ISLAMIC ARCHITECTURAL DECORATION

A

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ABSTRACT

"The architect should accept the methods and the elements he already has. He often fails when he attempts per se the search for form hopefully new". (Venturi ; 43)

I understand architecture as a practical extension of creative activity. It should embrace and welcome any advancement in technology, but without in the least sacrificing the aesthetic tradition. As Venturi has stated, we cannot dispense with the elements we have. It is better in the interest of the architecture that we should accept these methods and the elements.

The purpose of this study, is to present a review of architectural decoration used in Islamic architecture. The study includes techniques and themes of architectural decoration used in generally, and of Afghanistan, Iran, and Turkey, particularly. Turkish Islamic architecture differs greatly from that of Afghanistan and Iran, largely because of climate, available building materials and artistic traditions.

This study provides ornamental details from this comparatively little known part of the world which could provide for architects of the younger generation a source of inspiration. They can incorporate these decorative features with modern technology to create new dimensions in architecture.

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CHAPTER. 1

INTRODUCTION

Islamic architecture is basically (as was Gothic) architecture at the service of religion. Structures erected included mosques, religious schools (**madrasas**), convents (**khanqah**), Shrines (**mazar, gumbad**), and----related to mosques and schools----the minaret (**meenar**). Further, there are secular structures, such as houses, palaces, forts, hospitals, bazaars, bridges, and fountains. The proportion of surviving secular buildings in relation to religious ones, is rather small. The rulers of many dynasties erected elegant and spacious palaces. Most were hastily built from impermanent materials. They were abandened by succeeding generations, who erected their own dwellings.

Nowadays, the monuments of Islamic architecture may be considered from an aesthetic approach or from that of archaeologists, who record all the details of individual structures. Typically, a is a combination of these approaches is usually prefered. Aesthetic judgment is a proper approach to analyze such features of construction and design, with emphasis on such things as the relation of solids to voids, verticality or horizontality, the harmony, or lack of it, between structural forms and applied decoration, the development and change in decorative pattern, color combinations in decoration, and the redundancy of color to structure when seen from a

distance as compared to close at hand.

Information about the practice of architecture in the Muslim world is very disputable. The specific term of architect (**mimar**), is found in inscriptions as early as the thirteenth century, but the terms that occur over and over again are simply builder, or master workman. It is tempting, however, to believe that these builders were members of one among the many craft guilds that flourished throughout the Islamic world and in which technical skills were passed on from generation to generation.

Ibn Khaldun, wrote briefly about architecture. He stated that architecture was the first and oldest of the sedentary crafts; that building conditions and results varied according to methods, relative skills, climate and wealth; that the quality of the architects depended on the power of the dynasties[1].

The ritual requirements of the mosque were few in number and were always the same throughout the Muslim world. Each mosque, needed the following: a central area, open or covered, where the faithful could prostrate themselves in prayer; a **mehrab** or prayer niche, facing toward **Mecca**, the holiest Islamic cities, where the prayer leader stands, to indicate the direction of **Mecca**; a **mimber**, or pulpit, adjacent to the **mehrab**; a **minaret** from which the people were called to prayer; a basin of water for the ritual washing (ablution) prior to prayer.

These basic requirements were early supplemented by additional architectural elements, some derived from the pre-Islamic architectural styles of the various countries. A lofty entrance portal led into the central area; if open, this rectangular area was lined with arcades behind which were prayer halls. The area in front of the mihrab was treated as a sanctuary, and became a square chamber crowned by a dome. The **iwan**, a high, rectangular, barrel-vaulted hall completely open at one end, appeared as an element of the entrance portal; it was placed before the sanctuary chamber and became an accent in one or more of the sides of the central area. In Iran a "standard" plan was developed---- "standard" in quotation marks, because its builders certainly never thought of it in any such term---- for mosque and madrasa. An iwan portal led into a rectangular open court which had an **iwan** in the center of each of its sides, and the iwan opposite the entrance opened into the sanctuary chamber.

In Turkey, this standard plan sometimes appeared in the madrasas, but the plan of the mosque developed quite differently. In the great mosques of the Ottoman period the design was concentrated on the raising of a stately mass high into the air. This mass, preceded by an open forecourt, was basically a dome of great radius supported on a square of four great piers, or an octagon of eight. Inside, a vast crowd could assemble under the dome. Architects experimented with the basic forms, placing two or four half-domes against the main dome.

Taking part in these and other architectural experiments was the renowned architect Sinan (1490-1588), a contemporary of Michelangelo.

Islamic architecture displays arculated construction, that is, the use of arched forms. In early structures, arches springing from pier held up flat wooden roofs, but, later, vaults of brick or stone were used to cover all interior areas. Everywhere the builders experimented to see how many types of vaults could be erected over square and rectangular areas, and they produced just as many different types as did the craftsmen of medieval Europe. Domes were highly developed; they stemmed from such prototypes as the rubble masonry domes of sassanian (pre-Islamic) Iran and the wooden domes of Christian churches in Syria. On the Iranian plateau, very large brick domes were erected without the use of supporting center. In Iran, as the domes grew larger and loftier their interior height became out of scale with the plan area of the chamber below, and so a lower dome was inserted below the main one: these double domes(the outer one of slightly bulbous profile) were also found to the east of the Iranian plateau. In Turkey the size of the area under the dome had a considered relationship to the interior height of the dome, and so double domes were not employed. Also, while, faience mosaic coated the domes of Iran, in Turkey domes exteriors were sheathed with sheets of lead.

Within the Safavid (A.D. 1499-1736) period the technique of faience mosaic gave way to the less expensive technique of

haft rangi(seven colors). There the standard square tiles were decorated with a small segment of a larger design; the details of the design were painted with one of seven different coloring materials, and the tiles were then given a single firing in the furnaces.

Turkey went through a different phase in the decorative development of its architecture. Faience mosaic came into use at least as early as in Iran, and reached a crescendo at Bursa. Haft rangi(seven colors) tiles were used throughout the Ottoman period. In building, however, the Turkish genius lay in the use of dressed and carved stone. Greater Anatolia was a stone-carving center as early as the time of the Greeks and Achaemenids[2].

In the Muslim world, architecture had the status of a major art. Two other crafts, which had no such prestige in Western world, achieved the rank of major arts in Islam. These were calligraphy and carpet-weaving. There was in both Turkey and Iran a clear relationship between these crafts and architecture. One of the greatest calligraphers of Safavid times, whose talent was devoted primarily to manuscripts, designed the inscriptions of the Masjid-i-shaykh Lutfullah in Isfahan.

The amazing number of inscription preserved on the monuments of Iran and Turkey, and the different types of scripts employed, bear witness to the high state of development of calligraphy. Such inscription were almost without exception

in Arabic, and were intelligible to a mere handful of religious scholars. Throughout the Seljuk period (A.D. 1037-1194), an archaic form dating from the first centuries of Islam, called Kufic, was favored: in this script the letters are blocky and crowded together, as on the inscriptions of the tombs at Kharraqan. The concern of the calligrapher was in creating a harmony with the surfaces of the structure. Thus one script might emphasize bold vertical strokes, another could stress horizontal movement, a third might show a flowing movement with spaced accents. Muslim architecture, with its integration of other arts and crafts into architecture----and given the major role of religious edifices in Islamic society----should be viewed as a comprehensive reflection of a highly developed and enduring faith and culture.

ENDNOTES

1. Seherr, S. P - Thoss. Design and Color in Islamic Architecture. Smithsonian Institution Press, 1968. p.18

2. Ibid. p.21

CHAPTER 2

CHAPTER.2

HISTORICAL DEVELOPMENT

The decoration applied to Islamic monumental architecture falls into three broad chronological phases, although the impulses determining these phases sometimes run concurrently and overlap in different parts of the Islamic world, or recur at later periods. All three may be found operating at the same time, in the same country, on the same building or even the same object.

THE CLASSICAL HERITAGE

The first phase comprises the early centuries of Islam when, under the Umayyed dynasty in the seventh to eighth centuries, the techniques and the motives are inspired by and follow logically from the inheritance of the late Classical World. Early Islamic monuments such as the Dome of the Rock in Jerusalem, the Great Mosque in Damascus show in plan, and even more in their decoration, how close was the art of early Islam to that of the civilizations preceding it, so much so that it is sometimes difficult to differentiate non-Islamic from Islamic buildings and objects. The old building techniques were still alive and probably much of the work continued to be carried out by craftsmen working in the Syrio-Byzantine and Sasanian imperial traditions. In buildings in various parts of

the Umayyad empire, in Syria and Palestine in particular, but also as far south as Medina and Mecca in Arabia, wall and floor surfaces were decorated with mosaics, which in their subject-matter and technique are almost indistinguishable from those found in earlier Christian buildings. Mosaics were still being used in Spain in the interior decoration of Great Mosque of Cordoba, in the tenth century, but, despite apparently short-lived manifestations under the Seljuqs, the Zangids and the Mamluks in Syria and Egypt between the eleventh and fourteenth centuries, this form of decoration gradually disappeared from the repertoire of Islamic art[1].

In Umayyad palaces, the decoration seems to make no particular differentiation between interior and exterior. Doorways and windows are framed with the type of continuous band that had been one of the striking and unifying elements of the Christian architecture of Syria. The stucco figures decorating facades and interiors have the prominent eyes and flesh folds of some of the Coptic sculptures from the convents and churches of Egypt[2].

A preference for overall patterning, repetition of elements, and intricacy is already clear in the stucco and stone decorations of the facades of the seventh century palaces of Qasral-Hayral-Gharbi and Mshatta, with their regular diaper patterns contained in triangular, square, or rectangular frames. The repetition of the same motif in different media---- the row of birds in the paintings of Qusayr Amra in Jordan. At

the same time the Classical repertoire of figures and floral motifs is interspersed, for instance on the screens of Qasral-Hayral-Gharbi (West), with diminutive architectural motifs such as the intersecting arches, columns and capitals. This successful eclectic fusion between the different cultural strains, the diverse legacy of the classical world in the eastern Mediterranean----a compound of Graeco-Roman elements mingled with more Eastern influences----is immediately apparent in Umayyad buildings. This forms a basis for the development of Islamic decoration. The same legacy is still apparent in Abbasid buildings, although here the tendency is towards gigantic monumental architecture where the decoration had to be applied fast, cheaply, and on enormous surfaces. This explains the use of stucco on an unprecedented scale as a material for decoration, and its popularity, with tiles and brick, throughout the centuries in Islam these three materials became in time the materials par excellence of Islamic decoration.

The various phases in the evolution of the Abbasid style found in ninth century Samarra punctuate the development of Classical motifs----the vine scroll, for example----into more abstract compact compositions where strong contrasts of light and shade are sought through deep bevelled carving. With the introduction of moulds it became possible to apply stucco paneling to even greater surfaces in a repetitive manner, principally as dados, giving Abbasid interiors a continuous, sumptuous, monumental and plastic revetment. The similarity in

design and treatment between stucco and wooden decorative elements is another factor in the coherence of Abbasid decoration. Often motifs found in diaper patterns, deeply and smoothly carved in wood, are the same ones that give the stuccoed, compartmented dados their wavy, rippling effect. This type of overall stucco treatment for interior and exterior surfaces travelled far in the Islamic world; it is found, for example, in a mosque in Balkh in Afghanistan and at Nayin in Iran. By the thirteenth century a subtle difference between the mouldings suitable for interiors and exteriors was evolved in regions such as Khurasan although the repertoire of motifs remains virtually the same for both----an abstracted version of Classical designs including the vines and palmettes[3].

In the Fatimid buildings of North Africa and Egypt, the shell niche of Classical inspiration finds a new life through its Islamic twelveth century interpretation. It becomes narrower and elongated and terminates in a rather rigid, fluted but angular head niche decorating the outer and inner walls of buildings----the mosque of as-Salih Tala in Cairo, for example----with rows of tall blind niches. The tendency to articulate facades with tall blind niches continues in Ayyubid architecture (A.D. 1169-1252)and becomes one of the characteristics of Mamluk architecture (A.D. 1250-1390), when they run almost to the whole height of buildings.

Meanwhile Spain, almost up to the fall of its last Islamic dynasty in the fifteenth century, preserved the decorative

schemes it inherited from the local Classical tradition and from Umayyad Syria. These were to create an architectural decoration in marble and stucco which uses Classical elements such as the acanthus leaf and the palmetle, but in compositions on one plane and in increasingly intricate combinations. The range of motifs used in Spanish architectural decoration remains limited throughout, probably because of the political and geographical isolation of the peninsula from the rest of the Islamic world. Because of these limitations in range and choice, there is also an increasing tendency towards virtuosity in the elobration, permutation and repetition of motifs such as the intersecting arch, which appears in a simplified version on one scale and at the same time in a complicated version----as in the Great Mosque of Cordoba, where the arches are multilobed when structural----or appears applied serially in compartments to facades or to minaret towers[4].

THE EASTERN INFLUENCES

The second phase in the development of Islamic decoration derives from the non-Hellenized elements of the art of Persia and even further East. It is characterized by strong contrasts of plane and texture using stone, brick and stucco in various combinations.

From a tentative start in Mesopotamia, of which we see evidence at Raqqa, Ukhaydir and at Balis on the Euphrates,

through to the fully achieved development in Iran, Afghanistan and Turkey, remarkable decorative effects are obtained by a subtle use of geometric brick and terra-cotta patterns, sometimes combined with stucco and later with colored glazed tiles. Particularly in the Iranian Plateau at certain periods (the Seljuk especially), richness of effect is conveyed not by the richness of material but by the manner in which simpler and cheaper materials like stucco and brick are used. The tomb of Ismail the Samanid in Bukhara (fig. 1) and the **minaret** of Masud in Ghazni (fig. 2) both show how imaginatively brick in different layers and contrasting shapes was used by Muslim craftsmen to create textured effects of striking monumentality[5].

From the tenth century onwards, the decoration of **portals** and **mehrabs**----the way into an actual or implied space----is increasingly emphasized, while the rest of the building is left relatively plain or is decorated with individual panels, inscription bands or rows of niches. The exuberant decoration found almost exclusively around portals and windows in the Seljuq stone buildings of Turkey is exceptional. Strong contrasts of plane, deeply recessed muqarnas, carved framing bands with geometric and plaited designs, heraldic figures---- all produce an effect of engraving and at the same time of encrustation, of gigantic growth superimposed on otherwise rather plain facades.

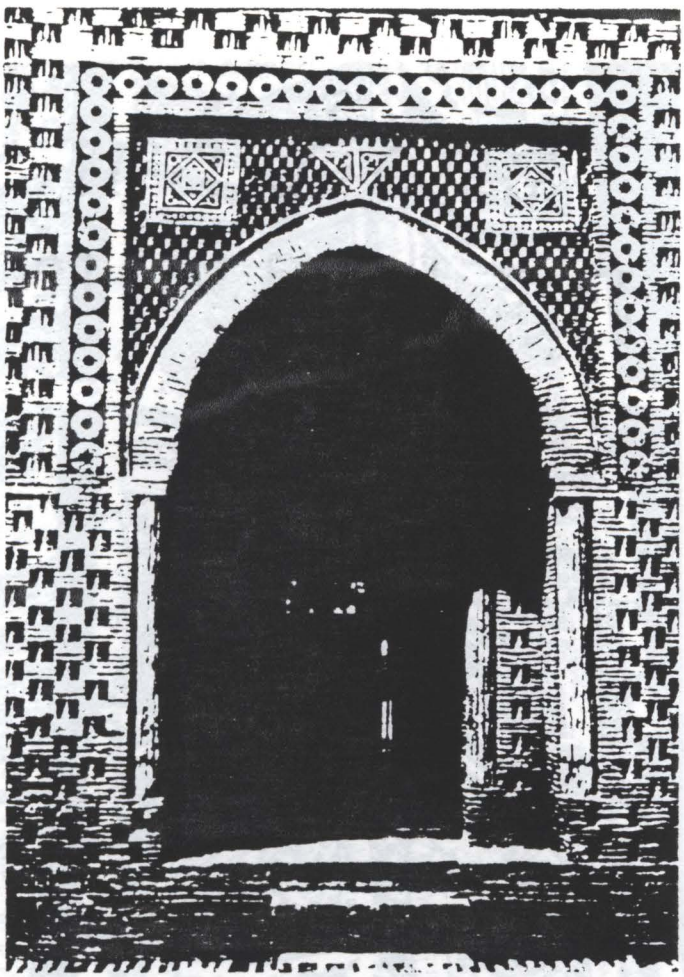

FIGURE.1 Iwan entry, tomb of Ismail in Bukhara

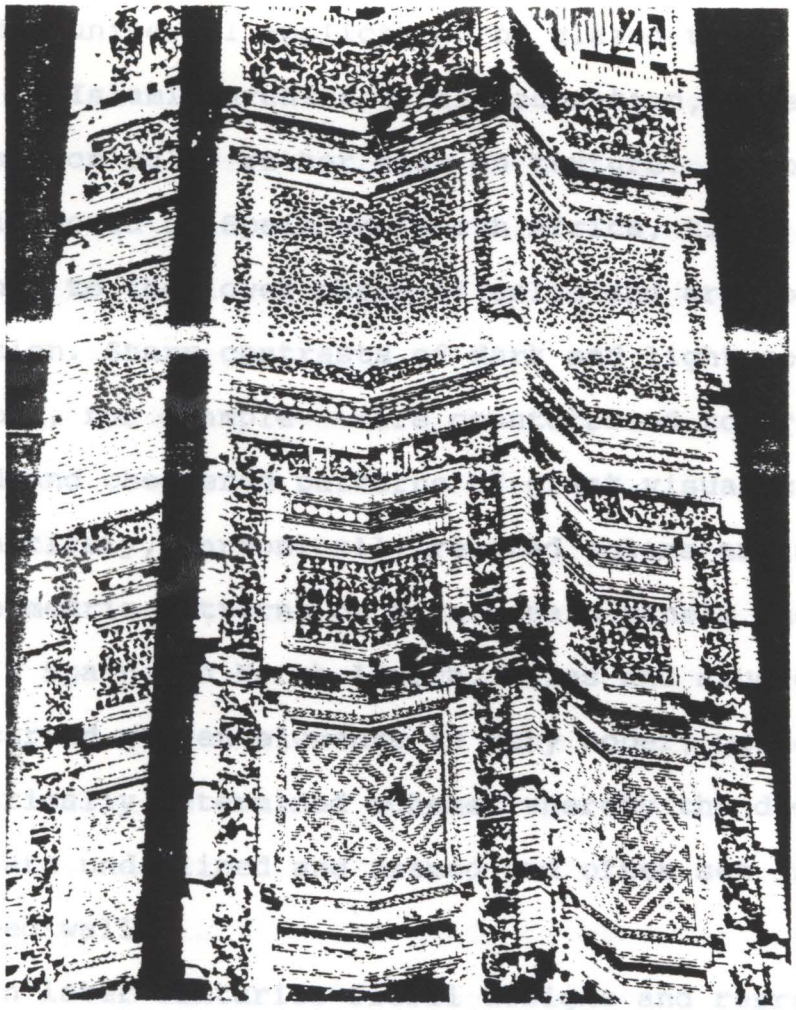

FIGURE.2 Brick patterns, minaret of Masud, Ghazni

EVOLUTION OF COLOR SCHEMES

The universal application of glazed tiles marks the third phase of Islamic architectural decoration, together with an emphasis on color rather than on texture. In the Western Islamic world of Spain and North Africa, tiles are generally confined to the lower parts of walls and are mostly geometric in design. Sharp contrasts of dark and light colors----in the Alhambra, for example----are counterposed to produce star-shaped and chequered patterns of great visual complexity. Alternatively, harmonically related colors are used to define the geometric patterns of tile-mosaic panels and dados.

In Spain and North Africa, tiles and stucco are combined with carved wooden elements in very sober, geometrically and symmetrically determined schemes whereby the dados, windows and doors are underlined and framed and often set in plain or stuccoed walls[6].

In later centuries floral designs and representations of imaginary or real buildings like mosques, tombs, mihrabs or the kaba----compositions favored in Istanbul and other parts of the Ottoman Empire----were introduced with overwhelming success in the North African tile repertoire, particularly in Algeria, Tunisia and Libya[7].

In Iran and Central Asia, brick and tile often cover the whole surface of buildings as with a continuous wallpaper, the one textured, the other glossy and smooth. The tomb of Ismail

the Samanid in Bukhara and the friday mosque in Isfahan best exemplify this almost excessive use of brick and ceramic in architecture. Contrary to the North African and Spanish custom, the dados in major Persian buildings are generally in marble. The palette for ceramic tiles is dominated by shades of blue and turquoise, punctuated by white, black and green as well as yellow and pink, in the later Safavid and Qajar (A.D. 1499-1736) periods especially.

This tendency towards an overall covering of the whole building whereby all inner and outer surfaces are decorated with ceramic, first with meticulously assembled tile inlays and later with individually patterned tiles, culminates in the Timurid buildings of Iran, Afghanistan and Central Asia and the Safavid and Qajar buildings of Iran. Buildings such as the Masjid-i-Shah in Isfahan achieve their visual impact from the smoothness and "coolness" of their tile decoration, which vividly contrasts with the plain brick color of the surrounding buildings and the arid landscape, and through the subtlety of color combinations and fluidity of designs combining floral scrolls and calligraphy.

The decoration of Ottoman architecture stands somewhat apart from that of contemporary architecture in other parts of the Islamic world in that it combines great sobriety in its exteriors, mostly in stone with lavish interiors, often almost entirely covered with tiles. There, a color scheme of predominantly blues and greens, sometimes enriched by a very

deep tomato-red, is characteristic[8].

Mughal buildings in India, although they rarely have tile decoration, reflect the same principles of decoration as those in Iran: they too aim at an overall effect, at total impact where there are no sharp contrasts of texture and the same type of design covers the whole building. In India, the effect is achieved with more precious materials, marble inlaid with hard and semiprecious stones. The result, however, is more sober than in Iran because the range of color is limited, and the general effect sought is monochromatic, with an emphasis on white marble or red sandstone backgrounds.

THE ROLE OF DECORATION

The role of decoration is central to any analysis of Islamic art; it is one of the unifying factors that, for thirteen centuries, have linked buildings and objects from all over the Islamic world across an enormous geographic span, from Spain to China and Indonesia.

Islamic art is an art not so much of form as of decorative themes that occur both in architecture and in the applied arts, independent of material, scale and technique. There is never one type of decoration for one type of building or object; on the contrary, there are decorative principles which are pan-Islamic and applicable to all types of building and objects at all times. Islamic art must therefore be considered in its entirety because each building and each object embodies to some extent identical principles. Though objects and buildings differ in quality of execution and style, the same ideas, forms and designs constantly recur[9].

If in their choice of forms the artists and architects of Islam were rarely innovative, their preoccupation with surface decoration was highly original. They perfected a type of decoration whose purpose was first and foremost that of providing buildings and objects with an intricate and complex overlay, covering their structural cores (often of a different material) as with an outer skin.

Islamic architectural decorated surfaces have a physical

reality as well as a visual impact----an independence of their own, which gives them an importance at least equal to their architectural forms.

The layers of surface decoration are increased and the complexity of visual effects enriched by the use of carpets and cushions, which often reflect the same decorative schemes as those found on walls and ceilings. Floors and ceilings contribute to the fluidity of space by the nature of their decoration, since they are often patterned in the same manner as the walls.

There is a common misconception in the West: that Islamic art is an art severely restricted to two dimensions. Admittedly there are few examples of Islamic sculpture in the round, but the very character of Islamic decoration implies three-dimensional possibilities[10]. One purpose of interlacing designs, for example, is to create the illusion of different planes, often accompanied by variations in color and texture. Equally, the mastery of negative and positive contrasts is evident just as much in the minor arts as in the inlay and carved stone and tilework on a larger scale. Surfaces of buildings are provided with a series of interwoven layers of different textures and depths. This preoccupation with textured surfaces explains the presence of stucco and tilework in places where alternative materials exist. Even ceramic tiles, which generally make their impact by smoothness of plane, are not only animated by color contrasts and intricacy of design but also appear counterposed

to rougher materials like brick, or are themselves molded in relief so as to produce maximum effects of translucency and glossiness and also of depth and thickness. Brick and stucco, in particular in Iran when applied to such buildings as the Qarraqan tomb towers or the minaret of Ardestan, demonstrate the virtuosity of Islamic craftsmen in the handling of materials to produce three-dimensional effects. Bricks are laid at an angle to cast maximum shadows and therefore increase depth of plane.

The development of artistic techniques throughout the range of Islamic art is always geared to creating increasingly intricate surface decoration by the use of reflecting and shining materials and glazes, the repetition of designs, the deliberate contrasting of textures and the manipulation of planes. However, despite this tendency towards effects of decorative richness and intricacy, there is always an ultimate sense of sobriety in Islamic art.

Islamic art is an art of repose, intellectual rather than emotional, where tensions are resolved. It is a conceptual art where questions and answers are finely balanced. Absence of tension is achieved mainly through the subtlety of surface decoration in which patterns are limited to well defined areas but are at the same time infinite in the sense that they have unlimited possibilities of extension. The principles are of repetition and the continuous permutation of motifs and designs. Like water itself, which plays such a unique role in

Islamic architecture, the decoration continually reflects and multiplies patterns to provide a "cool" refuge for the eye and the mind, creating an art which is dynamic and yet unchanging[11].

