding of pattern as an agent of meaning. While the Brethren's assertion that knowledge of geometry enables openness to theology may not hold, the patterns of Islamic art have enabled Goldin to recognize through them the instability of form emphasized in many Islamic teachings about the relationship between the temporary, mundane world and the Reality of the supranatural, Divine realm.

Her comparison with cubism is particularly apt. In his analysis of the representation of three dimensions on a two-dimensional plane as a problem in the study of optics, ibn al-Haytham (965–1040) emphasizes the importance of moving around the object.

A partial un-concealment of an opaque object in vision is always associated with the concealment of some of its surfaces … when an opaque box that has the form of a cube is within my field of vision, I can only see three of its sides simultaneously, which appear as skewed planes rather than squares. Nonetheless, when I look at these intersecting planes, I see a cube with sides as squares. Unlike its appearing aspects, the orthogonal structure of the cube, which is delimited by square sides, is preserved in its geometric form as a solid within the *distorting* visual effects of perspective … Either perception is frontal, and the cube faces the eye in such a way that one of its sides is perpendicular to the axis of the virtual cone of vision, and hence appears as a square; or the third dimension of the cube is shown via an inclination in depth when viewed laterally (el-Bizri, 2005, p. 196).

Thus, the foundational text enabling the development of European perspectivalism, ibn al-Haytham's *Optics*, written in Arabic in the early eleventh century and

translated into Latin at the turn of the thirteenth—already articulated observations made in Europe only eight centuries later, exemplified by Jean Metzinger's 1913 discussion in *Cubism and Tradition*:

> Already they have uprooted the prejudice that commanded the painter to remain motionless in front of the object, at a fixed distance from it, and to catch on the canvas no more than a retinal photograph more or less modified by 'personal feeling.' They have allowed themselves to move around the object in order to give under the control of intelligence a concrete representation of it, made up of several successive aspects. Formerly a picture took possession of space, now it reigns also in time (Mitchell, 1977, p. 177).

When we walk around to the other side of the cube of art history, the entire history of perspectivalism, defined by the artificial constraint on movement, becomes an aberration in the geometric understanding of sight, to which the early Twentieth-century 'discovery' of cubism in Europe constitutes a return.[8] Through this late theorization, Goldin demonstrates a greater ability to analyze the meaning of pattern as expressed through its own, direct, agency than Islamic art historians unwilling to interpret Islamic art through emic sources and uninterested in the formal languages of modernism. In solving the racialized understandings of Islam as an agent in aesthetic meaning in early considerations of Islamic pattern, the secularist imperative emphasized by many Islamic art historians ironically allowed for more recognition of spiritualism in modernist European works seeing spiritual inspiration in 'the East' than in the geometries of the Islamic world that inspired them.

Modernism and Spirituality: Monir Shahroudy Farmanfarmaian and M. C. Escher

Inspired by the Islamic geometric tradition in radically different ways, the art of Monir Shahroudy Farmanfarmaian and M. C. Escher exemplify the tension between secularity and spiritualism in the languages of pictorial and geometric representation.

Tiled with mirrors, Monir's sculptures use a spiritually inflected Iranian visual idiom within the framework of the modernist, secularizing spaces of art galleries and museums (Figs. 2 and 3). Bahman Kiaorstami's 2015 film documenting her work emphasizes her embodiment of the Western model of individual genius. Yet her sculptures are largely manufactured by the same artisans who adorn permanent and makeshift shrines in Iran. Her description of their facility with a string, rather than the arduous measuring of modern architects, underscores their perpetuation of an 'intellect of the hand' often undervalued in the Euronormative prioritization of theory (Kiarostami, 2015; Graves, 2018, p. 215).

Grandchild of grammars of pattern, her work translates the visual attraction of the shrine into the secular commodity of the gallery. 'In 1974 or 1973 I went to Shiraz

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[8] For a comparison of the historiography of meaning in Islamic geometries and perspectivalism, see Shaw (2019).

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with Robert Morris, a conceptual artist. We went to the Shah Chiragh Mosque and I made a deal that I would only go inside if they agreed to sit for half an hour and observe the shrine. Watching that space was like seeing live theatre, quite inspiring for me. People would come and go, praying and supplicating at the shrine and all this activity was reflected in the surrounding mirrors. I was very impressed by the mirror work there. I wished I could take a piece of it off the walls of the mosque and install it in my living room so that I could appreciate it everyday…'[9] Recognizing the spiritual affect of the shrine, she erases the spiritual performativity of the medium that she extracts from it. Her capacity to reuse forms deemed as 'traditional crafts' in the realm of high art depends on this distance both from ritual and from tradition. It resituates the historical contexts of Islamic geometries within the framework of modernist geometries. Frank Stella points out that her time in New York allowed her to discover Tehran. 'She was able to take what in our world would be decorative and apply it and just use it as if the tiles had come down off the sides of the mosque.'[10] Like European collectors of the nineteenth century placing purloined mosque tiles in their homes and galleries, her translation of tradition into art depended on its isolation from religion. Her recognition of patterns made in paint by lifting one piece of painted glass from another as manifestations of the same tessellations as formally represented by geometry reflects the intrinsic communication of form without intermediary.

