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***Circles and Centers: A Review Article***

CAROL BIER

*The Textile Museum, Washington, DC*

**Geometric Patterns from Islamic Art & Architecture**, by ROBERT FIELD. Tarquin Publications, Norfolk, UK, c1998.

"The Nature of Islamic Ornament, Part III: Geometric Patterns," exhibition on view March 17-July 18, 1999 in the Hagop Kevorkian Fund Special Exhibitions Gallery at The Metropolitan Museum of Art.

Circles of equal radius, when tight-packed, naturally combine in two ways. One method yields centers that form a triangular grid; the other method yields centers that form a square grid. These basic mathematical considerations underlie the play of pattern in Islamic art. By selecting centers in a triangular grid, one may establish a rhombic grid or a hexagonal grid. By connecting centers to form lines and angles, or highlighting curves, many seemingly complex patterns may be generated from simple algorithms. The triangular grid lends itself to six-pointed stars and hexagons; the square grid may yield eight-pointed stars and cross forms. Lines and angles may then be established to create more relationships of stars and polygons. Further connecting lines (and erasing lines) may produce interlaced patterns.

Two recent works in different formats but with similar objectives explore aspects of geometry in Islamic art. Robert Field has compiled a sweet little book (6"x8½") of photographs, diagrams, and commentary called *Geometric Patterns from Islamic Art & Architecture*. Stefano Carboni has organized a gem of an exhibition (around thirty objects), "The Nature of Islamic Ornament, Part III: Geometric Patterns" at The Metropolitan Museum of Art.

Both works, small as they are, seek to present to a broadly conceived public the basic visual components of complex geometric patterns as they occur in Islamic art. The book's objectives are simply stated: it is an invitation to look, to see, to discover, to wander. It stems from the author's own sense of wonder spurred by his attempts to draw the patterns he encountered in Granada and Seville, which developed into appreciation of diversity and invention that he seeks now to share with others. The exhibition is the third in a four-part series on Islamic ornament, all organized by Stefano Carboni, Associate Curator in the Department of Islamic Art at The Metropolitan Museum of Art. The first two parts, on calligraphy and vegetal ornament, were each exhibited in 1998; the fourth part on figural decoration was on view from September 1999 through January 2000.

Field's book presents photographs of art in architecture (for example, doors, grills, ceilings as well as walls and floors, but no textiles) and a few illuminated manuscript pages with accompanying analytical drawings showing the underlying grid that structures each pattern. Each photograph is accompanied by an identifying caption, which mentions the monument and its location, but gives no date. There is a brief bibliography of general works on Islamic art and architecture, including the standard works on geometry in Islamic art.<sup>1</sup> The key

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<sup>1</sup> Such as Parman Bourgoïn, *Arabic Geometrical Pattern and Design* (Dover, 1974) and Issam El-Said, ed. by Tarek El-Bouri, and Keith Critchlow, *Islamic Art and Architecture: The System of Geometric Design* (Garnett Publishers, 1993).

contribution of this little book is in the association of photographs of patterns with line drawings which show underlying grids.

Carboni's exhibition labels provide data for each object, but there is no catalogue (in spite of references to cat. nos. in the exhibit scripts). He assumes an evolutionary model of development and argues for pre-Islamic origins for designs elaborated upon by craftsmen within the Islamic realm. The public is provided neither a bibliography, nor a list of activities to pursue, both of which could have been easily accommodated with hand-outs. For museum visitors who pay this exhibition its due, an immediate result is that they find heightened awareness in visual responses to geometric pattern throughout the Met's stupendous Islamic galleries as well as in arts of other cultures. One hopes that Carboni's four conceptually-based exhibitions will be reproduced in a book format. His treatment of these interrelated themes succinctly presents significant ideas for further exploration.

Both Field's book and Carboni's exhibit are organized around a progression of shapes. The book (without a table of contents, index, or headings) begins with patterns containing squares or rectangles (pp. 6-11), and progresses to square grid-based patterns (pp. 12-19), followed by eight-pointed stars (pp. 20-21), and square-grid based patterns with eight-pointed stars (22-27, 32), then square-grid based patterns with octagons (pp. 34-37). The final section (pp. 49-54) explores what the author calls isometric patterns, including those with hexagons and six-pointed stars. I would prefer use of the term triangular grid, parallel to that of square grid; what Field calls the isometric grid is itself based on an invariable relationship of circles with centers connected to form equilateral triangles. In the exhibition, the objects are organized thematically by patterns illustrating particular shapes and forms—circles and interlaced circles (1-5), squares "or four-sided polygons" (6-9), stars "drawn from squares and triangles inscribed in a circle" (10-17), and multi-sided polygons (18-23). A nice touch is the allusion to geometric pattern around the perimeter of the upper walls on which have been affixed numerous isolated elements of Islamic geometric patterns in wood and ceramics.

Many recent works that touch upon geometry in Islamic art have called into question the role and relationship of mathematician to artist. The craft of the artist is assumed, but what of his or her mathematical knowledge? From the careful study of geometric patterns in Islamic art, it can be argued that the requirement for mathematical knowledge is minimal to make what appear to be complex patterns from simple algorithms. Once a generating unit and its mode of iteration have been determined, it is the process of pattern formation that carries the craftsman to completion.

Field's text and Carboni's script are each written from the perspective of viewer rather than maker. Neither work explores the processes by which geometric patterns are made. Not only is the process radically different (for example, for ceramic tile, pile carpet, illumination, or carved stucco), but each technology affects the process by which relationships of number and shape produce what may be perceived as geometric patterns. The resulting visual effect in a work of art is far removed—and yet integral with—the temporal processes of pattern formation. This point is in itself fascinating when one considers both the diversity and the pervasiveness of geometric patterns in Islamic art.

It is paradigmatic to cite the artistic influences of the Late Antique world (as in the form of a grape leaf) and Sasanian Iran (as in the motif of spread wings) in the early evolutionary development of Islamic art, which has so aptly been called a process of appropriation.<sup>1</sup> But the conception of a paradigm shift may enable us to consider in early Islamic art a formative period in which the shared heritage of Greek geometry and Indian mathematics inspired an understanding of two-dimensional space that resulted in an exuberant play with pattern which combines relationships of numbers (arithmetic) and shapes (geometry).

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<sup>1</sup> Oleg Grabar, *Formation of Islamic Art* (Yale, 1987).