This concept of decoration----flexible in nature, independent of form, material and scale----employs a limited number of basic formulae: calligraphy, geometry and, in architecture, the repetition and multiplication of elements based on the arch. Allied with and parallel to these are floral and figural motifs. Water and light are also of paramount importance to Islamic architectural decoration as they generate additional layers of patterns and----just as happens with surface decoration----they transform space[12].

GENERAL PRINCIPLES

UBIQUITY OF PATTERNS IN TIME AND SPACE

The interchangeabilty of the same design from one medium to another and the repetition of the same design on different scales, often within the same buildings. This can be explained by the fact that in Islamic decoration----whether applied to objects or buildings----each motif is merely part of an overall patterning of surface, achieved by the counterposition and superimposition of different designs and materials, each of which retains its identity within the whole composition. No single design or pattern need therefore be given significance over others, and all can be reused at will in new yet familiar combinations[13].

EXPANDING OR DIMINISHING OF PATTERN

The expanding character of each pattern is another constant feature of Islamic decoration, its capacity to be symmetrically repeated ad infinitum. Just as the volumes, the forms and structural elements may be multiplied, so it is with their decoration. Each part of the design answers every other part and is capable of extension to infinity because the structure of the design is such that it can go on multiplying itself forever as a metaphor of eternity[14]. Thus, facades and

wall surfaces are mostly decorated with symmetrical repetitions of units which in turn are made up of smaller repeated units.

There is, for example, an endless permutation of the mihrab motif----an arched niche, either deeply recessed or shallow, contained in a rectangular frame. This motif is used indifferently in secular and religious buildings in Western and Eastern Islam. Facades, walls, even ceilings, are punctuated by rows of arched niches of various depth and scale.

While individual components of the overall decoration of a building, a facade or a portal can be taken away or added to, each of these individual components is needed for the balance of the overall composition.

CLARITY OF DESIGN

Clarity of design in Islamic architecture is always present, however far from the viewer, and however intricate the patterns within it, the design of each surface can always be discerned. Often the patterns are so intricate that they are only distinguishable by the rhythm they set up when they are repeated----still, the framework of the designs is always visible even when the details are not[15].

Wall surfaces in Islamic architecture are subdivided into several layers of designs, each one echoing elements of the other. Although sometimes difficult to detect because of the intricacy of pattern, the overlay of design is far from

haphazard. The layering can vary but not the overall organization, where primary and secondary grids echo each other.

Primary grids indicate the principal elements of the decorative scheme. They control the calligraphic bands and the arches, niches, squares and rectangles by which each overall surface is subdivided. Patterns are mostly contained in rectangular or square panels, which are themselves strongly framed by horizontal and vertical bands. The framing bands of course produce a primary grid of their own, which reflects and underlines the contours of the building. This is frequently the case with the calligraphic bands which link facades with portals and windows, or different patterned or textured surfaces. Their function is to hold these elements together visually, as if with a belt.

Secondary grids control the patterning within each of the elements of the primary grid. Here are found the counterposition of designs and the contrasts of texture, materials, colors and patterns which produce the decoration of an inscription, a mihrab or a portal. Within these secondary grids are also found the qualities of repetition which unify each element with the other and each surface with the rest of the building. These common elements within a decorative scheme harmonize and bring together the different designs and patterns that are found near each other but are visually different or contrasting.

Primary and secondary grids in Islamic decorative surfaces demand to be "read"----literally in the case of calligraphy, which by its nature is directional. Calligraphic bands run across buildings, and the viewer, by reading their text, also participates in a continuous recomposition of the elements of the decoration. Here again the analogy is with the applied arts, manuscript painting in particular, where the same principles are applied to the balance between decoration and calligraphy as on a facade.

CONCEPT OF SURFACE AND SPACE

Decoration in Islamic architecture is not limited to the covering of surfaces, it also helps to transform space.

Islamic buildings cannot always be clearly identified by their form because each form is not restricted to any one purpose; on the contrary, each form implies multiplicity of purpose and flexibility of space. The same structural combinations, the arcades, the domes, the vaulted iwans, the high portals, can be applied to buildings as diverse as a palace, a stable, a school or a mosque. The same is true of the themes of decorations, which can be entirely interchangeable[16].

Space is defined by surface and, since surface is articulated by decoration, there is an intimate connection in Islamic architecture between space and decoration. It is the variety and richness of the decoration, with its endless permutations, that characterizes the buildings rather than their structural elements, which are often disguised. Many devices typical of Islamic architectural decoration----for example, the "muqarnas"----are explained by a desire to dissolve the barriers between those elements of the buildings that are structural (load-bearing) and those that are ornamental (non-load-bearing).

The decoration underlines not so much the structures of buildings and the forms of objects as the interplay between forms and surfaces. The tendency is for surfaces to be fluid:

decoration helps to make the transition, imperceptibly, from one plane to another. No sharp divisions are allowed. Light is filtered, water reflects, unifies and cools.

Another way of blurring the distinction between structure and surface is to use elements out of their normal structural context, for example by placing niches in ceiling; the niched walls curve into the domed ceilings, thus changing the normal spatial order of domestic interiors. Similarly, muqarnas that are painted, tiled or lined with mirrors deny the association their shape might have with a structural purpose[17].

The multiplication of a given pattern or architectural element on a different scale in one plane also helps to avoid sharp contrast and clear definition of scale and surface. Endless cadences of arches and columns, the multiplication of domes----the elements most typical of Islamic architecture---- all create a feeling of continuous space. A square building with a dome----that is, a cube with a hemisphere----has no directional axes. A dome is a rotated arch; in a circular domed space there are no corners, edges or axes. The focus is inward towards the center. The decoration supports this focusing inwards by inviting contemplation with its challenging but resolved complexity. A curve implies dynamism, the concept of change, of expansion. The builders of Islamic buildings very soon realized the dynamic possibilities of the arch as a form combining structural and decorative implications. Just as there were geometric patterns within geometric patterns in surface

decoration, so the structural elements deriving from the arch, such as niches, squinches, pendentives, were multiplied, magnified or reduced, exploded and reconstructed endlessly in three-dimensional forms. Arches, squinches and niches occur both in a simple, straightforward way with a totally visible function or meaning, and in a multiplied form, complicated at times beyond recognition into meaninglessness, at least from the point of view of the element's original purpose. The squinch in particular occurs widely as an ornamental feature outside its functional use as a transitional element supporting the dome: magnified, it becomes a portal which in turn contains in its upper part multiples of itself----the muqarnas, the honeycomb decoration so characteristic of Islamic architecture[18].

A good example of the ambivalence of form and the flexibility of surface treatment in architectural decoration is given by the requirements set for the planting of flower beds in Islamic gardens. These are sunk so as to be seen from above like a carpet. At the same time, carpets must look like gardens. The "garden" carpets, especially, reproduce the formal arrangements of gardens, their geometrical divisions, their water courses. If we imagine such types of carpets with their intricate floral designs laid on a patterned floor in a garden pavilion, it is possible to come closer to the idea fundamental to Islamic architecture of a continuity of space suggested by surface decoration.

The conceptual basis of much Islamic decoration is given by the floor decoration of the Taj Mahal which, with its rippled effect, suggests that the tomb is set in a tank of water. The decoration, as in the case of garden carpets, does not imitate the water or the garden in precise details, but it conveys the idea of water or garden: it creates a situation, a "landscape of the mind", a subtler environment than any naturalistic rendering.

ENDNOTES

1. Michell, George. Architecture of the Islamic World. Thames and Hudson, 1978. p.165
2. Ibid p.165
3. " p.165
4. " p.166
5. " p.166
6. " p.166
7. " P.166,167
8. " p.167
9. " p.161
10. " p.161
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12. " p.162
13. " p.163
14. " p.163,164
15. " p.164
16. " p.162
17. " p.162
18. " p.163

SOURCE OF FIGURES. Hill, Derek - Grabor, Ooeg. Islamic Architecture and Its Decoration. The University of Chicago Press, 1964.

CHAPTER.3

THE TECHNIQUES OF DECORATION

CARVED STONE

In Anatolia, where the traditional medium of construction was stone, carved stone became the major medium for ornamentation. The technique is a very ancient one and does not require further elaboration (figs. 3,4), except on one specific point : in many instances the stone sculpture seems to have been applied to the surface of the wall rather than understood as an intrinsic part of the fabric of the wall; it often appears remarkably artificial, as though it was imitating something else.

BRICK ORNAMENTATION

Much more original than the medieval Islamic use of stone is the use made of bricks for decorative as well as constructional purposes. The origins, significance, and development of this ornamental "brick style" are still somewhat of a puzzle, because its earliest clear example (figs. 5,6) is also its most perfect example, in the sense that, except for the dome, not one part of the building escapes the ambiguity of being meaningful on two levels : as decorated surfaces as well as parts of architectural volumes such as walls, towers, or spandrels of arches.

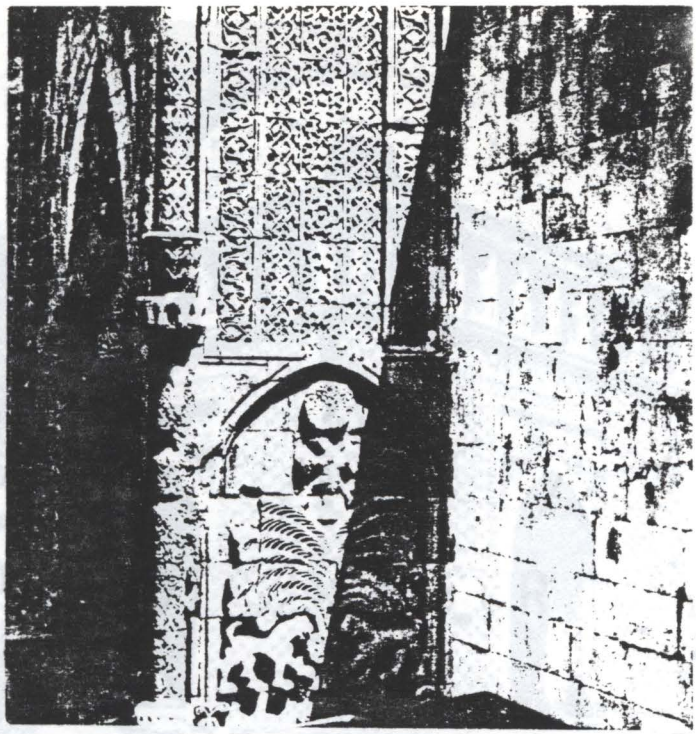

FIGURE.3 Carved stone decoration in Cifte Minareli madrasah

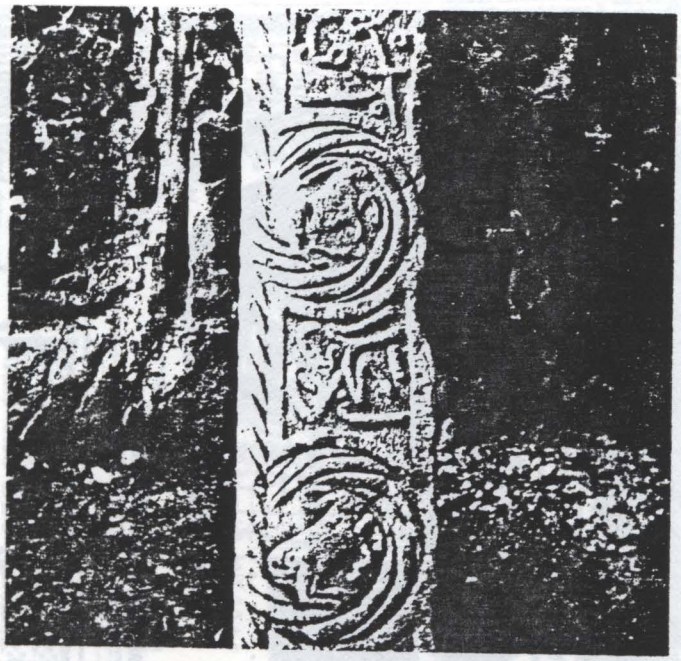

FIGURE.4 Carved stone decoration in Great Mosque

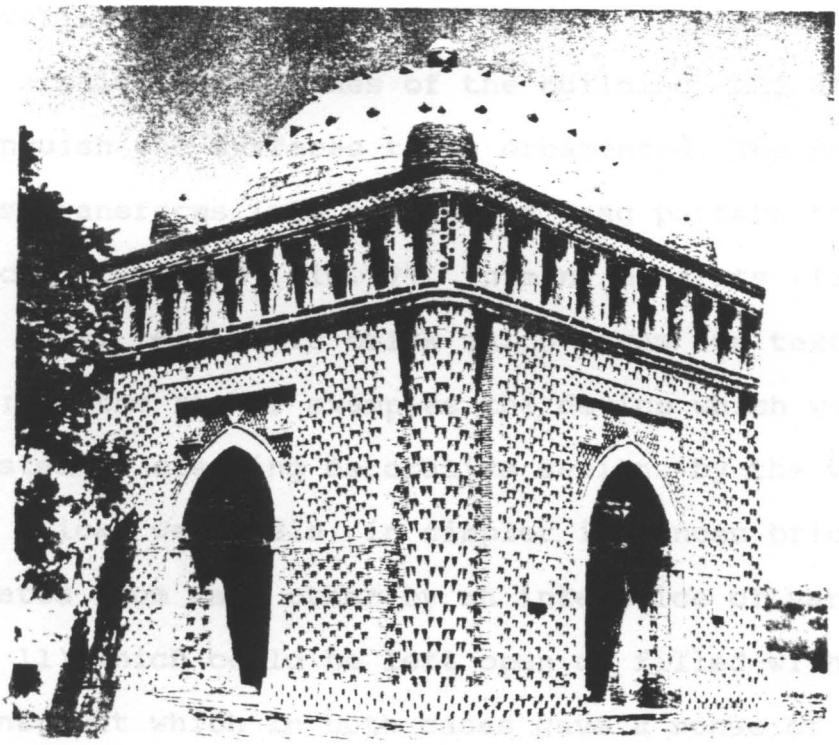

FIGURE.5 The tomb of the Samanids

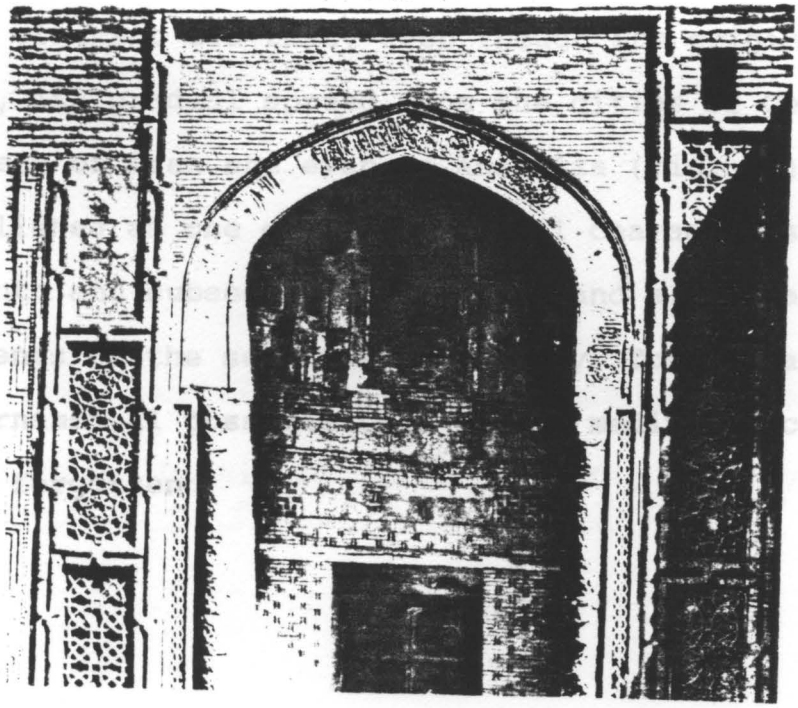

FIGURE.6 Maghak-i-Attari mosque entrance, Bukhara

Variations in brick work came not merely to emphasize the major architectural lines of the building, but also to distinguish the surfaces to be ornamented. The manner of laying bricks transforms into a linear zigzag pattern the curved surfaces of a dome (fig. 7). In many minarets (figs. 8,9,) or tombs (fig. 10), it is brick which gives its texture to the walls; in the richer examples the device which was used consisted of creating decorative designs by the very manner in which bricks were laid; in simpler instances brick were separated from each other by an interstice of varying size (fig. 11) which could be left open or filled with stucco designs, but which in both cases gave a sense of volume to the wall.

The main interest and the historical significance of brick as an ornament are that, even though its origins are not very clear, its gradual spread from the cities of Central Asia to the rest of Iran and even to Anatolia (fig. 12) can clearly be established as one of the principal characteristics of the eleventh and subsequent centuries, and also that, even in the monuments of the seventeenth century, for instance in Bukhara, the ornamental possibilities of the medium of construction were never forgotten[1].

STUCCO

The third technique of architectural decoration is not

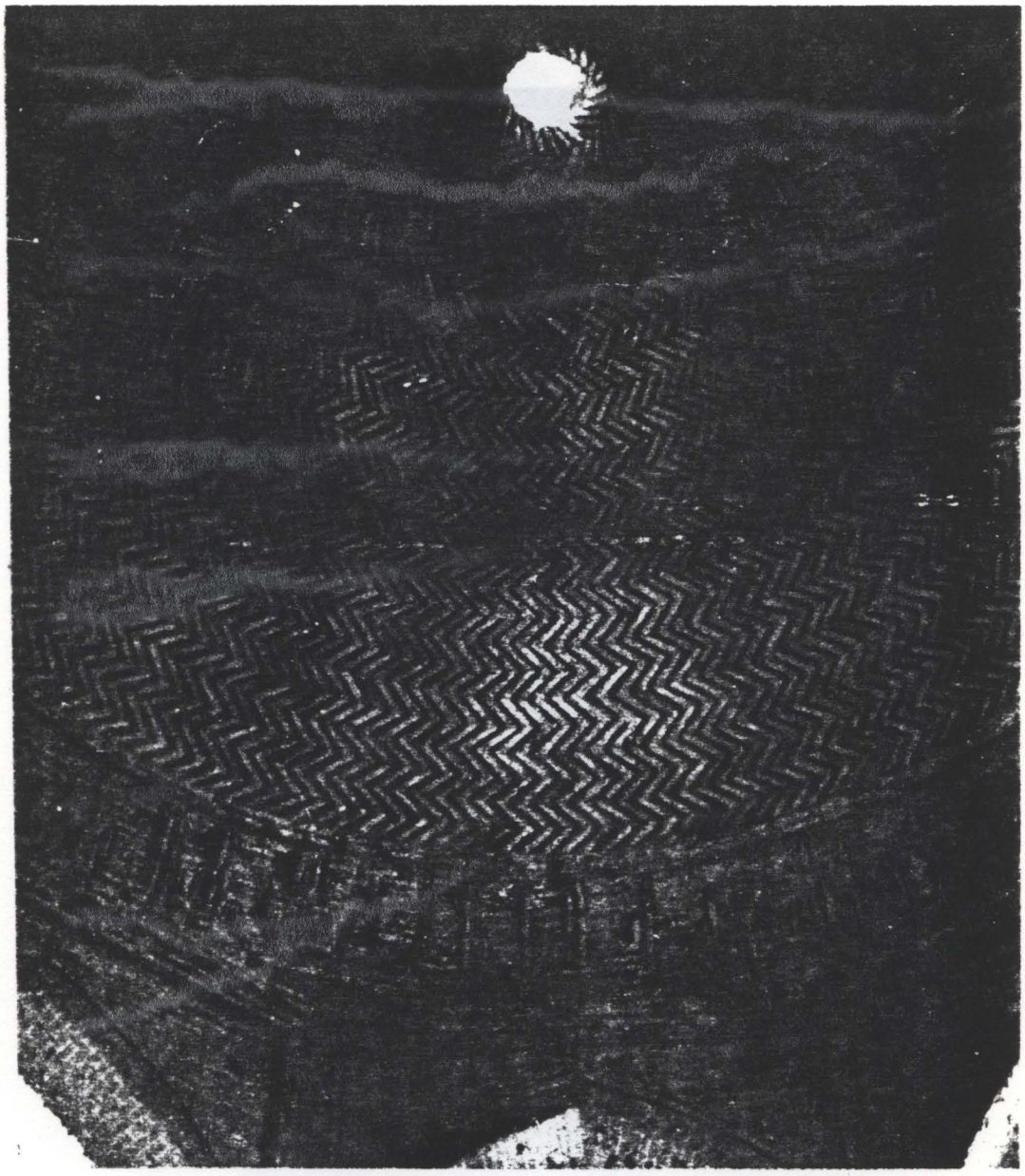

FIGURE.7 Detail of roof brickwork, Sangbast

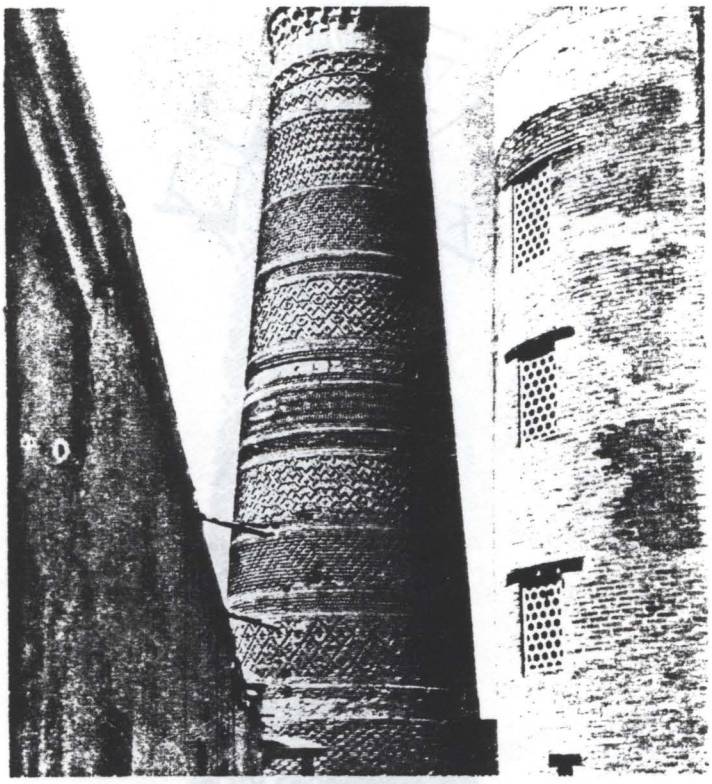

FIGURE.8 Mosque minaret Kalayan

FIGURE.9 Tarik-Khaneh minaret, Damghan

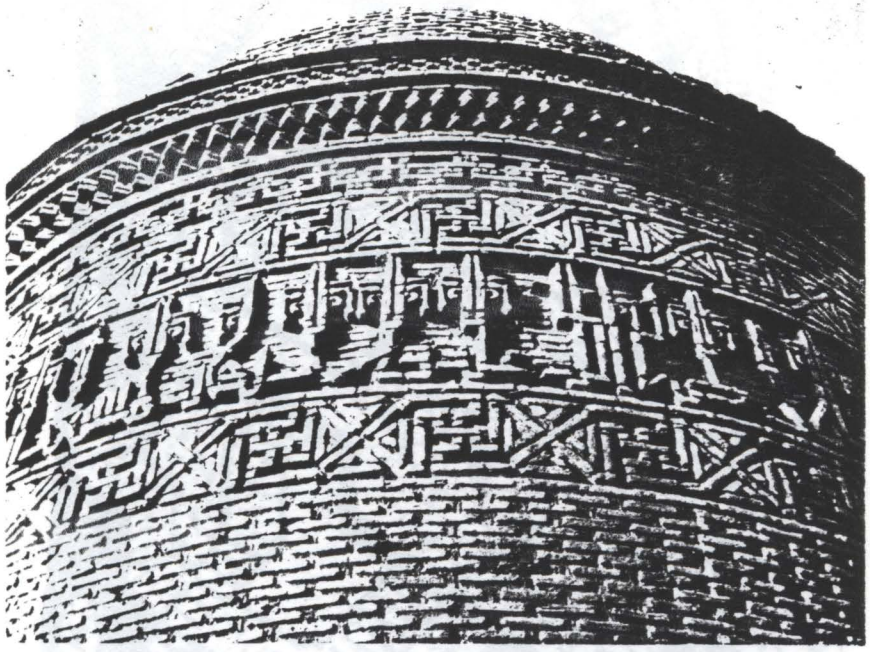

FIGURE.10 Kufic lettering on brickwork, Damghan

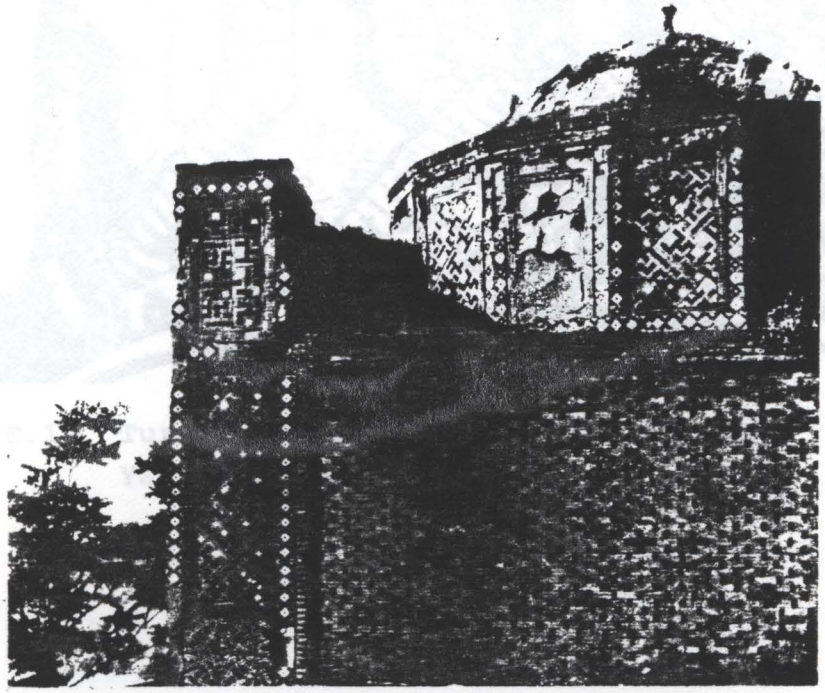

FIGURE.11 Exterior tile and brickwork,
Mausoleum of Ali

FIGURE.12 Turquoise tiles and red brickwork, Yakutiye madrasah

peculiar to Iran alone, but may have originated there and certainly found there some of its most remarkable uses: it is stucco. Already in pre-Islamic times, stucco had been used to cover walls of palaces and temples, because the medium of construction----rubble in mortar or unbaked brick----was not very impressive and also because richness of surfaces decoration was deemed to create a more important effect than barren walls. Although instances do exist (as in the palace of Sarvistan, Afghanistan) where stucco was simply applied to the walls without major decoration, in most cases an extensive sculpture is found on these walls, using decorative themes issued from textiles and iconographically significant images to create in cheap material an impression of magnificence. These early Iranian themes and purposes were picked up by the Muslims as early as in the eighth century and characterize the stuccoes of the Umayyad palaces of Syria and Jordan, or, in a more original way, those of Samara (fig. 13,14), something of the character of older themes of decoration in stucco can be still found.