In contrast to Farmanfarmaian's connections to Islamic traditions, the Dutch master draughtsman and printmaker M. C. Escher encountered the patterns of the Alhambra as a tourist (Fig. 4). Much like Goldin, he describes them as directly addressing him in a visual, artistic language. Yet he cannot understand meaning without representation. In a letter penned during his second visit to the Alhambra in 1936, he comments, 'What a pity the moors didn't use forms derived from nature, such as building blocks, fish, birds, reptiles, or humans. Recognizability is so important to me that I've never been able to do without it.'[11]

He addressed what he perceived as a representational lack through the intervention of his brother, who saw similarities between his sketches and two-dimensional crystallography. Even with this evidence that pattern bore a visual resemblance to the structure of the natural world—that, in effect, it already represents it—Escher persisted in conceiving as pattern as abstract. To remedy this, he envisions an image that makes the implicit meanings of patterns explicit.

> I began to see the possibilities offered by the regular division of the plane. For the first time, I dared to create compositions based on the problem of expressing endlessness within a limited plane. …

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[9] Minutes 248–630.

[10] Minute 29.

[11] Minute 31.

And endless series of three-dimensional men is rushing down the stairs. Gradually they lose their plasticity as they frieze, flatten, and turn into the pattern of a regularly organized tessellation. The motif simplifies upward towards its original form, the diamond. Three diamonds, in white, grey, and black together form a cube, and thus regain their plasticity. The cube turns into a block, a house, and from the house a human product. The people reappear, to endlessly repeat their cycle. The familiar tile floor motif on the terraces is the same original motif again, the diamond, the link between two and three dimensions, the idea upon which the entire composition is built… the landscape behind the houses is intended as a maximum of naturalness in contrast to the mathematical tessellation at the bottom of the print. (Lutz, 2019, minutes 32–37)

If geometry serves as the agent of its own meaning, confounding the semiotic definition of language, then Escher's painting would appear to function as its translation into the idiom of European painting. Replacing the shape-shifting forms of Jami's poetry with shape-shifting forms across a two-dimensional page, Escher renders that which is implicit in the language of pattern explicit in the language of European verisimilitude. Yet in that latter tradition, good mimesis requires a semiotic structure between signifier and signified; the painted image represents an absent signified. This is patently not the case in Escher's work, where form transforms into form with no referent to reality. In the end, Escher presents a representationally overdetermined version of the sense infinite connectedness offered in Islamic pattern. Transforming the forms of tessellations from diamonds to men and back again, or from fields to ducks or birds to fish or reptiles to drawings of reptiles (in other transformation prints) represents each element through the tradition of European verisimilitude but eliminates the grammar of its language in which the representational parts need to cohere into an entire message. It is, perhaps, this overdetermination that renders Escher's work popular in a manner not reflected in the relative paucity of art historical analysis, which might sanction its displaced representationalism as 'kitch.' Escher in effect only provides independent words enabled to fit together by a focus on morphology rather than meaning, ignoring the semiotic function that he valorizes in the Western tradition while articulating the non-semiotic language that disturbs him in 'Moorish' pattern. If there is a meaning—that of the underlying structure of being that can become articulate in any form—it is just as well articulated in the abstractions from which he was initially inspired.

Geometry: Language Without a Code?

Theorization dissects setting and ritual into supposedly exchangeable parts placed on the operating table of analysis. Yet those parts are as likely to explain the experience of a culture as the dissection explains the personality of a corpse. It requires the relinquishment of the intrinsic meanings of praxis, rendering it possible to speak of Islam without Muslims. This tendency is perhaps nowhere more pronounced than in the theorization of geometry as it has moved outside of art history. Ardalan's initial forays into the theorization of geometry as a 'sense of unity' encountered through