The history of stucco is thus continuous, and by the eleventh century the medium existed throughout the Near East, basically as a mode to cover the walls with decorative designs. But considerable changes were brought into the appearance of stucco some time in the eleventh century. These changes were partly in the themes and in the manner in which stucco was used[2]. The old function of wall covering is there, but in most

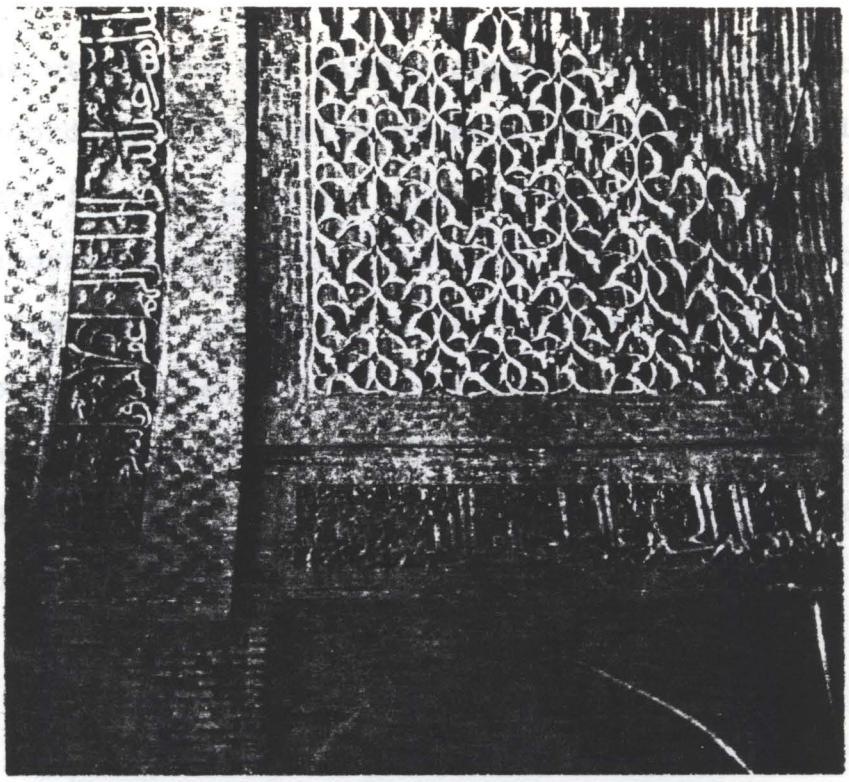

FIGURE.13 Stucco work superimposed over brick

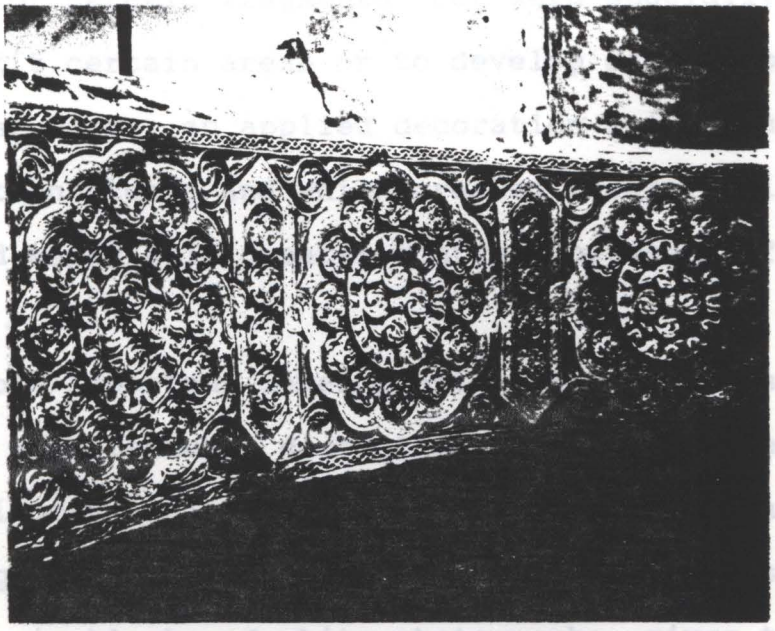

FIGURE.14 Stucco work in the main mosque, Nayin

instances the stucco is not simply applied to the wall but organized according to a series of major architectural lines. Finally stucco is also used in interstices between bricks or as a sort of decorative veil over the simple structure of the vault. From Iran this versatility in the possibilities available to stucco was carried elsewhere, although in great architectural compositions of Anatolia, stucco themes were more often copied into stone, which is probably responsible for the somewhat artificial character of some of them[3].

TERRA-COTTA

The fourth significant medium of decoration was more peculiar to the Iranian sphere. It consists of terra-cotta,i.e, basically, of ceramic fragments that were specially molded or formed to fit certain areas or to develop certain patterns. It was,in other words, an applied decoration which was more expensive than stucco and which created greater relief in designs and especially greater contrast between different types of designs[4].

The most important development related to this use of ceramic in architectural decoration is what has been called "mosaic faience", which has a smooth effect. Its basic aim is clear enough, the introduction of color. It is this color which, even in black-and-white photographs, gives to the great monuments of the fifteenth century in Samarkand (fig. 15) or

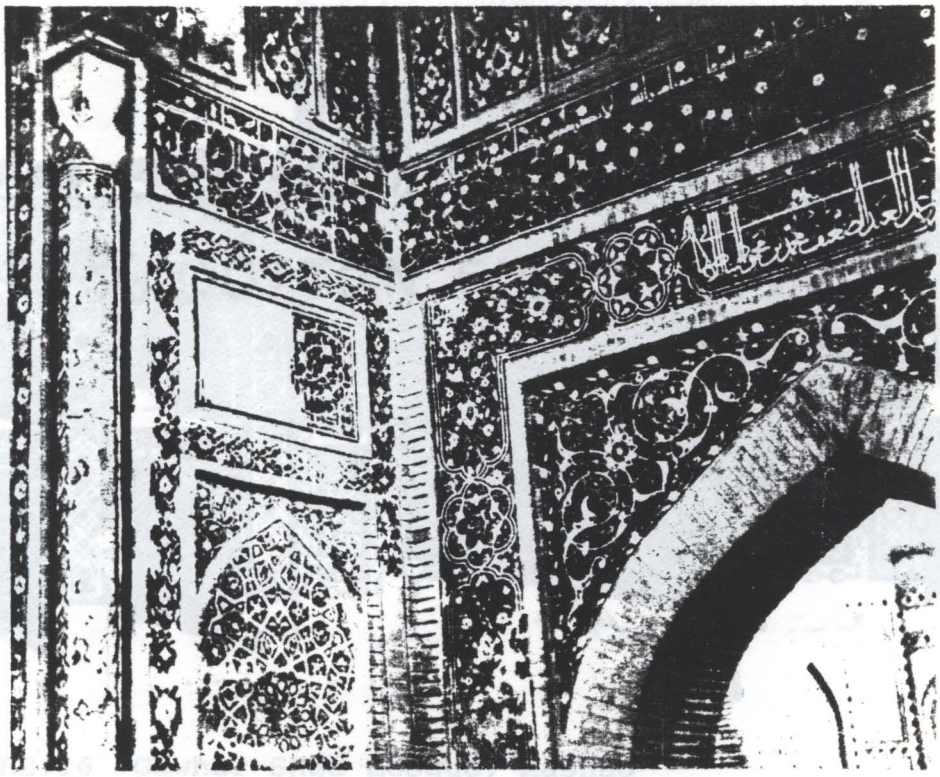

FIGURE.15 Tilework on entrance arch, Gur-i-Amir

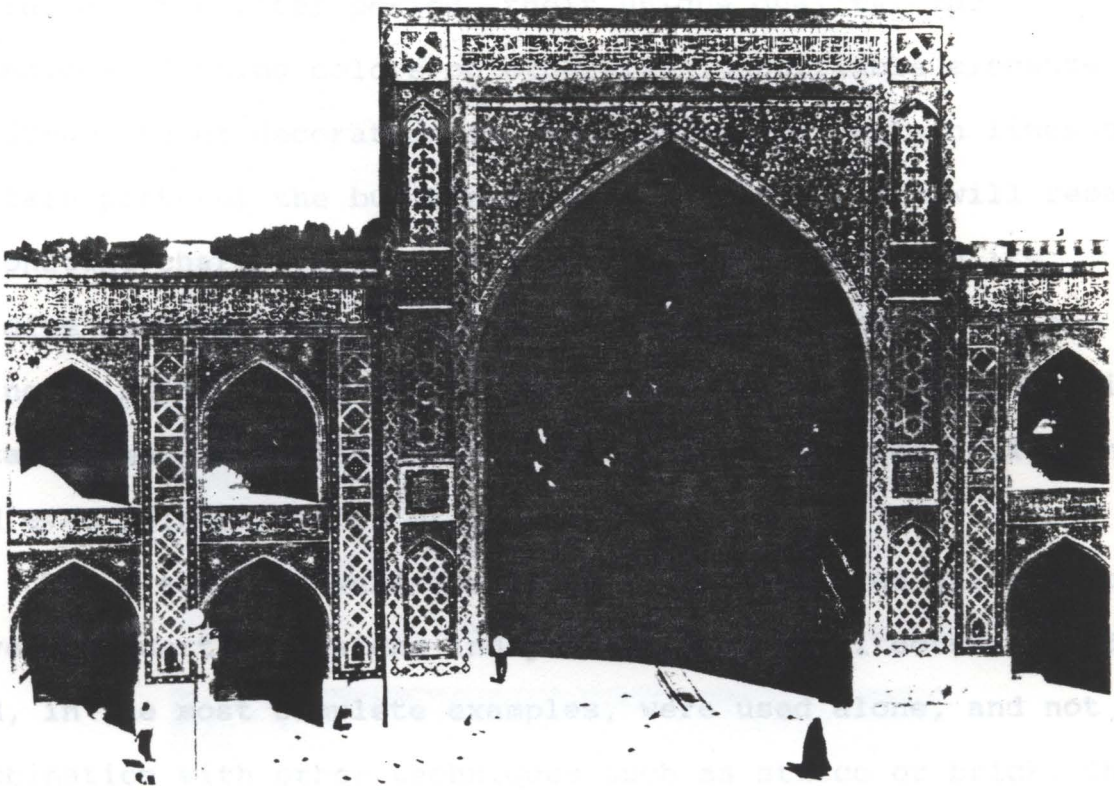

FIGURE.16 Gawhar Shad mosque, Mashad

Mashad (fig. 16) as well as to the superb Safavid or Ottoman buildings of a later period, their unique quality. The technique of using colors on otherwise identifiable elements of construction or decoration in order to stress certain lines or certain parts of the buildings or of the decoration will remain a constant characteristic of Islamic architecture and its origins must probably be sought in a universal tradition of using painting to emphasize certain architectural or decorative details; many examples exist of stucco with painted backgrounds and even painted motifs of decoration[5].

Whole surfaces were covered with multicolored tiles which developed certain designs independently of architectural needs and, in the most complete examples, were used alone, and not in combination with other techniques such as stucco or brick. The technical varieties of such tiles and their schools have been discussed in histories of ceramics, and need not concern us here, but the origins of the technique as a whole have been a matter of some discussion. It is in the monuments built in Konya in the middle of the thirteenth century (figs. 17,18) that faience mosaic on large wall surfaces appears for the first time in full. Since both Turkish and Iranian architecture of later centuries used the techniques, whereas in the Arab countries of Syria and Egypt it was clearly only a foreign importation, it may perhaps be concluded that the discovery of the possibilities offered by colored tiles belongs to both regions. The ultimate possibility of colored tile decoration

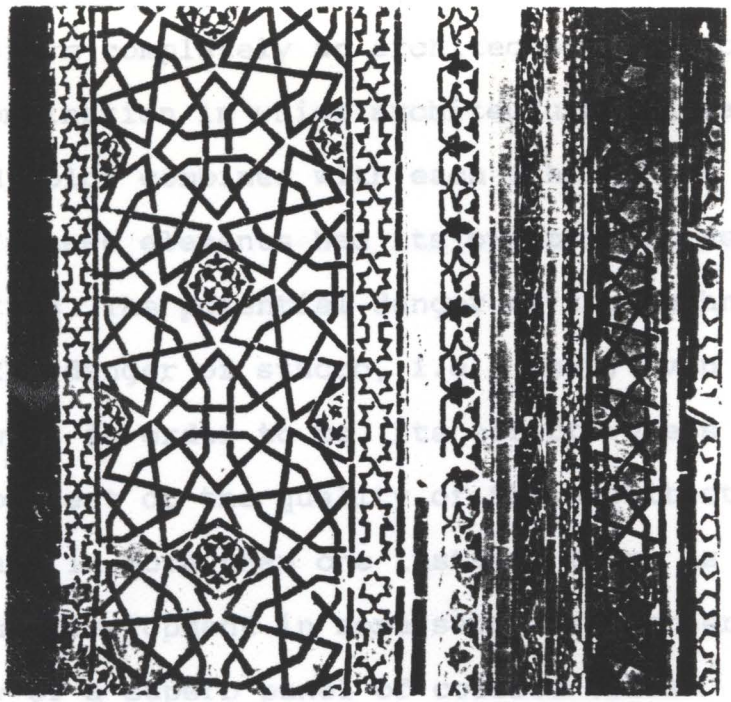

FIGURE.17 Tilework, Sahip Ata mosque, Mashad

FIGURE.18 Tiled ceiling of madrash

was to transform completely an architectonic composition into a brilliant combination in which architectural masses, decorative designs, and color combined with each other while at the same time each of these elements had its own principles and characteristics. The potential danger of the technique is similar to the danger of stucco, i.e., that, even though it requires a wall in order to be, its effectiveness is to an extent independent of the quality of the architecture on which it is used and in more than one instance there is something absurd in the development in some secondary corner of an entrance way of a superb panel of colored tiles[6].

ENDNOTES

1. Hill, Derek - Grabor, Ooeg. Islamic Architecture and Its Decoration. The University of Chicago Press, 1964. p.73
2. Ibid p.74
3. " p.74
4. " p.75
5. " p.75
6. " p.76

SOURCE OF FIGURES. Hill, Derek - Grabor, Ooeg. Islamic Architecture and Its Decoration. The University of Chicago Press, 1964.

CHAPTER.4

THE THEMES OF DECORATION

The central themes of ornament can perhaps best be divided into five basic elements, it being understood that in most instances, it was a combination of two or more of these elements which actually made up the design.

HUMAN AND ANIMAL MOTIFS

The first category is the rarest. Human and animal features existed in medieval Islamic sculpture; no examples in situ remain from Iran and the exact architectural function of the many stucco figures which are found in museums today is not very clear. A few instances of sculpture of human beings and mostly of animals exist in Anatolia (figs 19,20)[1]. Using of these motifs is not permitted in Islam, so there is no existing example in contemporary Islamic Architecture.

ARCHITECTURAL

A second decorative theme may be called architectural. It is a known feature of Islamic art that a considerable number of elements that had originally a structural meaning were transformed into purely decorative devices and as such played a

FIGURE.19 Animal carving in the Great Mosque

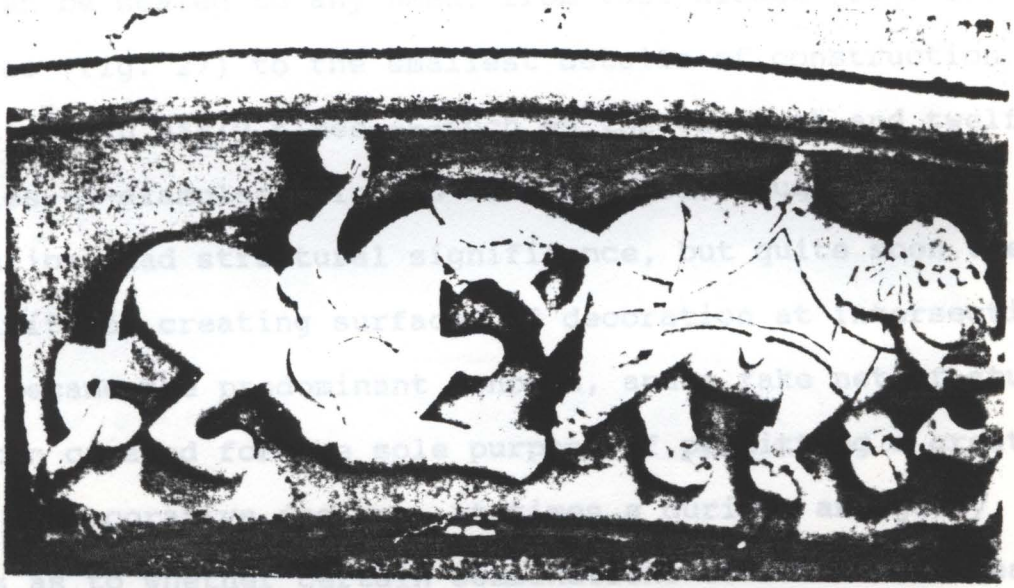

FIGURE.20 Animal carving in Seljuk madrasah

part in vast ornamental compositions. Such elements are columns, single or in branches, and moldings recombined in a peculiarly unarchitectonic fashion (fig. 21), or strange conglomerations of pilasters (figs. 22,23), capitals, and bases (fig. 24). But the single most common architectonic element in decoration is the so-called muqarnas, stalactite or honey-comb, which occurs first on the upper part of the minaret and last on the capitals of the engaged columns on (fig. 25). The muqarnas is an architectural and decorative element whose origins are as unclear as it's ubiquity is certain. Basically it is a section of vault which, used in combination with other identical or related elements, creates a three-dimensional ornamental effect which can be scaled to any need, from vast niches (fig. 26) or entrances (fig. 27) to the smallest details of construction or decoration. In early times----such as the eleventh and twelfth centuries----examples exist to show that some muqarnas combinations had structural significance, but quite soon the possibility of creating surfaces of decoration at intersecting angles became the predominant concern, and a fake net of stucco was often created for the sole purpose of permitting a greater number of decorative designs. At times a curious ambiguity remains as to whether certain combinations of forms were meant to be fully decorative or purely architectonic, an ambiguity which is present as early as in the tenth century in Cordova and Bukhara and which seems to complicate even further any attempt at defining precisely the significance of decoration in

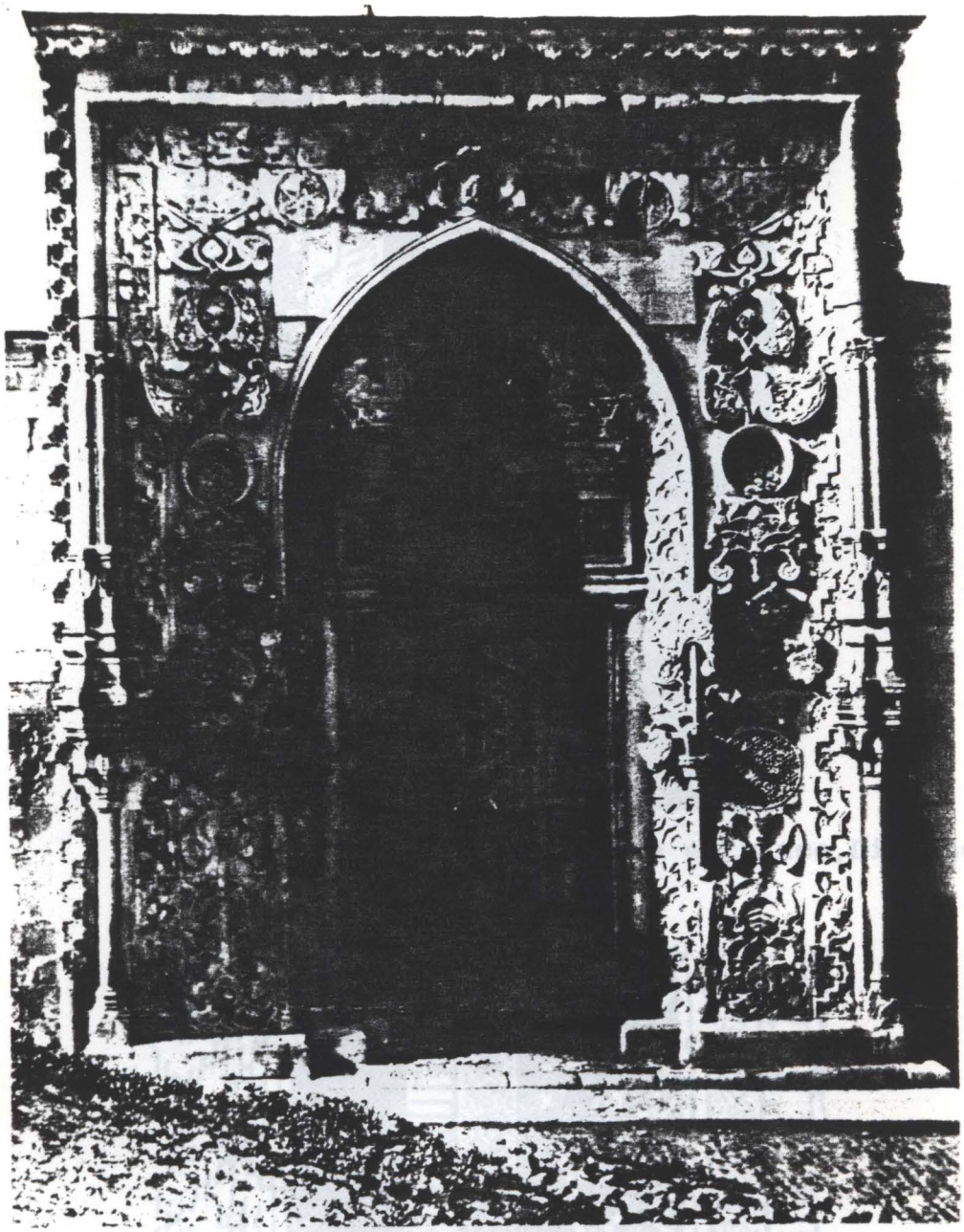

FIGURE.21 Main entrance to mosque, Divring

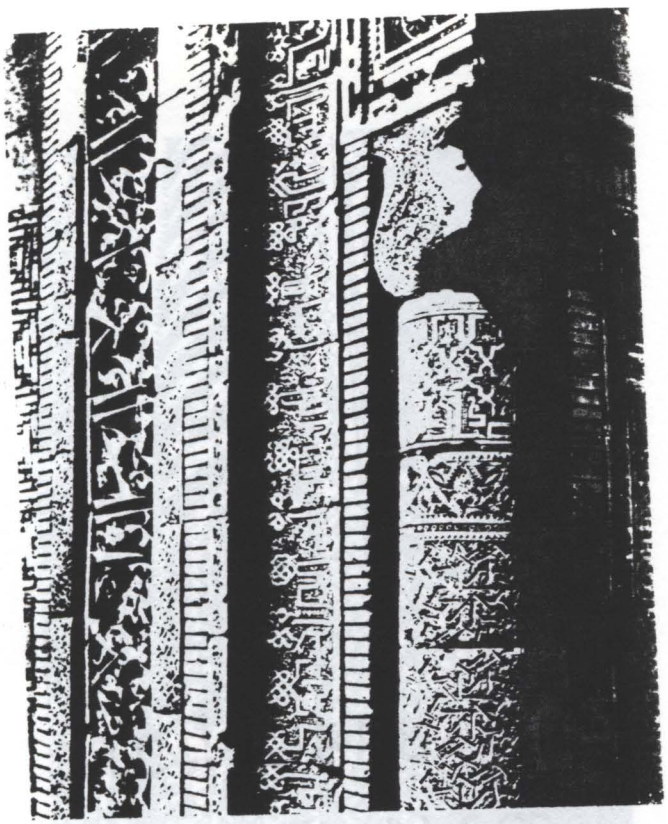

FIGURE.22 Detail of mosque entrance, Divring

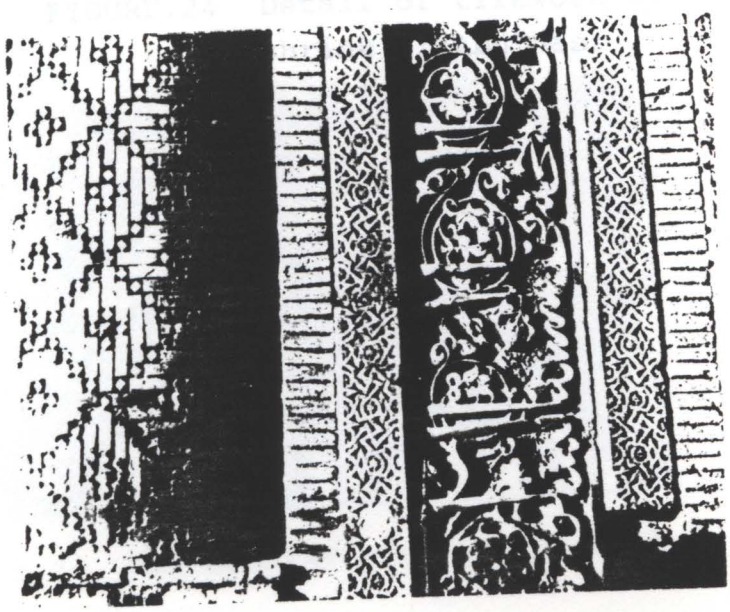

FIGURE.23 Detail showing patterned brickwork

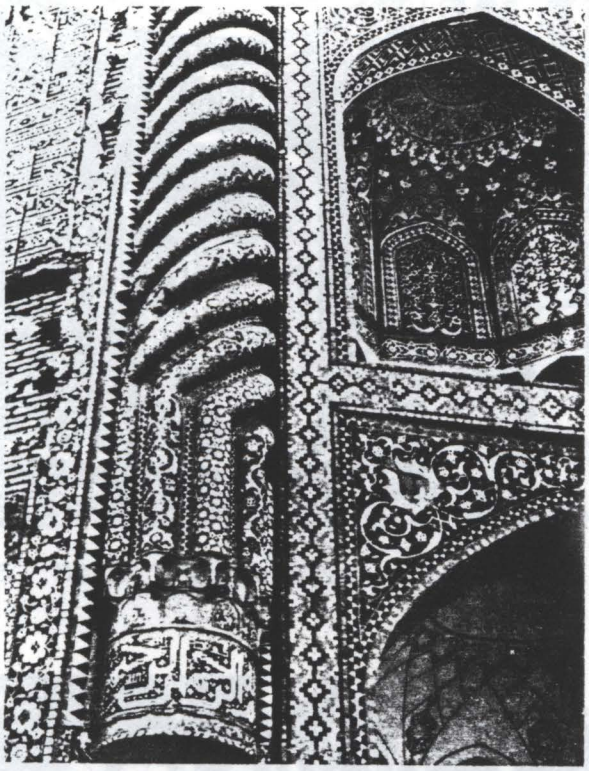

FIGURE.24 Detail of tilework at shrine of Abu Nasr

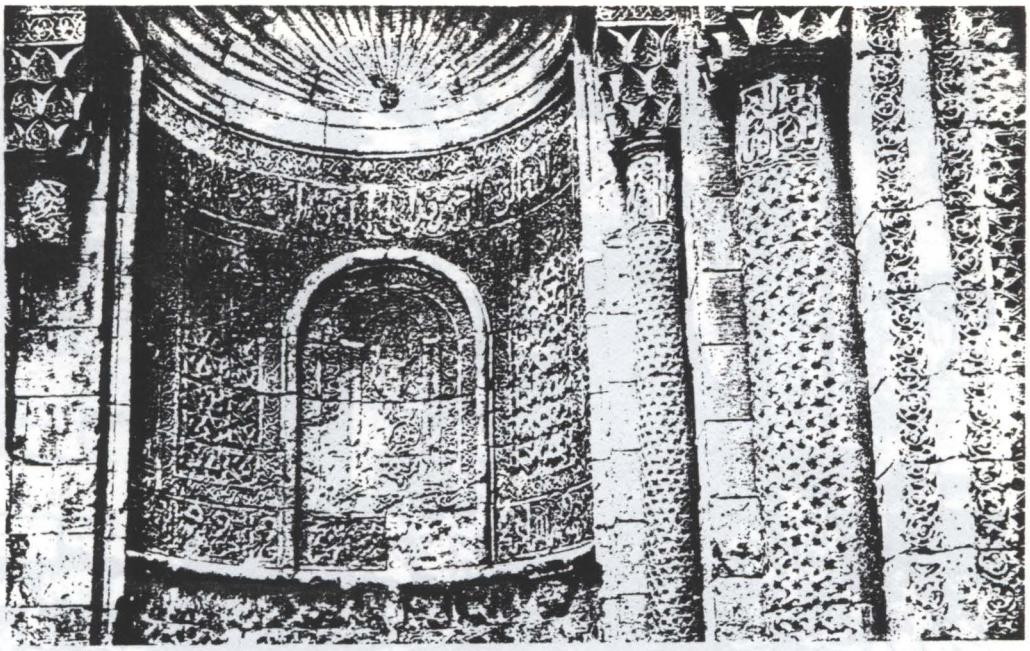

FIGURE.25 Detail of mihrab, Dunaysir

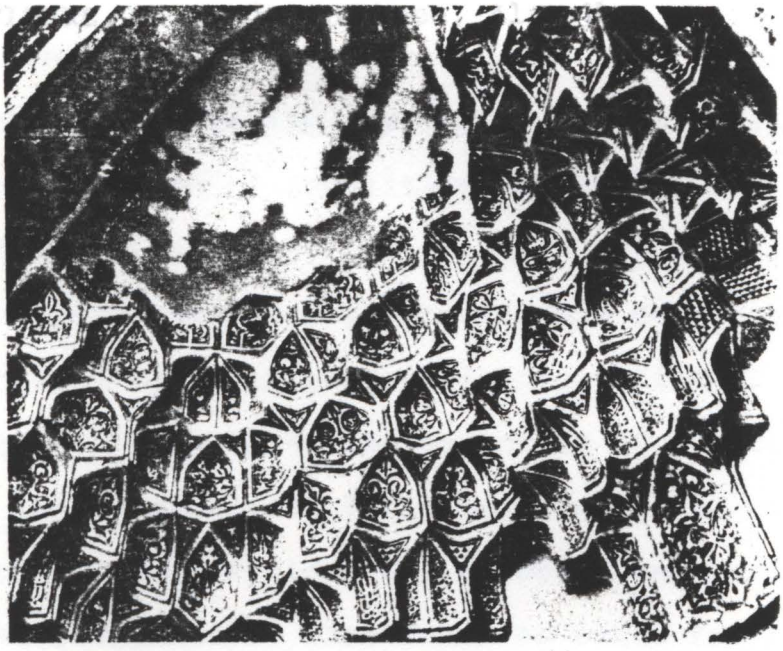

FIGURE.26 The archway roof at approach

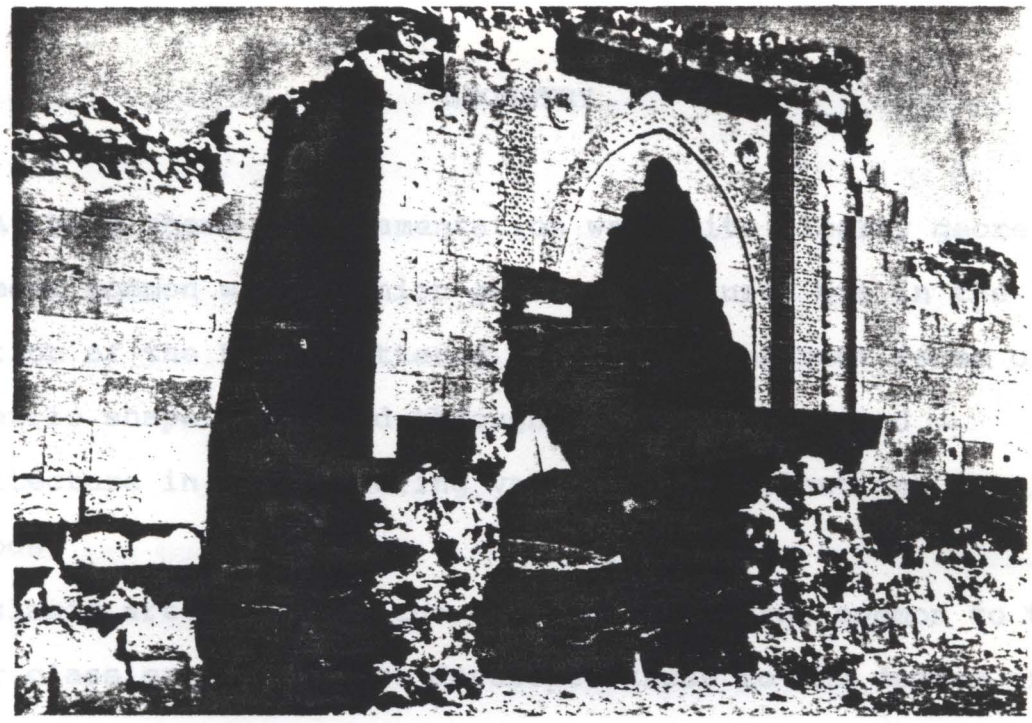

FIGURE.27 Main entrance, Alay Han

Islamic art[2].

GEOMETRY

A third theme of ornamentation was quite clearly geometry. The most common way in which geometry was used was in the creation of the basic patterns of design. Abstract forms of geometric shape are found throughout Islamic art and architecture in a bewildering variety of combinations at all periods.

Islamic art inherited the geometric patterns common to the later classical world, but developed these to the degree of complexity and sophistication previously unknown, transforming decorative geometry into a major art form. These patterns clearly demonstrate the fascination of Islamic artists with the visual principles of repetition, symmetry, and continuous generation of patterns[3].

The superb assurance of the Islamic designers is demonstrated by their masterful integration of geometry with such optical effects as the balancing of positive and negative areas, interlacing with fluid overlaping and underpassing strapwork, and a skillful use of color and tone[4].

Geometric patterns also form the basis for organizing the other decorative elements, being independent of scale and applicable to any material. More than any other type of design they permitted an interrelationship between the parts and the

whole of a building complex, the exterior and the interior spaces and their furnishings[5].

The generating source of much Islamic design is the circle, with the radius functioning as a basic line unit, and divisions of the circumference derermining the system of proportion. The basic unit may be developed into a square, a triangle or a polygon. Squares, pentagons, hexagons and octagons, frequently star-shaped, are in turn often contained in circles. These forms are then elaborated by multiplication and subdivision, by rotation and by symmetrical arrangements (figs. 28-35). These emhasized patterns are used in planning. Design can be subdivided and sections of the overall pattern can be given prominence to decorate borders or special sections within or around the main design.

One of the most common geometric patterns found in Islamic architecture is the star, which occurs in countless variations, with six to sixteen points, and in every material, scale and variety of application, from pierced window screens and woodwork to tile panels and embroidery[6].

At first glance, the tremendous variety of geometric shapes, rectangles, squares, various kinds of diamonds (figs. 36,37), an endless variety of geometrically conceived star patterns (figs. 38,39), various "net" patterns based on geometric principles (fig. 40), meanders, and many circles, all seem to show the most amazing imagination and inventiveness. The most significant facts about the geometric units used seem, however,