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Fig. 2 Monir Shahroudy
Farmanfarmaian, Untitled,
1976. Mirror glass, stain-
less steel, plaster, and wood,
1276×789×40 mm, Tate
T13735
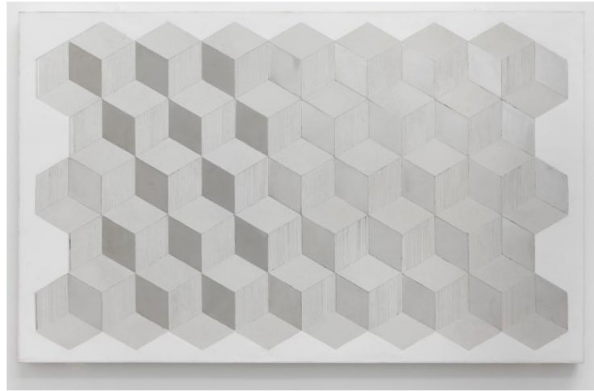
poetry and architecture gained a more broadly spiritualist vocabulary in the works
of Kenneth Critchlow, who founded the Visual Islamic and Traditional Arts Depart-
ment at the Royal College of Art in London in 1984, which moved to the Prince's
Institute of Architecture in 1992–1993. More recent authors and teachers like Eric
Brough and Richard Henry have taught geometry as technical drawing depending
on the mathematical articulation of form, focusing on the transformation of sub-grid
into pattern while minimizing the relationship with Islam or spirituality. Seeking the
underlying rules under the apparent form, this procedure recalls the protestant prior-
itization of scripture underlying modern Orientalist approaches to religion through a
history of origins. Yet it also enables the secular practitioner to encounter the trans-
formation from one mathematical structure to another: the movement of forms at
the heart of geometric expression, as well as at the heart of the Islamic recognition
of substance in a multitude of forms. Even without the intermediary of Islam, the
destabilization of matter intrinsic to it remains articulate in geometric practice.

Geometric pattern attracts viewers in its own language, leaving them to translate
it into their own vernacular. While the modern era has repeatedly aimed to sequester

Fig. 3 Monir Shahroudy
Farmanfarmaian, Lightening
for Neda, 2009. Mirror mosaic,
reverse-glass painting, plaster on
wood. Queensland Arts Gallery
Foundation

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Fig. 4 M. C. Escher, Cycle, 1938. Lithograph. MC Escher Foundation
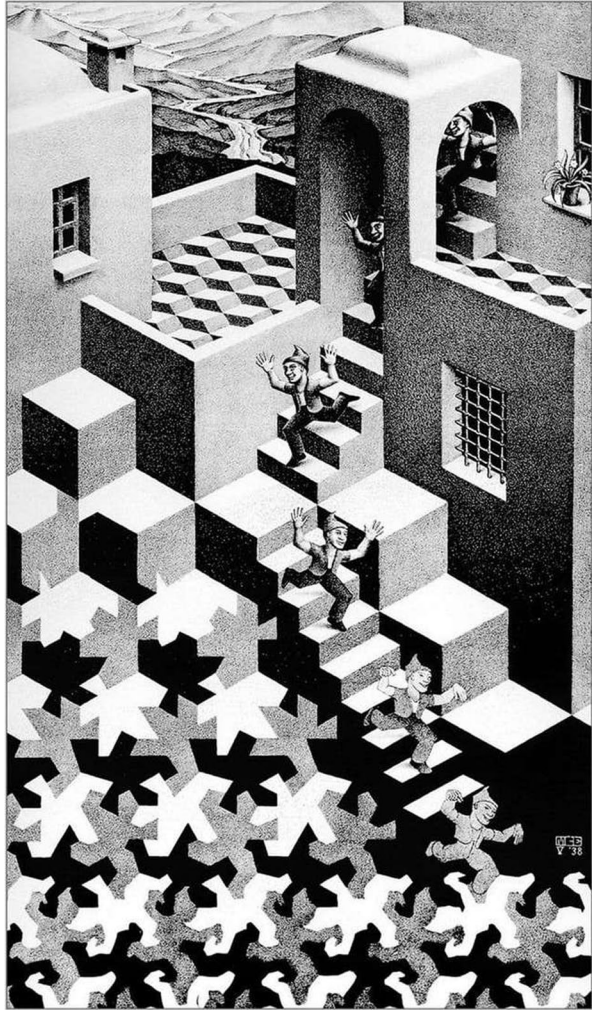
the spiritual in the rationalized spaces of grammar and gallery alike, the repeated tension between the secular and the spiritual pervading discourses of Islamic pattern in the modern era might point to a certain truth to the language of geometry the Brethren described: how ever we theorize them, geometric patterns ignore the intermediary. They insistently speak their own language. This conflicts with the primacy of the human subject in modern thought as somebody who encodes and decodes. A language without signification or intermediary necessitates a transcendental signifier so deeply entrenched in the human—nay, the cosmic—that it becomes the primary language. Call it what you will—math, God, Allah, ornament, or decoration… it has no history or religion. It just is.

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