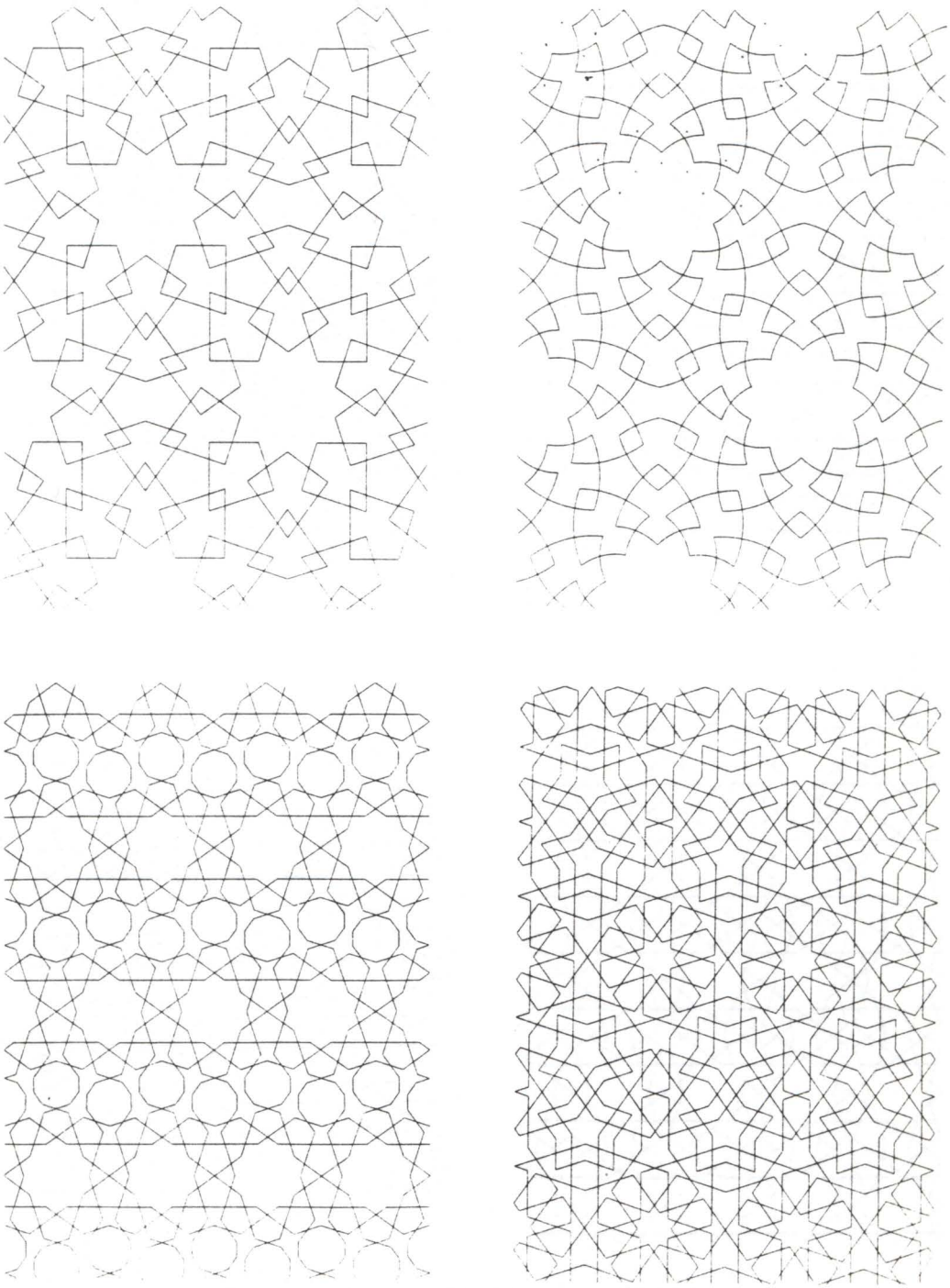

FIGURE.28 Geometric patterns, pentagon

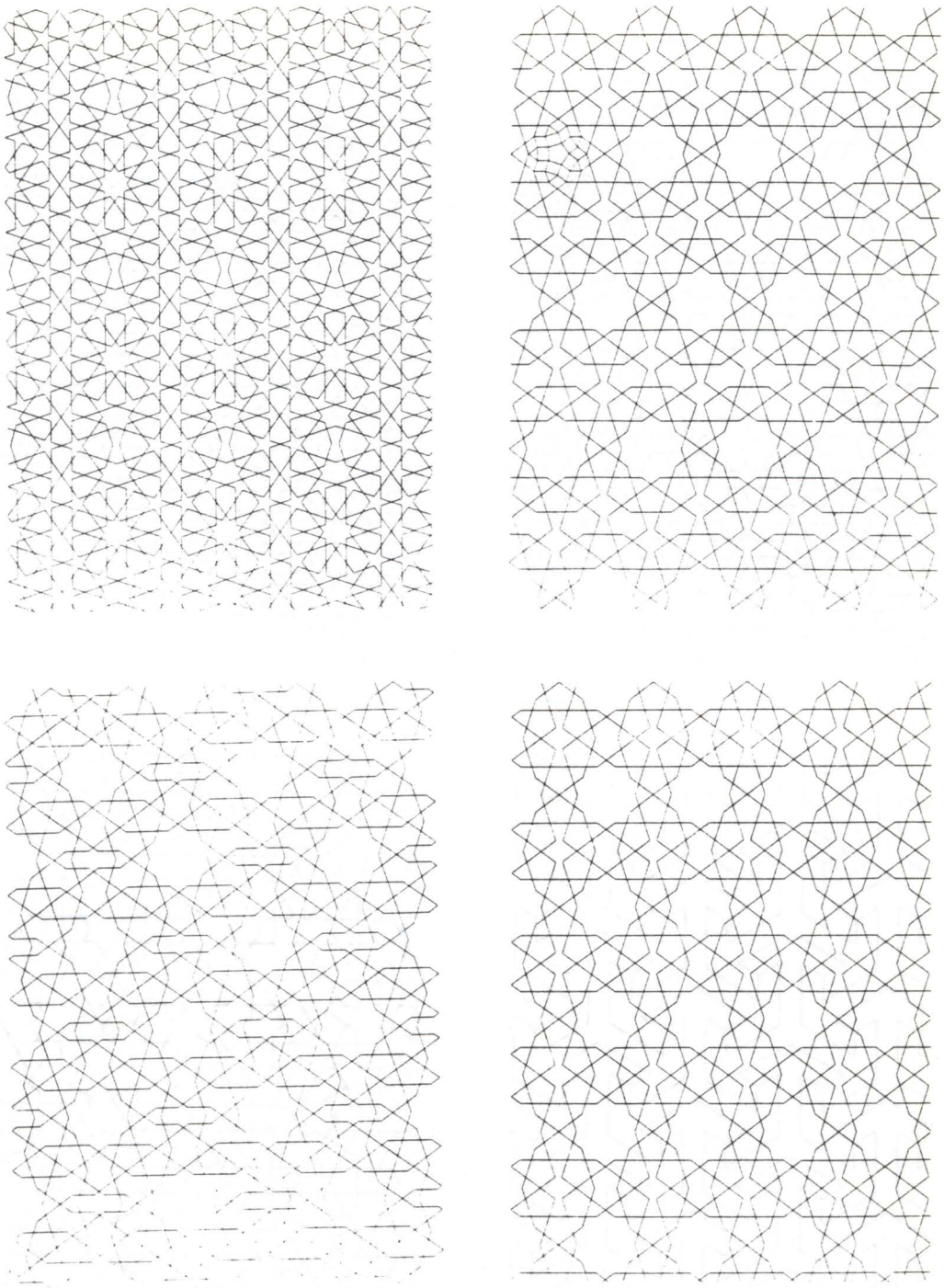

FIGURE.29 Geometric patterns, pentagon

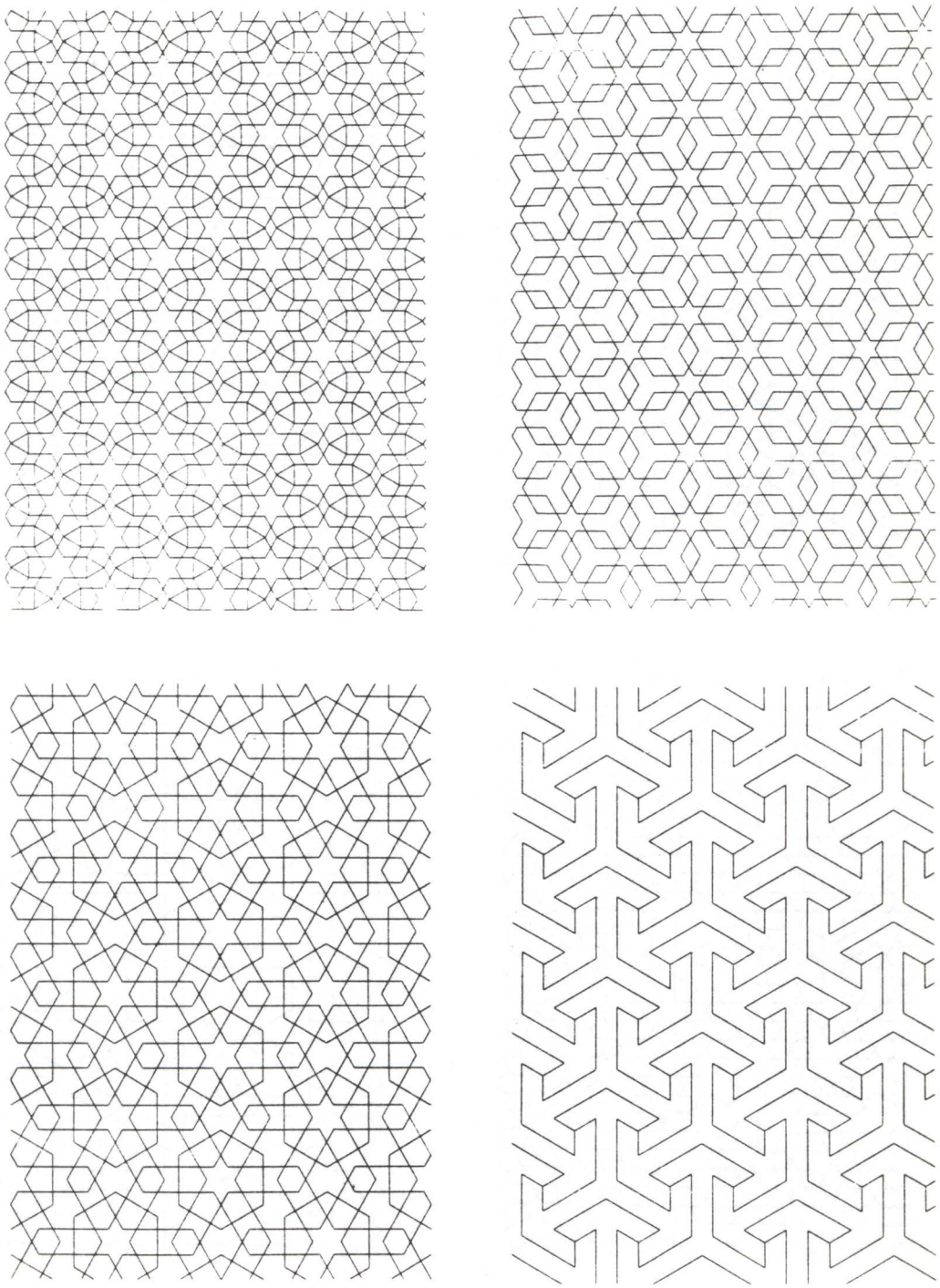

FIGURE.30 Geometric patterns, hexagon

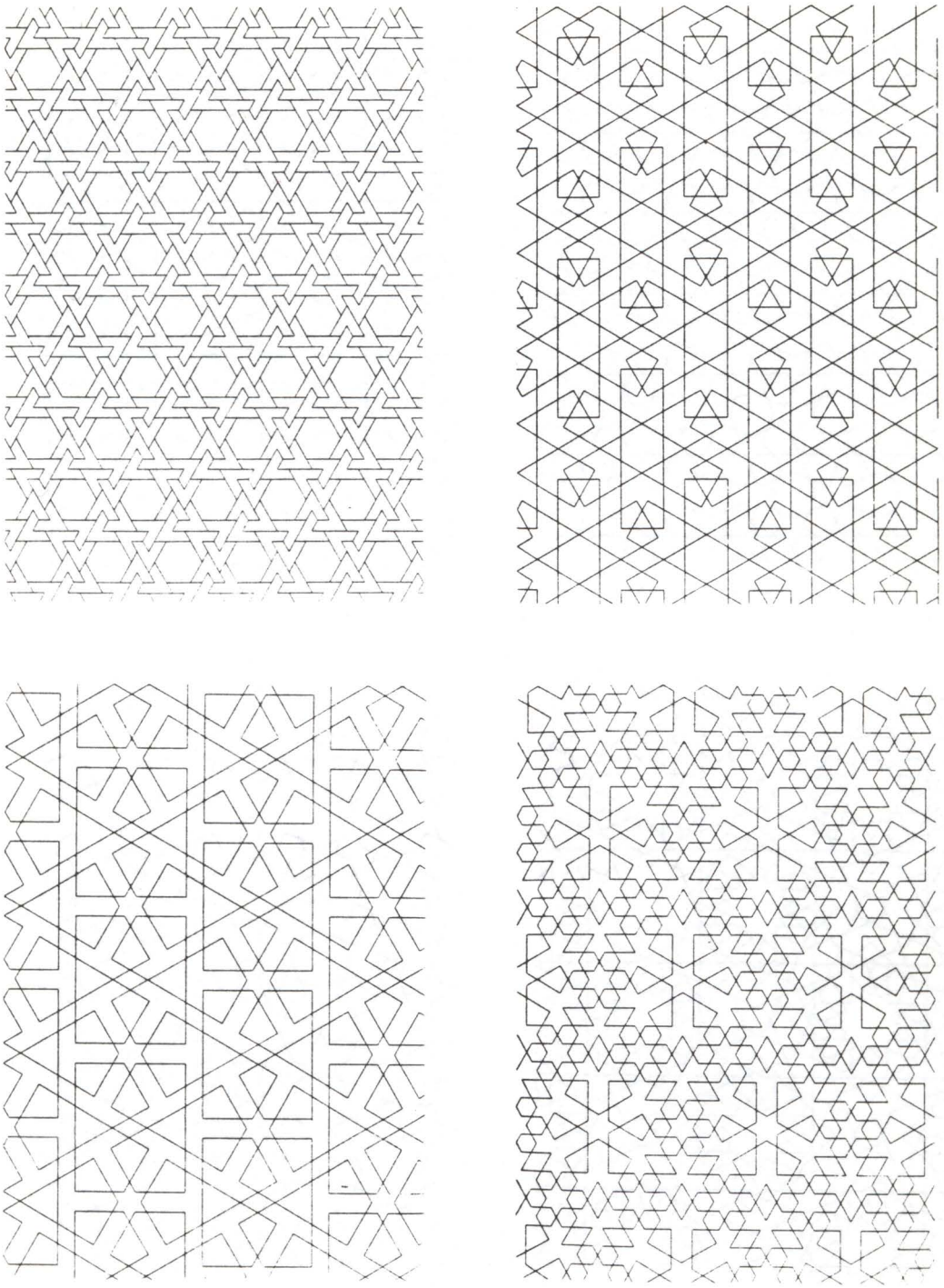

FIGURE.31 Geometric patterns, hexagon

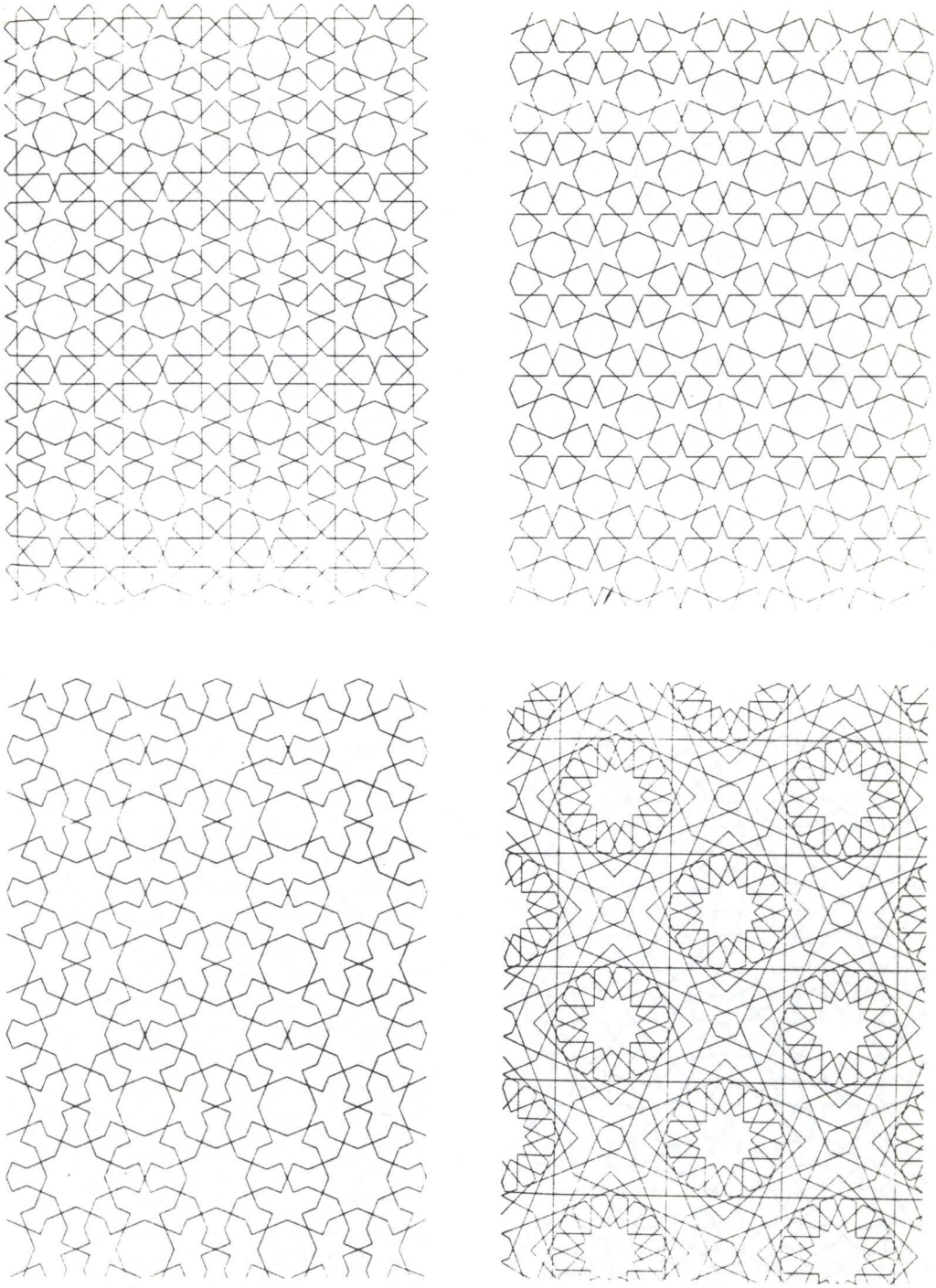

FIGURE.32 Geometric patterns, octagon

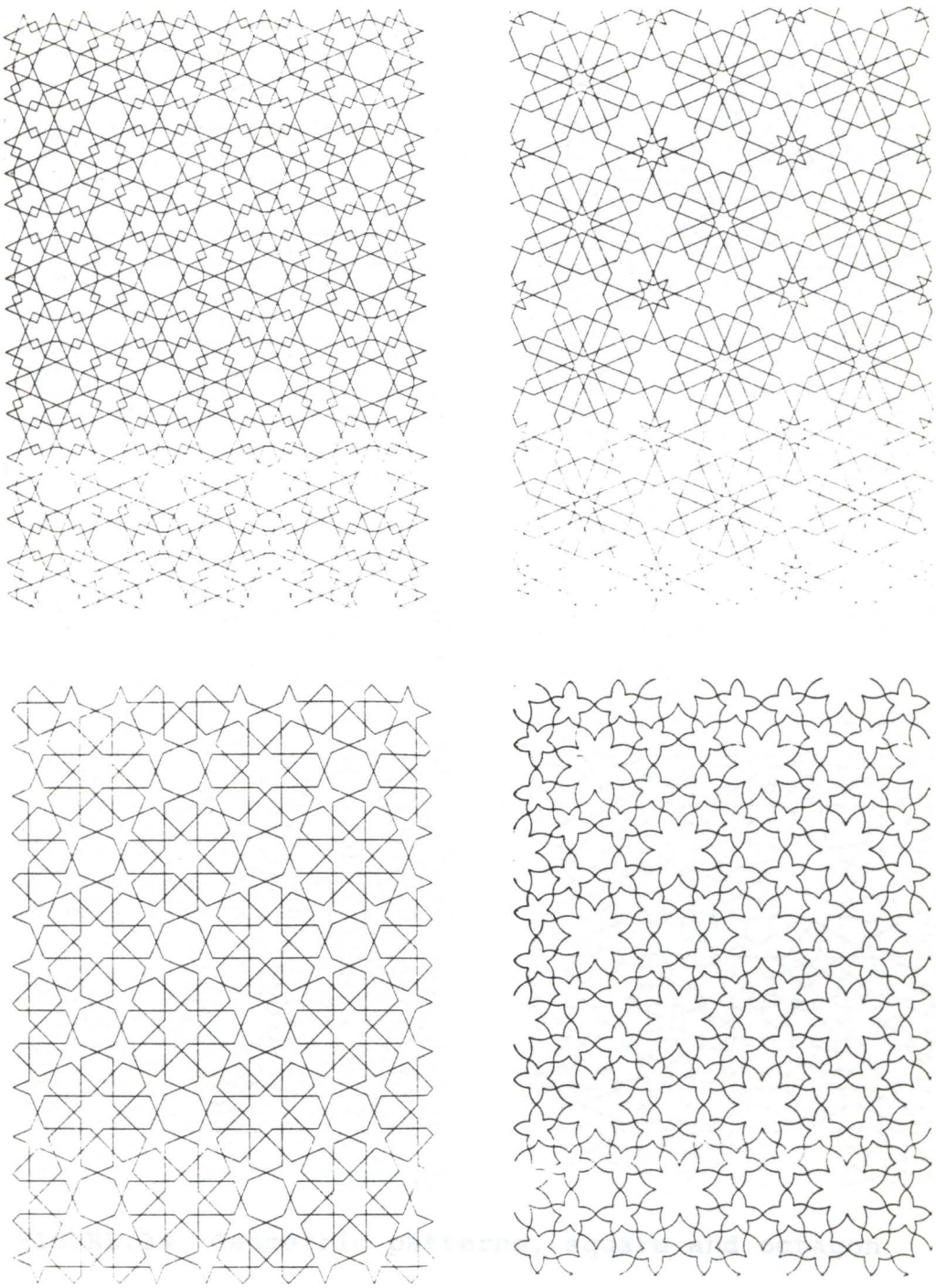

FIGURE.33 Geometric patterns, octagon

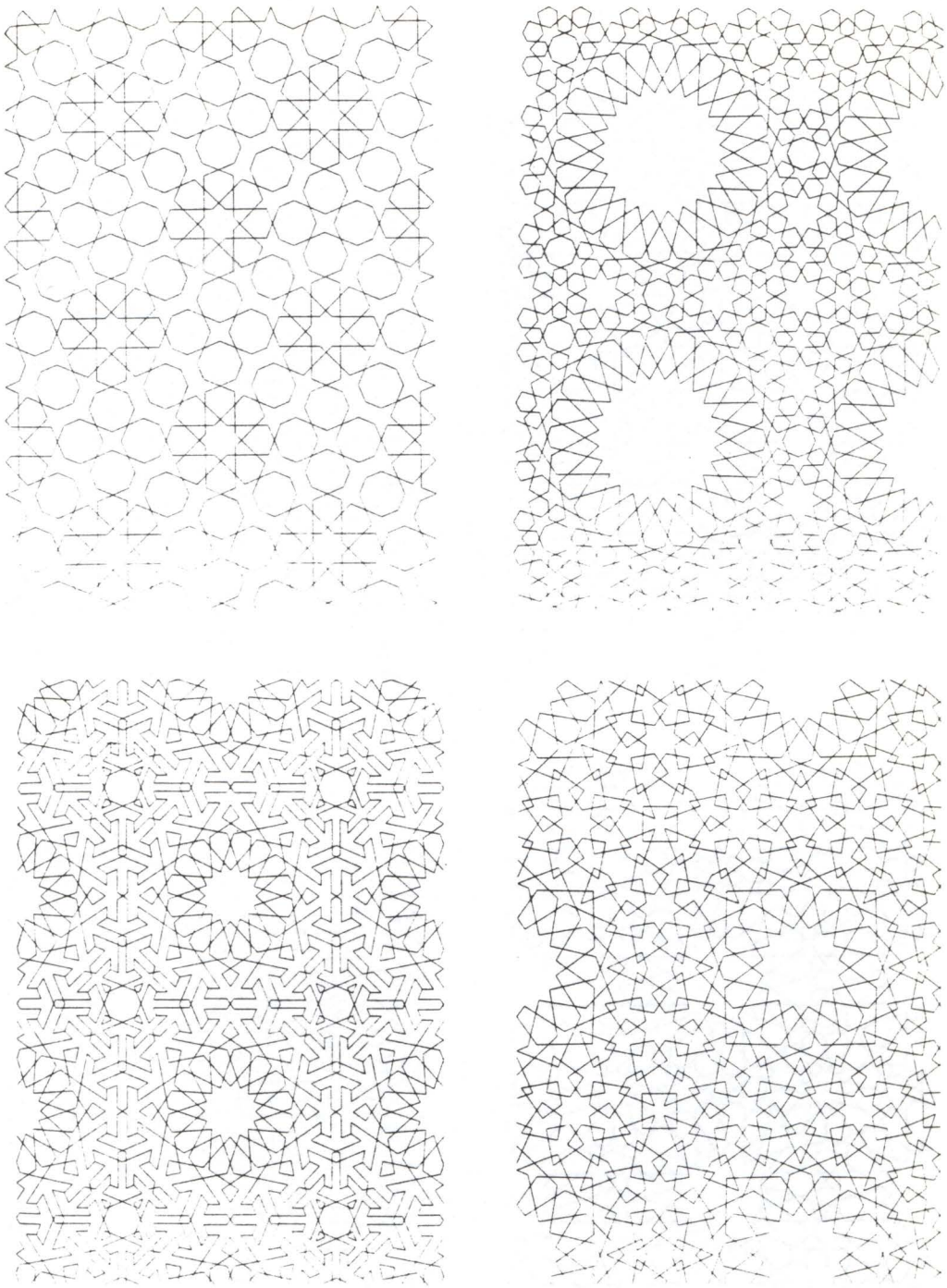

FIGURE.34 Geometric patterns, square and octagon

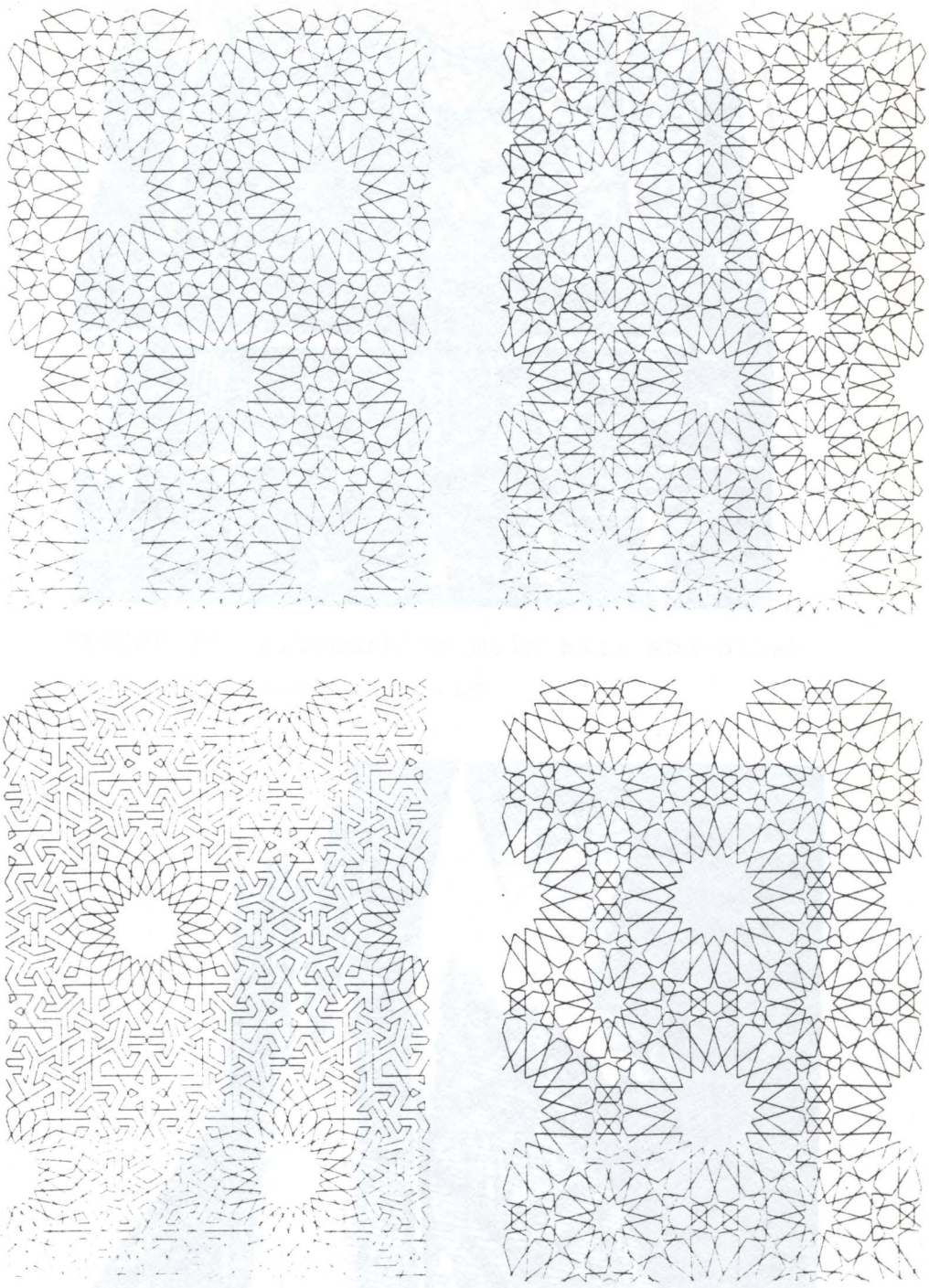

FIGURE.35 Geometric patterns, stars or rosettes

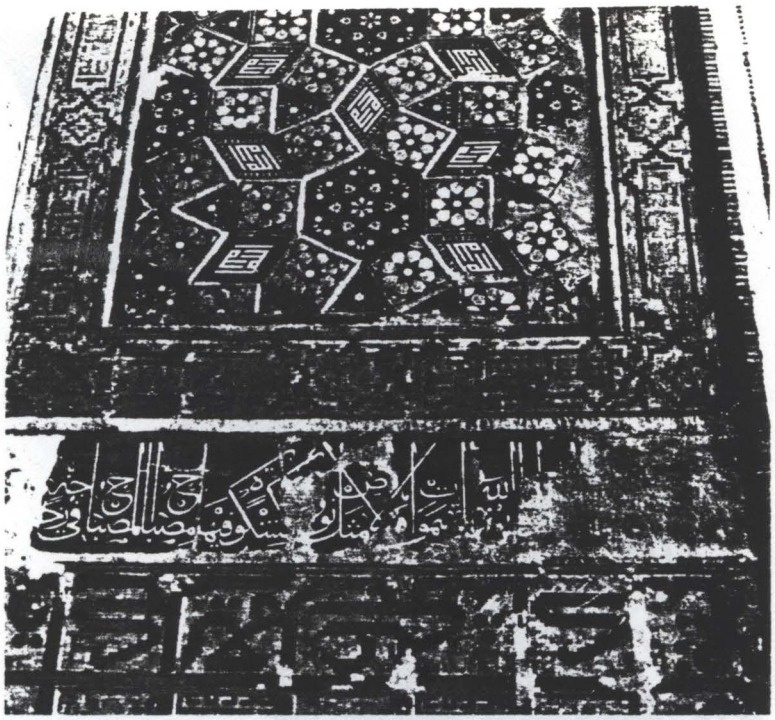

FIGURE.36 Tilework in main hall Abd-allah Ansari shirne

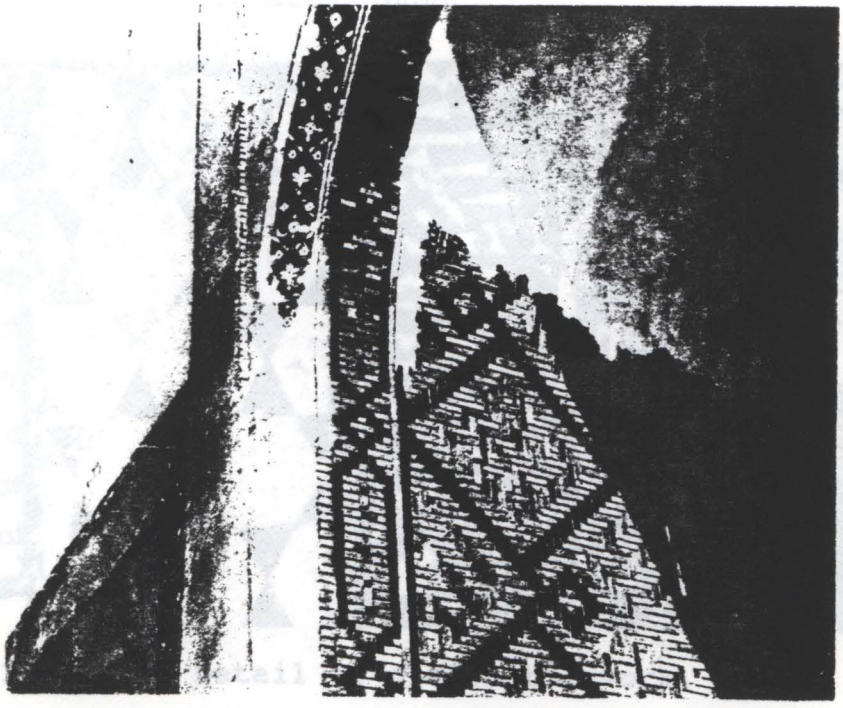

FIGURE.37 Tilework in prayer chamber Abd-allah Ansari shirne

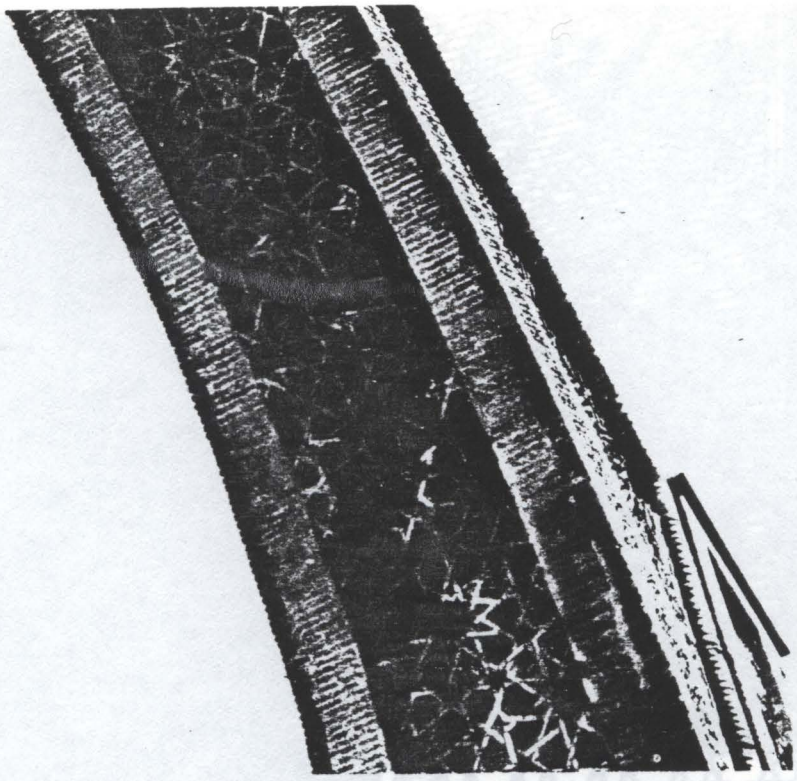

FIGURE.38 Detail of decoration on inside of arch, Bust

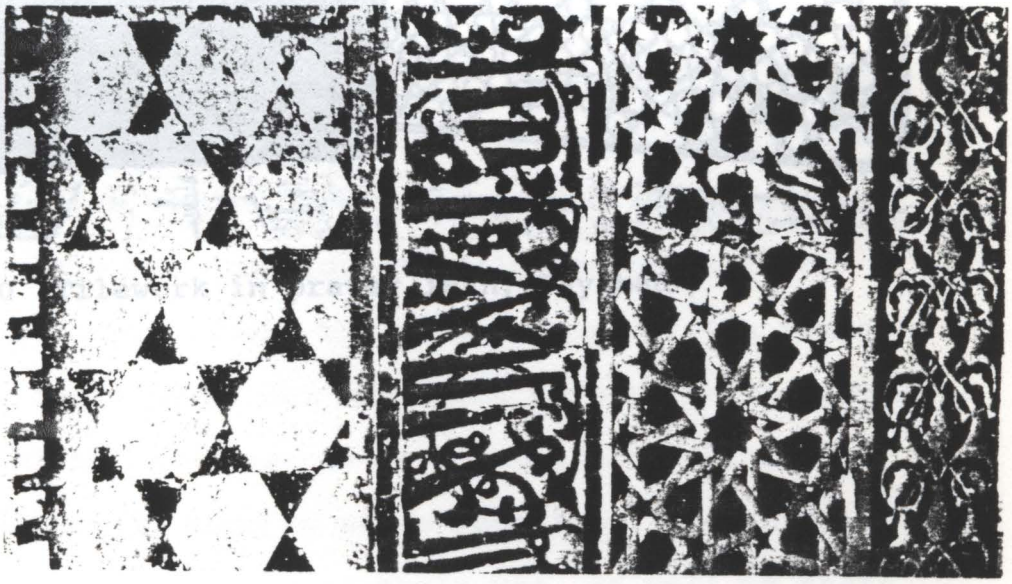

FIGURE.39 Detail of glazed tilework, Tokat

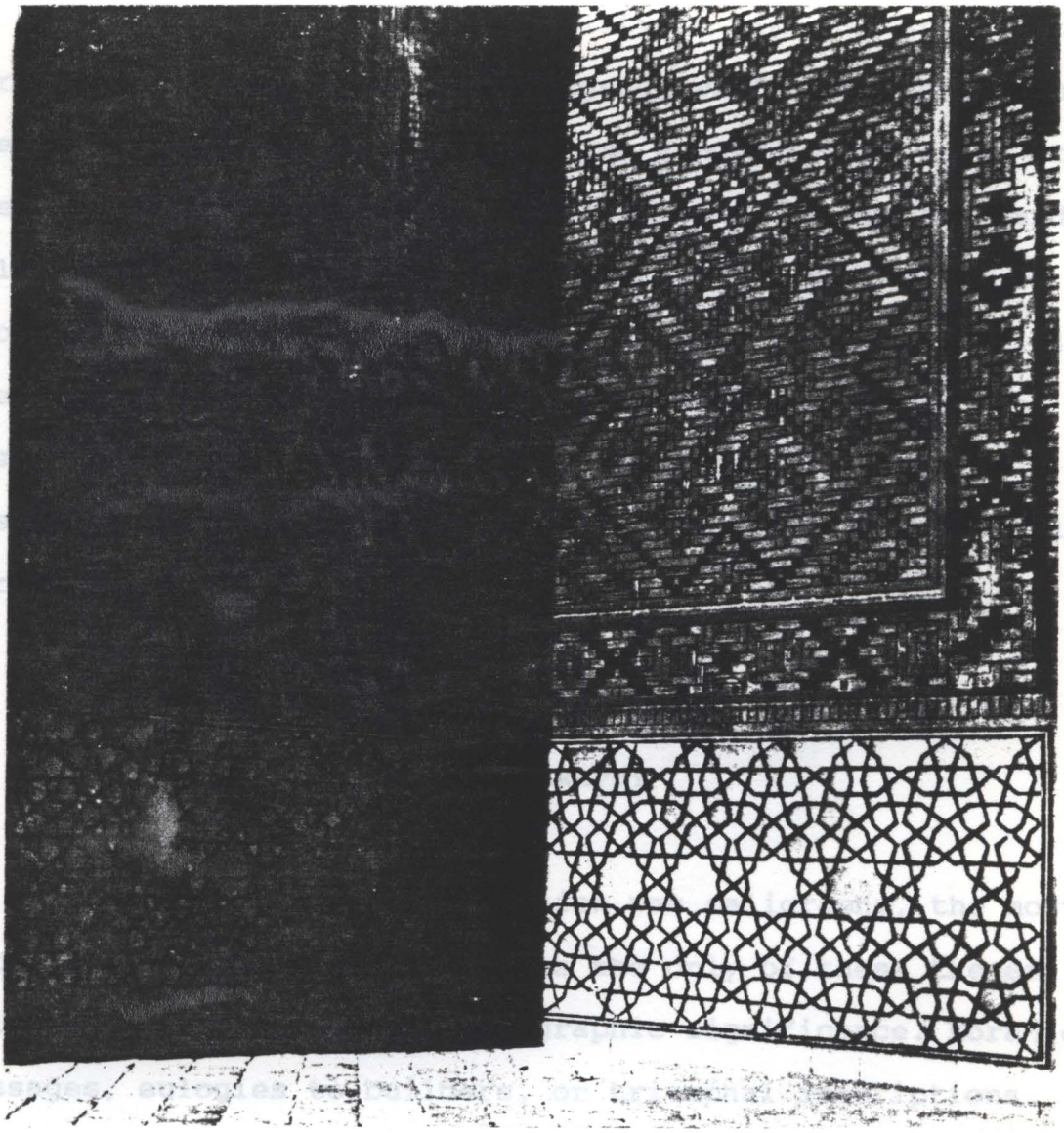

FIGURE.40 Tilework in prayer iwan, Tayabad

to be, first, their constant mobility in time and space, for in early designs such as those of Uzgend, we find basically the themes of Samarkand or Turkestan two hundred years later or even, translated into stone, those of Anatolia two thousand miles away ; and second that the fascination of the use of geometry in these designs is that in many instances (fig. 41) the visible decoration is only a segment of the geometric design grid that was necessary for its creation.
Also these design are often subsidiary grids panelized in the larger overall grid of space.

CALLIGRAPHY

The fourth theme of decoration was caligraphy, the most ambiguous of them all, for it was the only of these themes which had, in a sense, an iconographic significance. Koranic passages, eulogies to builders, or triumphal inscriptions served to explain the function of buildings or parts of buildings and to perpetuate the pious memory of the founder. Inscriptions could point out the exact purpose in any given instance of plans and elements of construction which were, in different buildings, made to serve functions, and this may in part explain the lavishness of their use, as well as their variety. Their range runs from the severe Kufic of the tomb of Qabus (fig. 42) to the superbly artificial squares in which

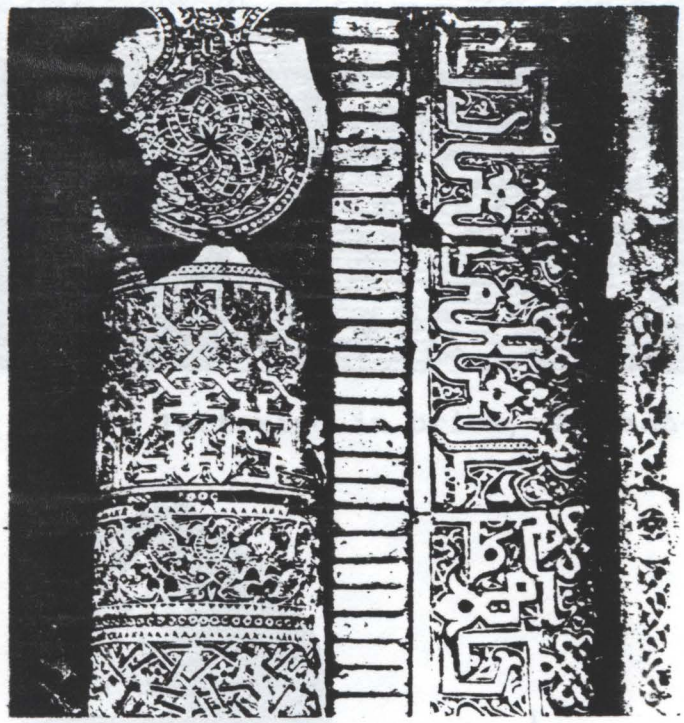

FIGURE.41 Detail of tilework on pillar, Uzgend

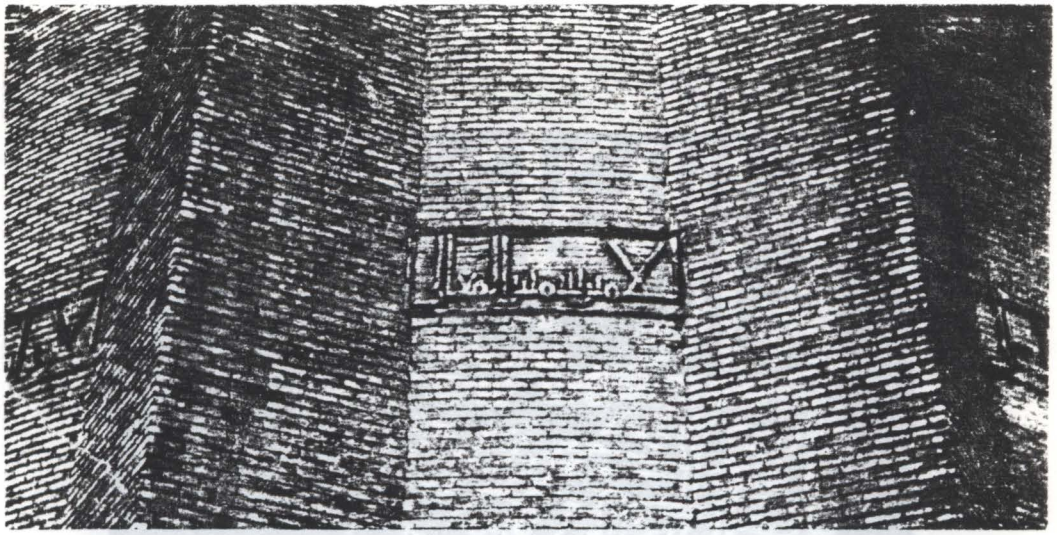

FIGURE.42 Kufic lettering in brick, Gunbadh-i-Qabus

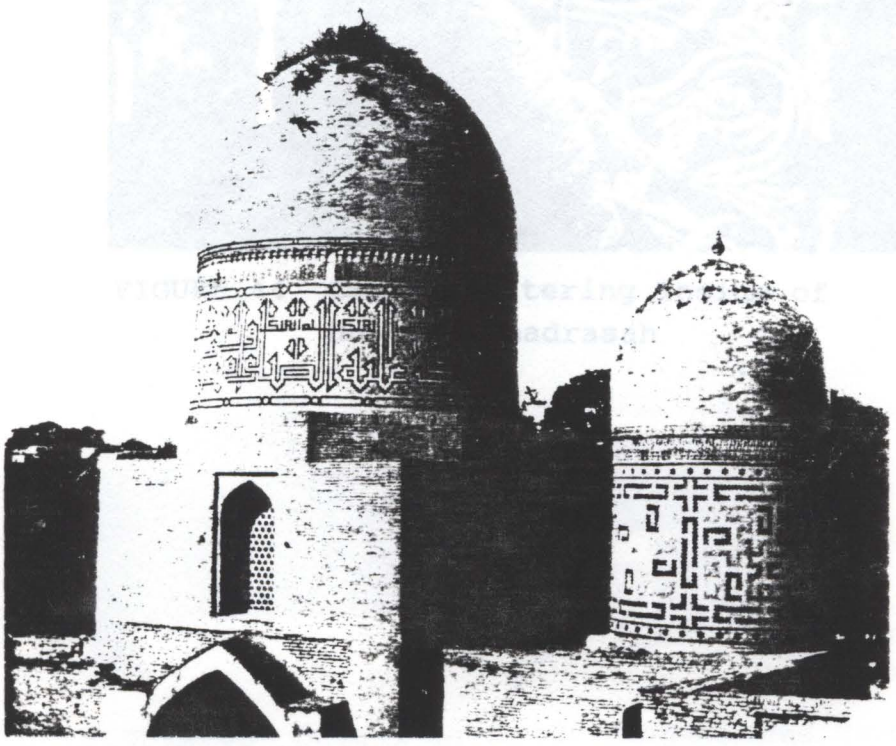

FIGURE.43 Kufic lettering on tomb of Shah-i-Zindah

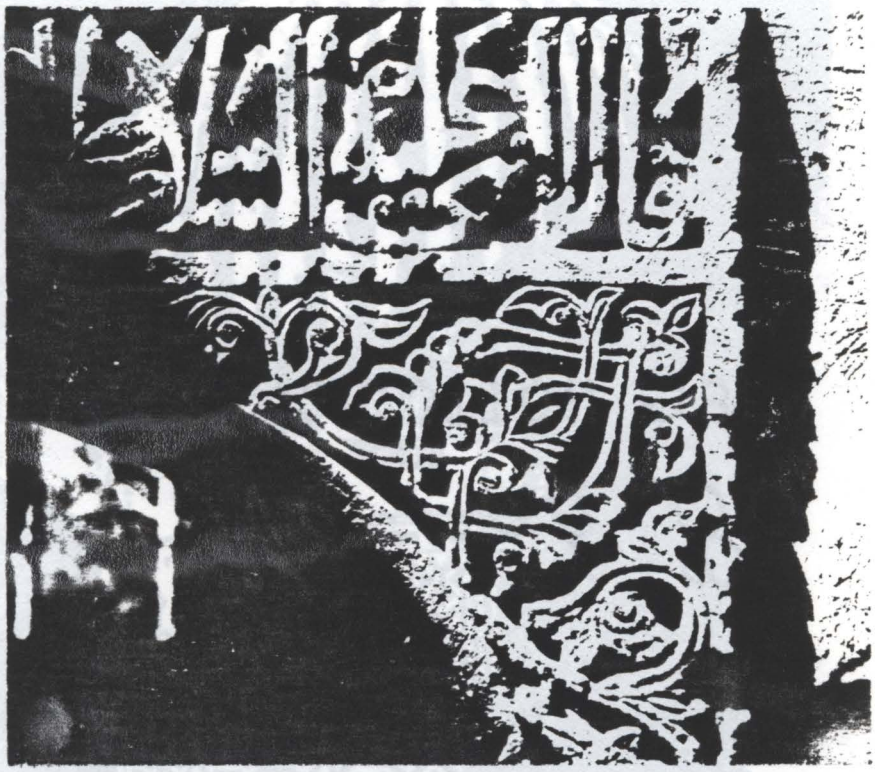

FIGURE.44 Carved lettering inside of Hatuniye madrasah

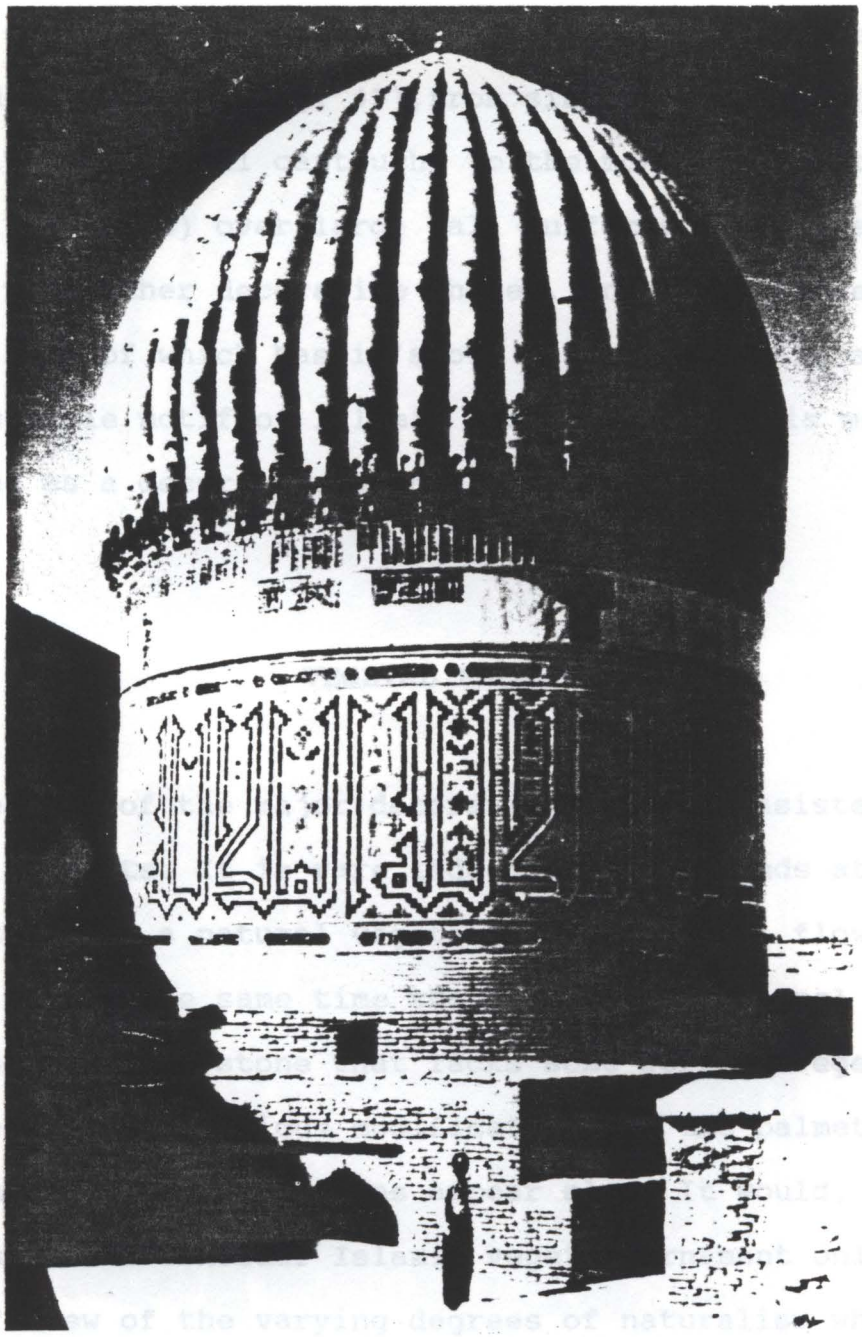

FIGURE.45 Detail of dome, Khoja Ahmad Yassavi

certain traditional religious formulas were made more magical than understandable (fig. 43),from simple statement (fig. 44) in cursive on a small cartouche to the monumentalization of the cursive (figs. 45) over large wall surfaces or to the playful mixture with other decorative themes. Under all these formal guises, each of which has it's own history, writing appears as an inescapable motif of Islamic architecture[7]. This motif is also used as a decorative than illustative.

VEGETAL ELEMENTS

The last of the major decorative themes consisted of vegetal elements. It is rare indeed that one finds at this time any instance of a natural vegetation, of natural flowers or leaves. Yet at the same time there is hardly a panel of tiles (figs. 46,47) or a stone that lacks some sort of vegetal element----mostly various modifications of the palmette, although other floral designs appear also. It would, however, be a mistake to consider Islamic vegetal ornament only from the point of view of the varying degrees of naturalism which appear in its leaves or flowers. For, in a deeper way, the true significance of vegetal themes was that they gave a tremendous sense of nervous life to the ornament. This appeared in two ways . First, so often, the tendril appears more striking than leaf or the flower. And, second, in most instances, Muslim

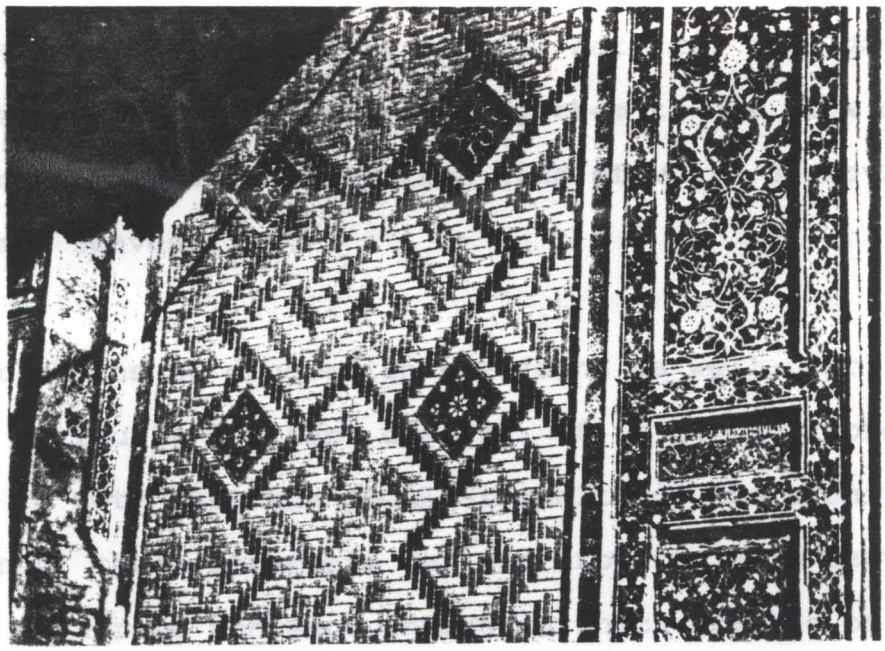

FIGURE.46 Vegetal elements in courtyard of Ulugh Beg madrasah

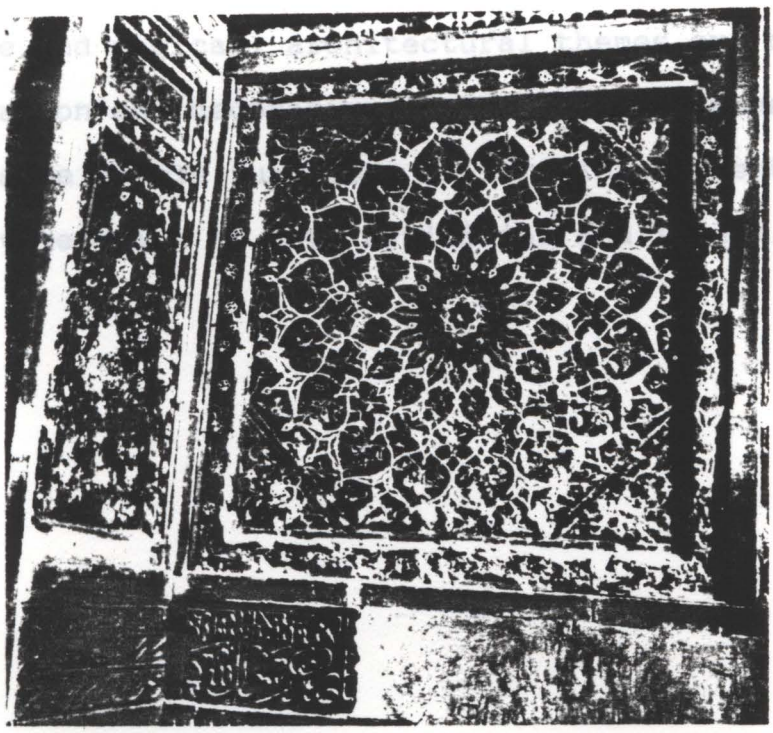

FIGURE.47 Vegetal elements and calligraphy

decorators did not use sterile vegetal motives; they gave them constant movement, either by relating them to the flow of writing or by developing them in a kind of whirl of moving tendrils and leaves[3].

Other themes of decoration are found as well, for instances curiously abstract designs. It is perhaps more important to note that the peculiar wealth of the architectural decoration of these monuments derives from two main facts: first, it is a rare monument indeed in which any one of these themes appears alone, and second, all of them have both a concrete and an abstract meaning. Animals or human figures are decorative and magical; architectural themes are both supports for decoration and decorative in themselves; geometric elements have the same double function; writing is ornament and also meaning; vegetation is both artificial and lively.

ENDNOTES

1. Hill, Derek - Grabor, Ooeg. Islamic Architecture and Its Decoration. The University of Chicago Press,1964. p.77

2. Ibid p.80

3. Michell, George. Architecture of the Islamic World. Thames and Hudson, 1978. p.169

4. Ibid p.169

5. " p.169

6. " p.170

7. Hill, Derek - Grabor, Ooeg. Islamic Architecture and Its Decoration. The University of Chicago Press, 1964. p.81

8. Ibid P.81

CHAPTER.5

COLOR PHILOSOPHY

In the Islamic tradition, color is considered primarily from a metaphysical point of view, one which sees the duality of light and darkness as permanent possibilities latent in the celestial Archetypes. The world of color cannot be devoid of opposition. The marvel is that color sprang from that which is without color". That which is without color, or Pure Light, is the realm of Pure Being and Absolute Unity, in which there is no individualization. Once determined, Light becomes the source of existence.

THE SYSTEM OF THREE COLORS

Three as number, and as triangle in geometry, reflects the fundamental conception of spirit, soul, and body which makes up all of creation.

Viewed alternatively as the three motions of the spirit, it evokes the acts of descent, ascent, and horizontal expansion which exhibit, respectively, passive, active, and neutral qualities (fig. 48).

White is the integration of all colors, pure and unstained. In its unmanifested state it is the color of Pure Light before individualization, before the one became many. Light, symbolically viewed as white, descends from the sun and symbolizes Unity[1].

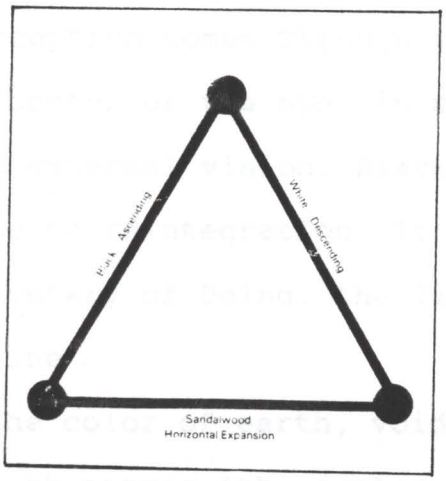

FIGURE.48 The triangle of three colors

As it is through white that color is made manifest, so through black it remains hidden, "hidden by its very brightness." Black is " a bright light in a dark day," as only through this luminous black can one find the hidden aspects of the Divine. This perception comes through the black of the pupil which, as the center of the eye, is symbolically the veil to both internal and external vision. Black is the annihilation of self, prerequisite to reintegration. It is the cloak of the " HOLY KABAH," the mystery of Being, the light of Majesty, and the color of the Divine[2].

Sandalwood is the color of earth, void of color. It is the neutral base upon which nature (the system of four colors) and the polar qualities of black and white act. Symbolically, sandalwood is man in the microscale, earth in the macroscale, body (JISM) to the artisan, the neutral plane to the geometrician, and the floor to the architect[3].

THE SYSTEM OF FOUR COLORS

Four as number, and as square in geometry, reflects the conceptual configuration of Universal Soul manifested as the active qualities of nature (hot, cold, wet, dry) and the passive qualities of matter (fire, water, air, earth). The quadrants of the day, the quarters of the moon, the four seasons, and the four division of man's temporal life (childhood, maturity, youth, and old age) are secondary

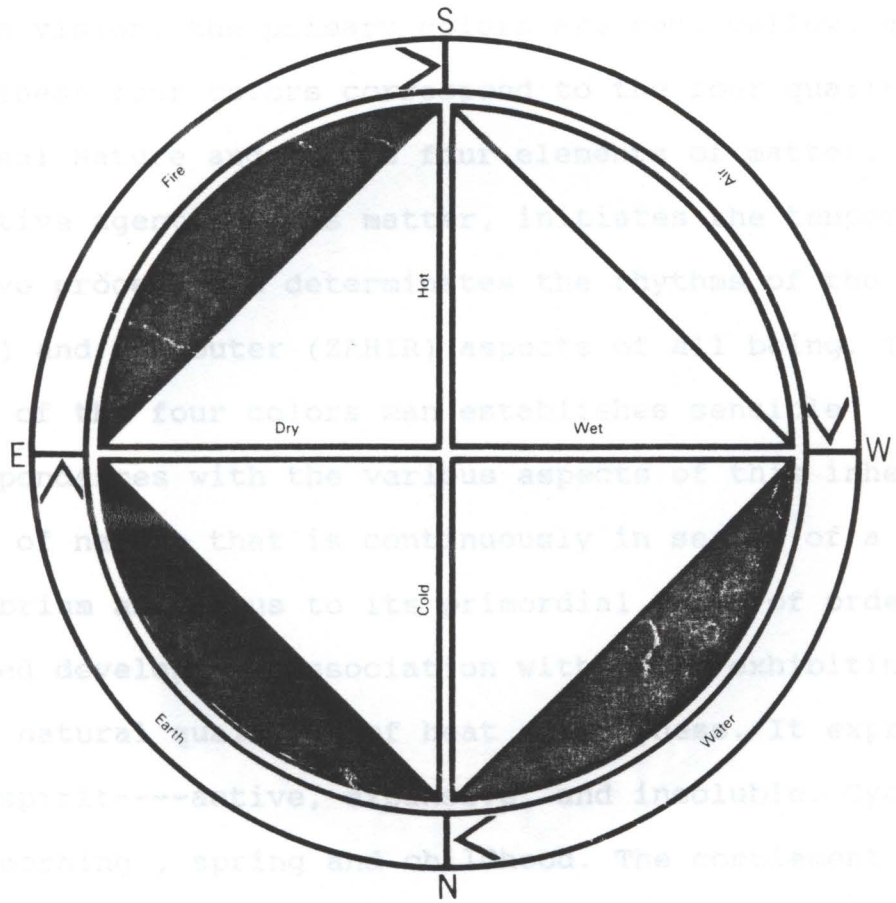

FIGURE.49 The circle of four colors

reflections of this system (fig. 49)[4].

In vision, the primary colors are red, yellow, green, and blue. These four colors correspond to the four qualities of Universal Nature and to the four elements of matter. Nature, the active agent towards matter, initiates the temporal creative process and determinates the rhythms of the inner (BATIN) and the outer (ZAHIR) aspects of all being. Through the system of the four colors man establishes sensible correspondences with the various aspects of this inherent energy of nature that is continuously in search of a state of equilibrium analogous to its primordial state of order[5].

Red develops an association with fire, exhibiting the paired natural qualities of heat and dryness. It expresses the vital spirit----active, expansive, and insoluble. Cyclically, it is morning , spring and childhood. The complement of red is green, which exhibits the opposite qualities of coldness and humidity. Green characterizes water, the superior soul, passive, contractive, and soluble qualities. Cyclically, it is evening, fall, and maturity. Yellow is air, hot and wet (fig. 50). Its qualities are contemplative, active, expansive, and soluble. It stands for noon, summer, and youth. It complements blue, which represents earth, cold, and dry. The inferior soul, passive, contractive, and insoluble are its qualities, while symbolically it represents the end of the cycles, for it is night, winter and old age. Viewed as a movement through the four quadrants of a circle, the descending and ascending

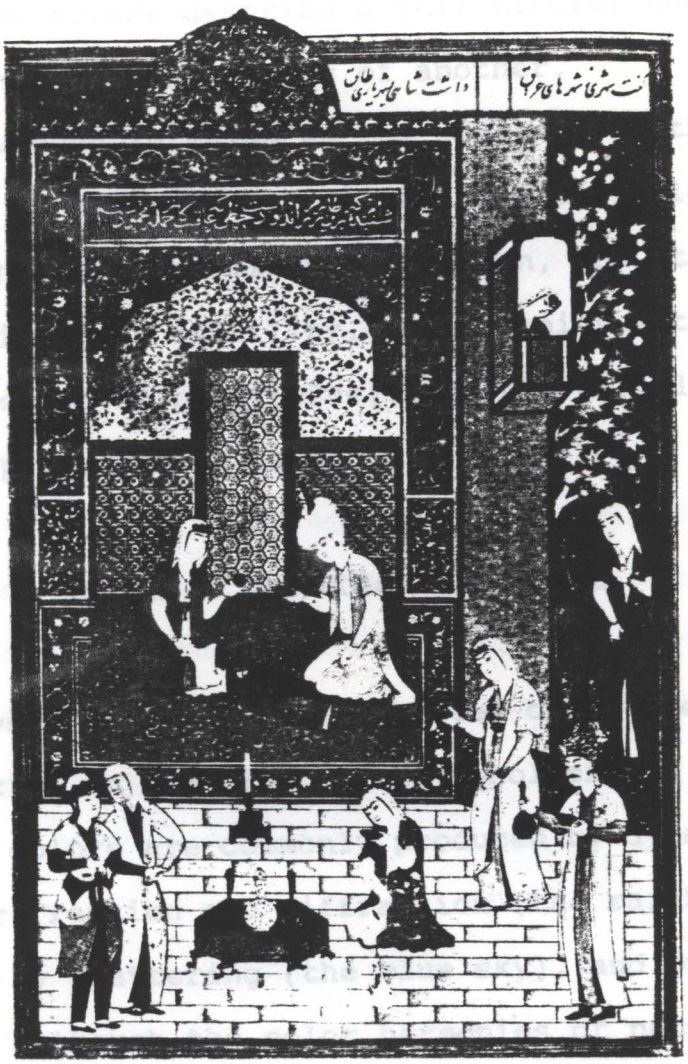

FIGURE.50 Bahram Gur in the yellow pavillion

motions of these colors describe a full circle; the end of one cycle only signals the beginning of another.

Green is viewed in Islam as the superior of the four colors because it embodies all of the others. Yellow and blue join to form the balanced mixture of green, and its afterimage is red. Green is hope, fertility, and eternity with its two inherent dimensions of past (blue) and future (yellow), and its opposite, the present seen as red[6].

ORDER IN THE COLOR OF NATURE

The purposeful use of color creates order where otherwise chaos might exist in the mind of the beholder.

Nature's colors are commonly produced by dyes and pigments, by refraction and diffraction (the rainbow, ividescence), by scattering (the blue sky), and by polarization. Although the color harmonies of nature are many, they exhibit strong group characteristics that are predominately of analogous or complementary harmony system. The nuances of the former are the harmonies of scale, hue, and the dominant colored light, while those of the latter are the harmonies of contrasting scales, hue, and the colors of complements, split complements, and tridic combinations. Simple or multi-level color patterns are observable, in which the eye tends to favor the more precise color forms and to reject anything on the border lines. Thus primary colors in distinctly

observable systems are most appreciated, particularly for their visual clarity[7].

THE HARMONY OF ADJACENTS

Analogous colors, or colors that are next to each other on the color circle (fig. 49), are commonly found in nature. The rainbow scales from red to orange, blue into violet. Autumn colors scale red through orange, yellow, gold, brown, and purple. The leaves of trees scale yellow-green, green, blue-green. Most colors in highlight and shadow will scale through adjacents. A red rose will have orange highlights and purplish shadows, while a yellow nasturtium will scale towards orange in the center and to yellow-green at the stem (fig. 51).

Analogous colors reinforce color emotions, as in all instances the simple primary or secondary is supported and enhanced by two intermediate neighbors that reflect its basic character[8].

THE HARMONY OF OPPOSITES

The simultaneous contrast of opposing colors on the color circle appears in nature as frequently as those of analogous colors. This contrast tends to heighten the intensity of each

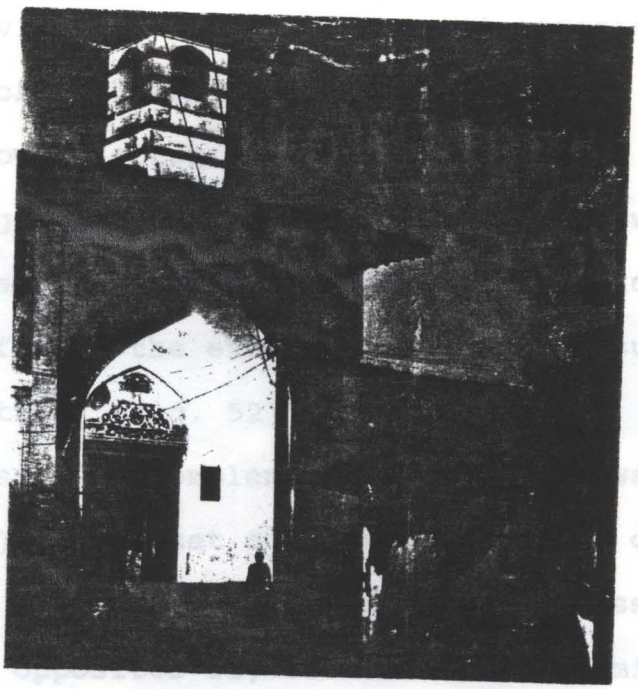

FIGURE.51 The harmony of adjacent colors

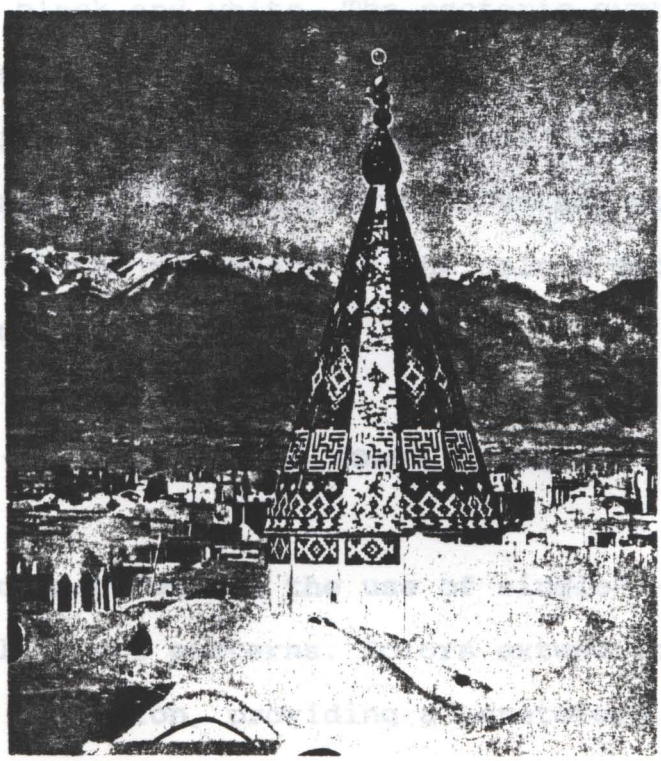

FIGURE.52 The harmony of opposite, Kashan, Iran

color and, by virtue of the phenomena of afterimage, to give brilliance, lucidity, and fulfillment to each.

Violet flowers often have yellow centers ; the blue bird has contrasting sparks of yellow-orange in his wings, while the drama of an orange sunset against a deep, liquid blue sky are but are but a few of the examples of nature's superb use of harmonious contrast (fig. 52)[9].

With opposite or complementary colors, a warm color (often in small areas) can be set against large areas of cool colors, thus causing a positive quality to offset a passive one. The arrangement of opposites is, of course, not limited to the color circle but perhaps most outstandingly exhibited in the complements of black and white. The esoteric symbolism of "that which is highest relating to that which is lowest" is profoundly manifested in the phenomenon of color complements and their afterimages. The latter tends to add apparent chroma and saturation to the vividness of the colors and their symbolic meaning.

SINGLE-LEVEL COLOR SYSTEMS

In Islamic Architecture the use of single----plane colors parallels single plane patterns. Colors extend the line into an apparent third dimension, providing a heretofore unattainable depth of personality to surfaces. On this level, color relationships, used primarily as infilling for geometric

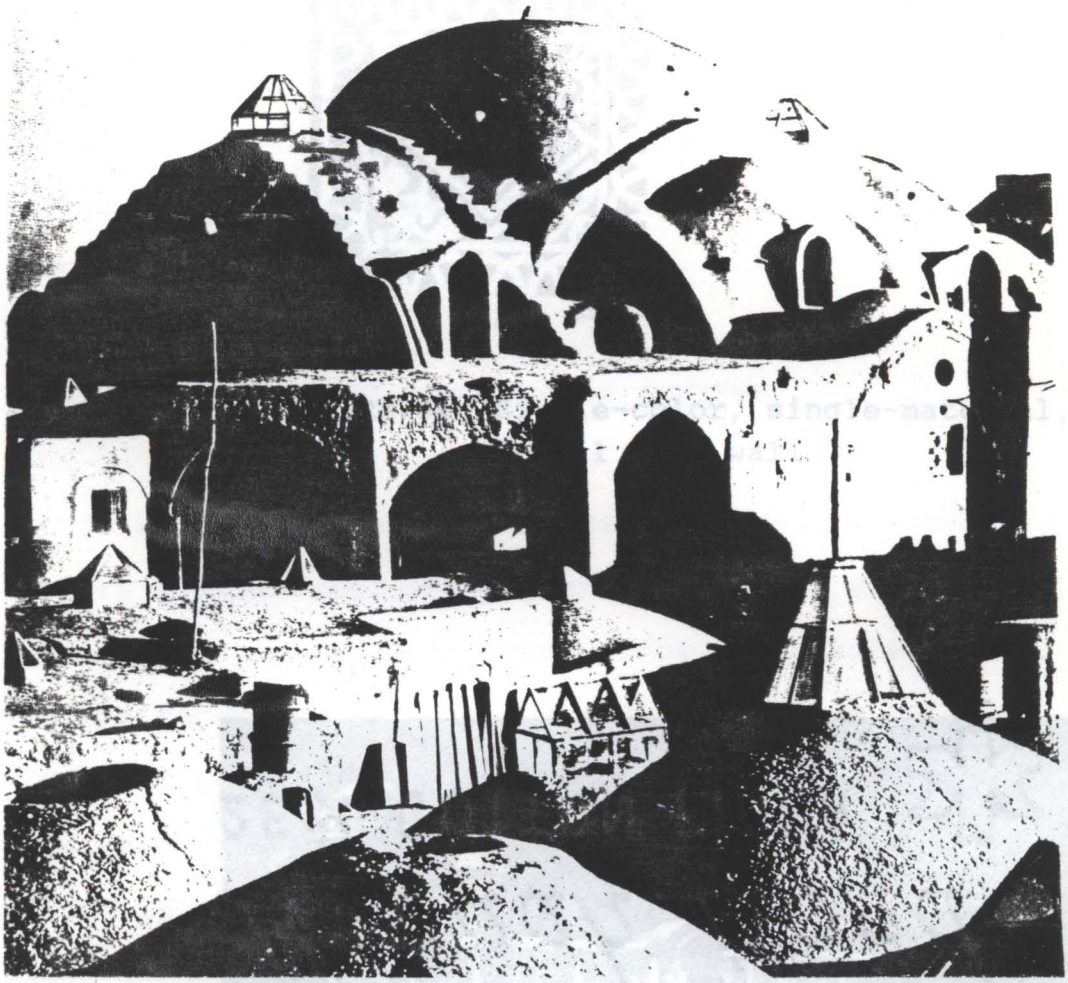

FIGURE.53 Single-color, single-material, Kashan, Iran

FIGURE.54 Single-color, single-material, detail of a wall

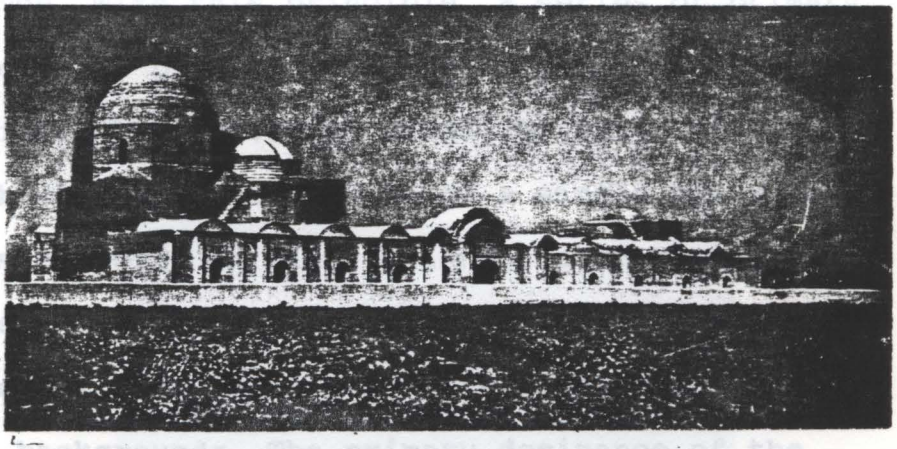

FIGURE.55 Single-color, multi-material, Varamin

patterns, are primarily on a one-to-one basis, giving, full opportunity for the personality and beauty of individual colors to be felt (figs. 53,54,55). Their interactions are related to the six distinct harmonic possibilities, which have been previously observed to be either harmonies of analogies of contrast.

MULTI-LEVEL COLOR SYSTEMS

It is well known that colors have dimensional qualities. Warm colors such as red, orange, and yellow are active and advance; cool colors such as green, blue, and violet are passive and recede. With this principle, a series of primary, secondary and tertiary planes, relating to background, patterns, and highlights, develops (figs. 56,57). Traditionally, backgrounds tend to be of a single color or of analogous colors centered on blue, neighbored by blue-greens and blue-violets. Moving toward the viewer, secondary levels, at times composed of many patterns, exhibit the complementary colors of their backgrounds. The primary dominance of the yellow orange is characteristic of this level, but turquoise blue secondary patterns are also common. In the latter case, however, the yellow-orange levels always assume the primary emphasis.

Highlights of white and light yellow blossoms or other motifs characterize the tertiary plane that appears nearest to

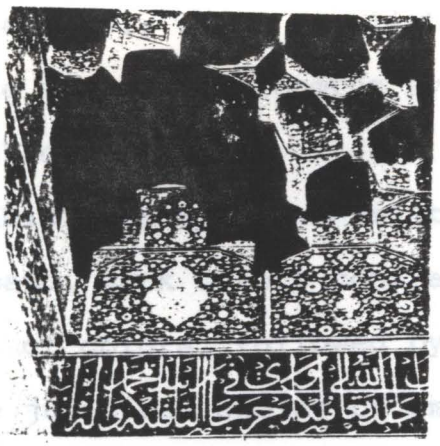

FIGURE.56 Multi-color, single-material, Isfahan

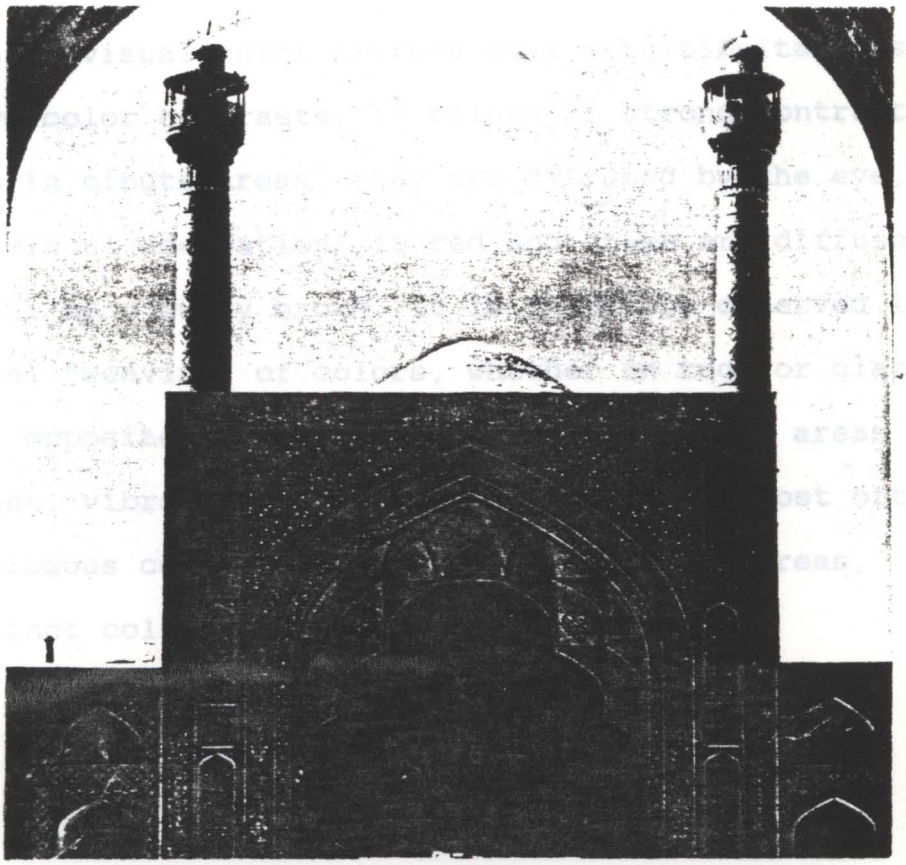

FIGURE.57 Multi-color, multi-material, Isfahan

the viewer. Inevitably these highlights belong to the most receding of the secondary patterns systems, thus creating a balanced visual depth[10].

Colors exhibit an apparent relative size, light colors tending to expand, dark colors contracting. Yellow will appear as the largest of colors, followed by white, red, green, blue, and black. The judicious choice of small white or yellow blossoms in the tertiary levels, discussed previously, attests to the traditional artist's awareness of this nuance of color usage[11].

The laws of visual color mixture deal with simultaneous and successive color contrasts. If colors of strong contrast are presented in minute areas, they are diffused by the eye, resulting in visual aberration. If red and green are diffused, the result will be a muddy brown. It is therefore observed in the traditional "weaving" of colors, whether in rugs or glazed faience, that opposite colors are juxtaposed in large areas and result in clean, vibrant visual mixtures; or, as is most often the case, analogous colors are interwoven in minute areas, creating distinct color sensations.

ENDNOTES

1. Ardalan, Nadar - Bakhtiar, Laleh. The Sense of Unity. The University of Chicago press. p.48
2. Ibid p.48
3. " p.49
4. " p.49
5. " p.49
6. " p.50
7. " p.50
8. " p.50,51
9. " p.51
10. " p.54
11. " p.54

SOURCE OF FIGURES. Ardalan, Nadar - Bakhtiar, Laleh. The Sense of Unity. The University of Chicago Press.

CHAPTER.6

The buildings have been selected as case studies from Iran and Turkey are Tomb Towers, Kharraqan, Iran; Majid-i-Shaykh Lutfullah,Isfahan, Iran;and Suleyman Mosque, Istanbul, Turkey. The main reason of selecting these are that they illustrate the majority of the themes and techniques of Islamic Architectural Decorations in the study area. All these are historic examples of classical Islamic design.

They describe how basic grids are used to develop a variety of geometric patterns. They show materials used in a combination as structural and decorative members and many symmetrical and asymmetrical designs executed with a combination of different materials and colors. For instance, by using one material (brick) decoration, as in the Tomb Tower Kharraqan, Iran, a tweed-like quality is achived. The mosaic tile designs are created on exterior and interior walls. A slight relief and contrasting textures add interest to the pattern and to the kufic script.

TOMB TOWERS, KHARRAQAN

These two Seljuq brick tomb towers, are located near Hisar-i-Aramani in the Kharraqan region of western Iran. On the right, or eastern side, the earlier building,is dated A.D. 1067-68; the later mausoleum, on the left, is dated A.D. 1093 (fig.58).

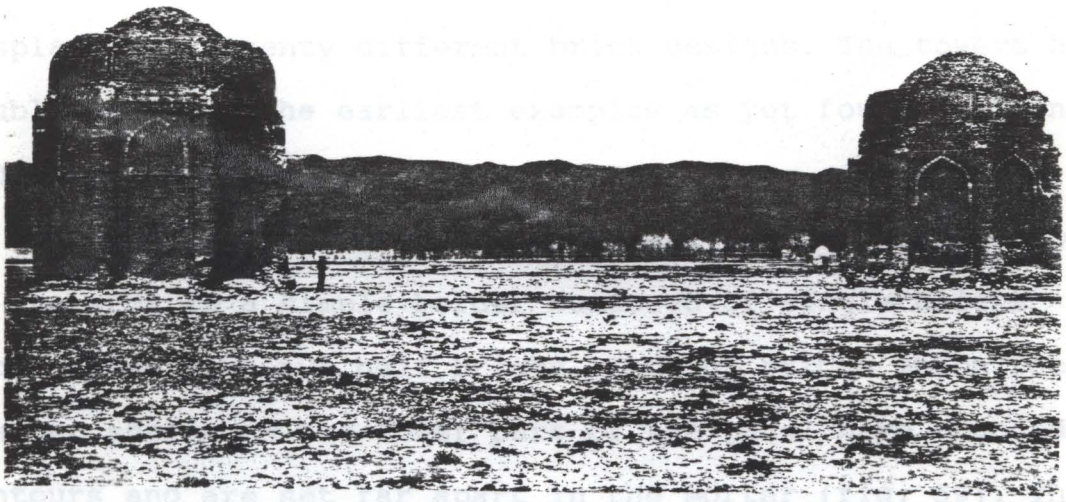

FIGURE.58 Tomb towers, Kharraqan

The octagonal towers stand slightly more than 40 feet high and have a diameter of 34 feet. The brick core of the structures is adorned with a decorative brick revetment. For additional embellishment, the engaged arches of the later Kharraqan tower are divided into two major panels with a row of three small arches separating them. Together the two tombs display some seventy different brick designs. The towers have double domes----the earliest examples as yet found in Iran---- and enclosed spiral staircases.

In the later Kharraqan tomb tower, around the upper part of the arch,is a simple border composed of single bricks alternating with two half bricks. The cut bricks which face the slender shafts on the lower part of the panel have rounded contours and are set far apart in the mortar (fig. 59). The pattern----which at a later date in this building was repeated in mosaic tile----has remarkable mobility and seems to change from varying viewpoint or in different lights. In a panel over the entrance to the earlier tomb whole and half-size bricks are used in an asymmetrical composition of opposing diagonals. In the earlier Kharraqan tomb, Iranian builders used brick in a variety of sizes, from the larger square bricks to very small kinds fired in special molds (fig. 60). The bricks were frequently cut into the desired shapes while wet, with a sharp knife or wire. This was the technique employed at Kharraqan. Another variation was achieved through changing the mortar bed. Not only did the builders vary the spacing between bricks; they

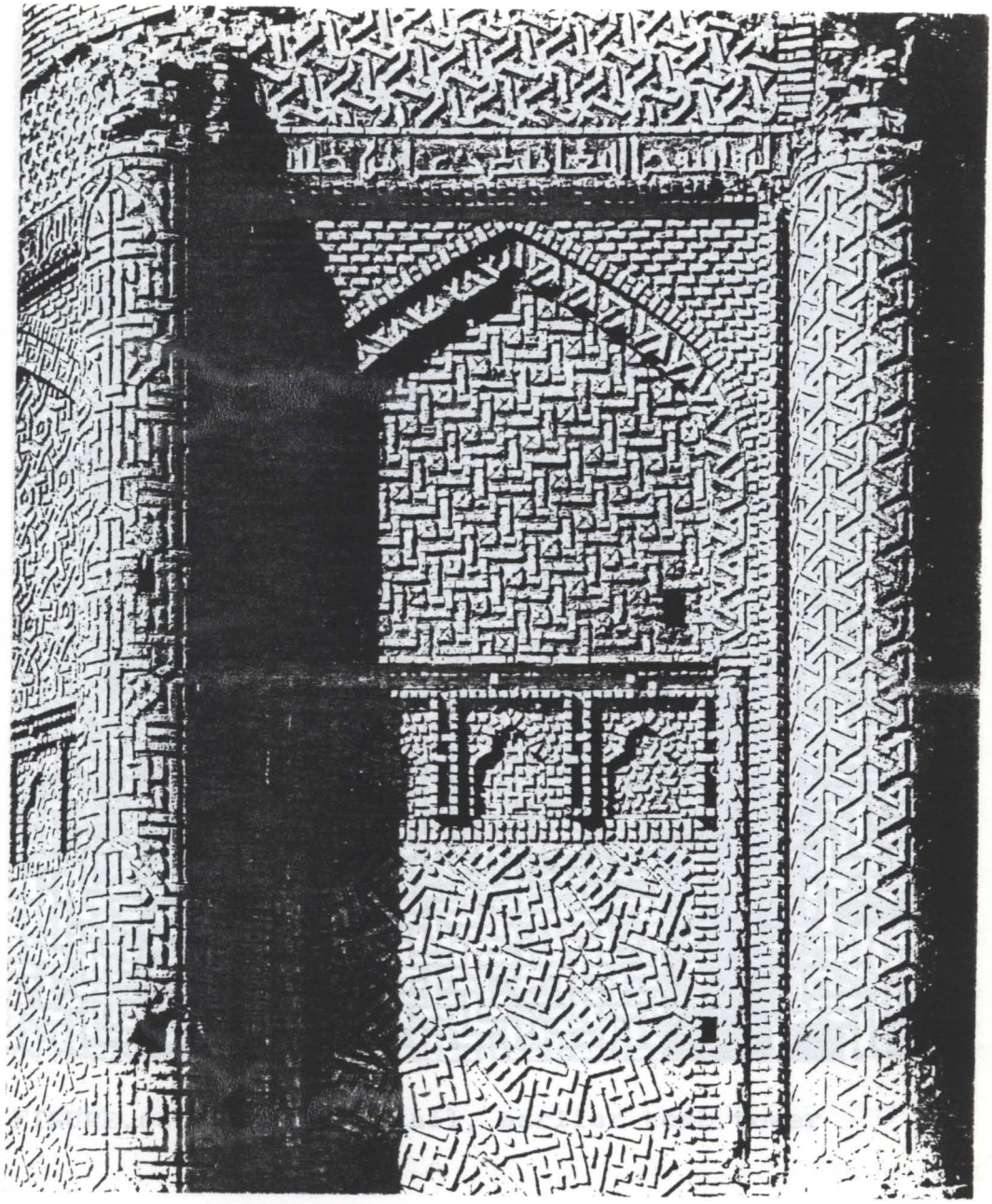

FIGURE.59 Detail of later tomb tower, Kharraqan

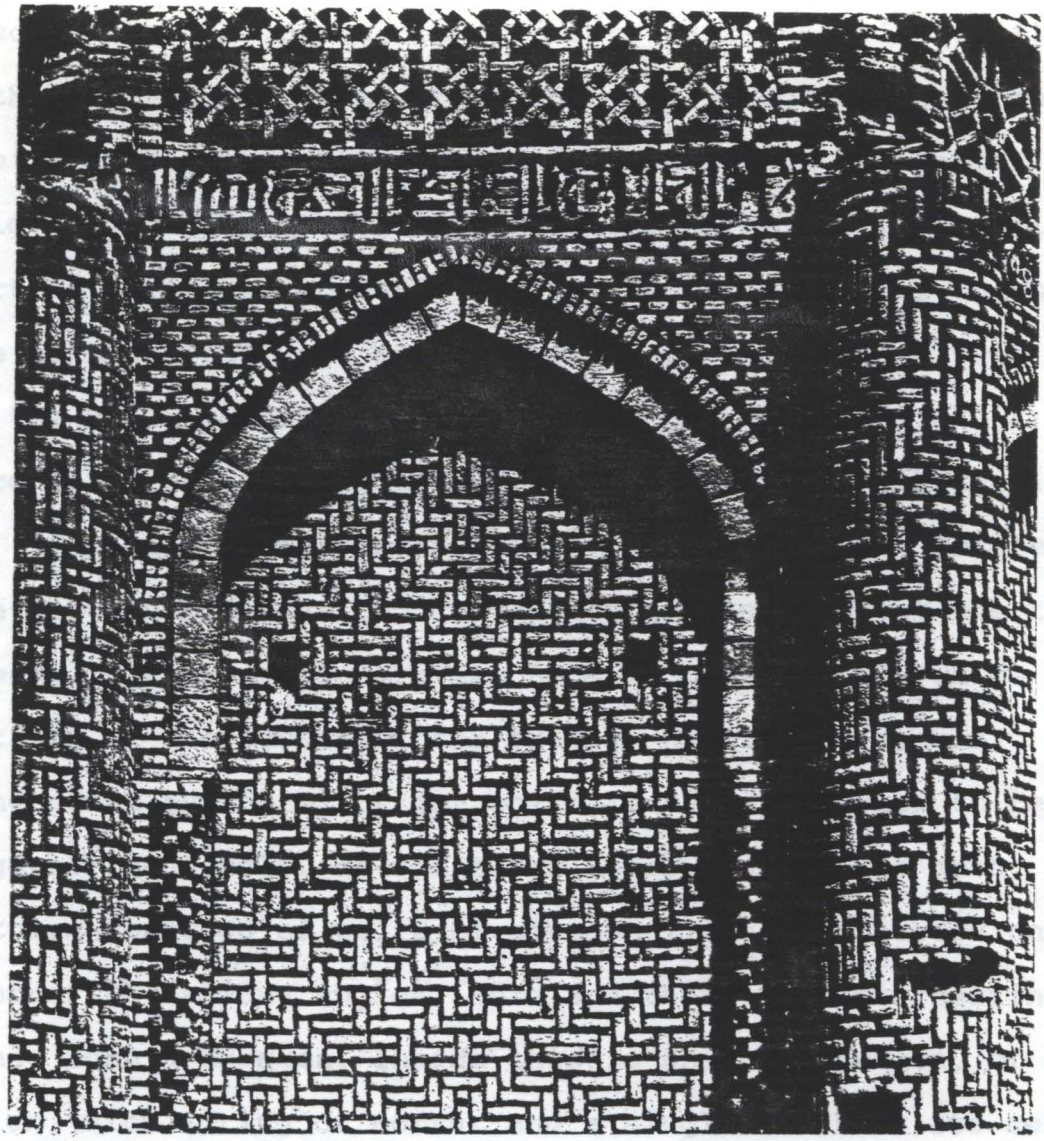

FIGURE.60 A panel detail, earlier tomb tower

also treated the mortar in different ways----having it flush with the bricks in some areas and deeply recessed in others. In the later Kharraqan tomb tower, the design on the center niche (fig. 61) seems, at first glance, very free. It is actually a part of a formal geometric design. The skillful way in which the artist framed the motif, however gives, no more than a hint of the repeated pattern. Their rich covering of brick decoration gives these towers a textural, tweed-like quality.

The earlier Kharraqan tower (fig. 62) shows a frieze on the southwest elevation. The segments which connect the three wheels in this design are the hubs of other wheels which are cut off by the border of the frieze. Wheels and spokes, punctuated by the brick dot which is the axle, seem to revolve together endlessly. In the later tower, inside the arch, is a pattern composed of pairs of sinuous lines which cross one another at various angles. Here and there the intersecting lines form a hexagon. Inside this is another hexagon, of raised brick, with a ring of mortar and a single brick at its center (fig. 63). Iranian friezes are often more static than the wall designs, and provide areas of repose. This decorative band is marked by deep shadows, so that the raised and recessed areas of the pattern are equal in value. The staccato rhythm of the small cut bricks in moldings gives a sharp outline to the panel. This is further accentuated by the use of a similar technique on the slender applied columns. Often, intricate patterns such as those in the niches were set up in wooden

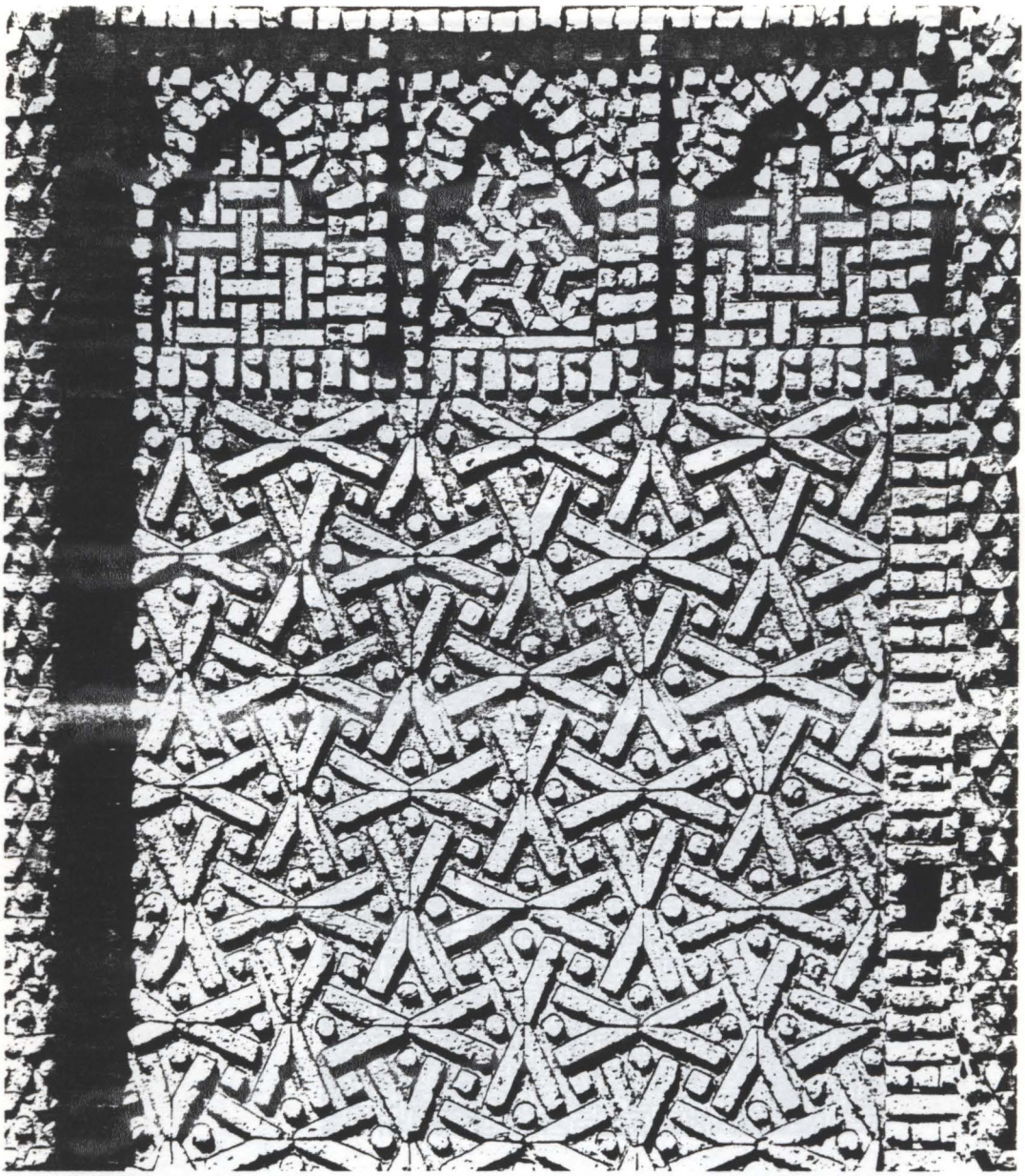

FIGURE.61 A panel detail, later tomb tower

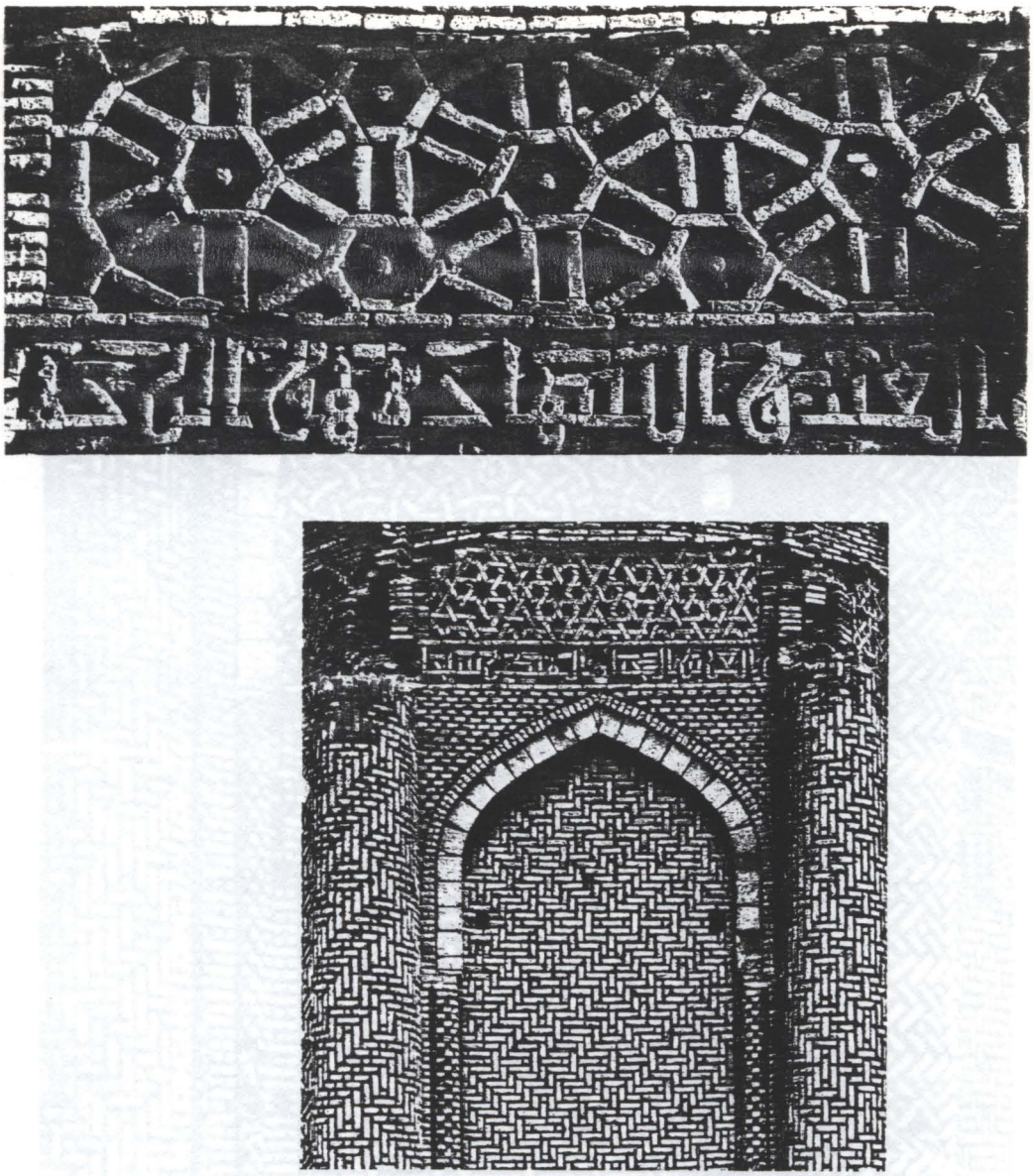

FIGURE.62 A frieze on southwest elevation, earlier tomb tower

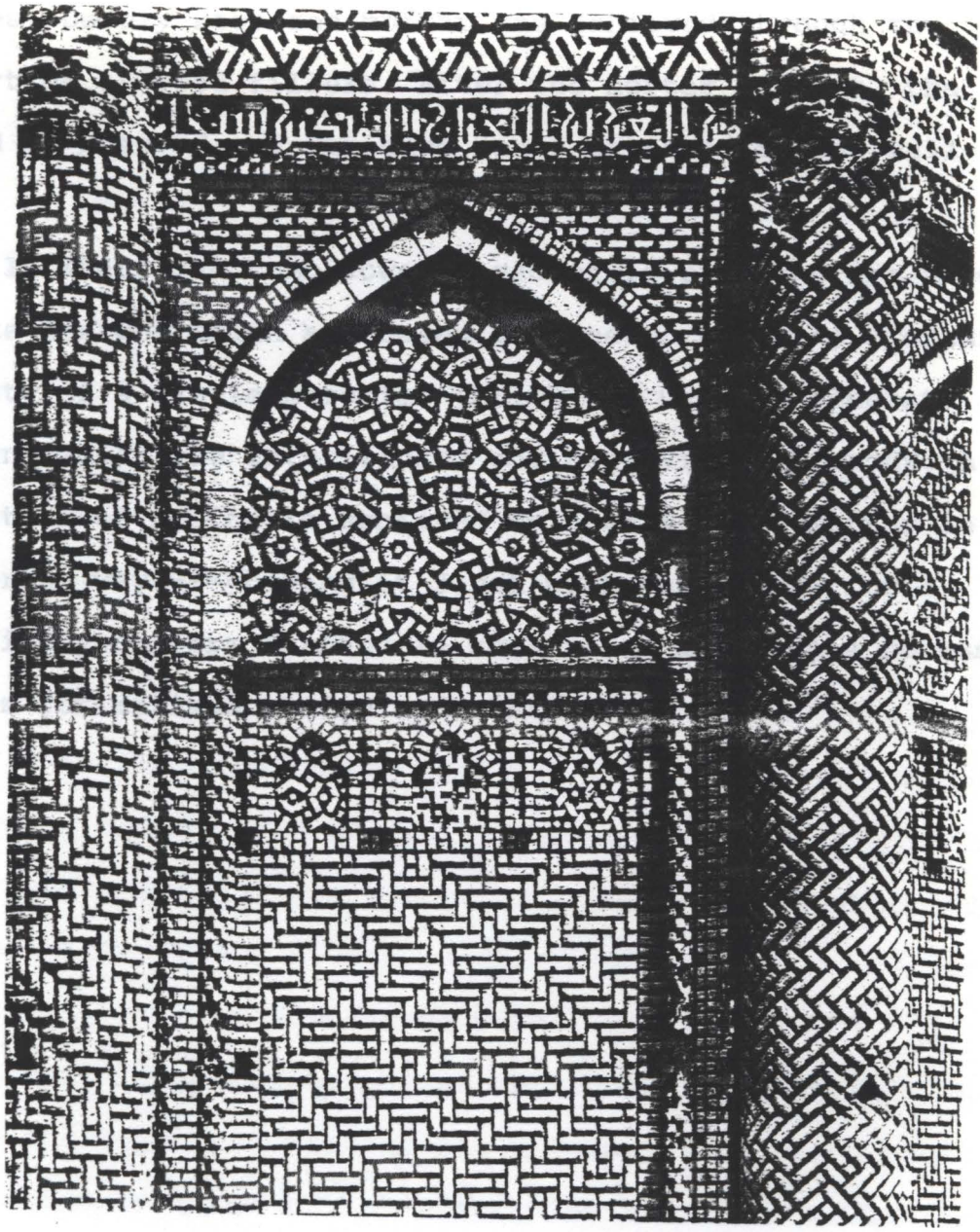

FIGURE.63 A detail from, later tomb tower

frames. Deeply recessed mortar was achieved through the insertion of wood fillers. After the mortar had set, the frame would be removed and finished panel attached to the wall as a unit.

In Kharraqan tomb towers, geometric patterns are used to create designs which are based on a network (grid). Textural variety of a single material (brick) is used to generate designs which are inter-linked and have visual harmony. A variation of design is achieved by treating the mortar in different ways----having it flush with the bricks for a relatively uniform surface in some areas and deeply recessed in others for maximum shadow and contrast.

MASJID-I-SHAYKH LUTFULLAH, ISFAHAN

The Masjid-i-Shaykh Lutfullh in Isfahan was built by Shah Abbas I, between A.D. 1601 and 1618. The architect was Muhammad Rida Ibn Ustad Husayn, and the calligraphy was executed by Ali Reza. The portal of this mosque faces the Maidan (A town square or plaza). Inside, a tiled corridor has been designed to go around the left side of the domed chamber and so to enter this sanctuary directly opposite the mihrab, which is in the wall oriented toward Mecca.

Seen from the front of the building (fig. 64), the dome rise off center to the portal with a pleasing effect. Luxuriant vines adorn this hemisphere and give the impression, against the desert color, of a bountiful Nature. Being a single-shell structure, the dome from the exterior appears low, but inside the restricted space of the sanctuary chamber it seems very high. Early Iranian domes were normally single-shell structures. Large masonry domes should decrease in thickness toward the top; this presented a problem. The base a vault would often be three bricks thick. The thickness would then be reduced until, at the summit, it was only one and half bricks. This technique produced a jagged contour. The steps from one thickness to another on the outer surface of the dome were usually smoothed by a covering of dressed brick. Another problem arose with the desire for a more imposing exterior height. The interior became disproportionately lofty; hence the

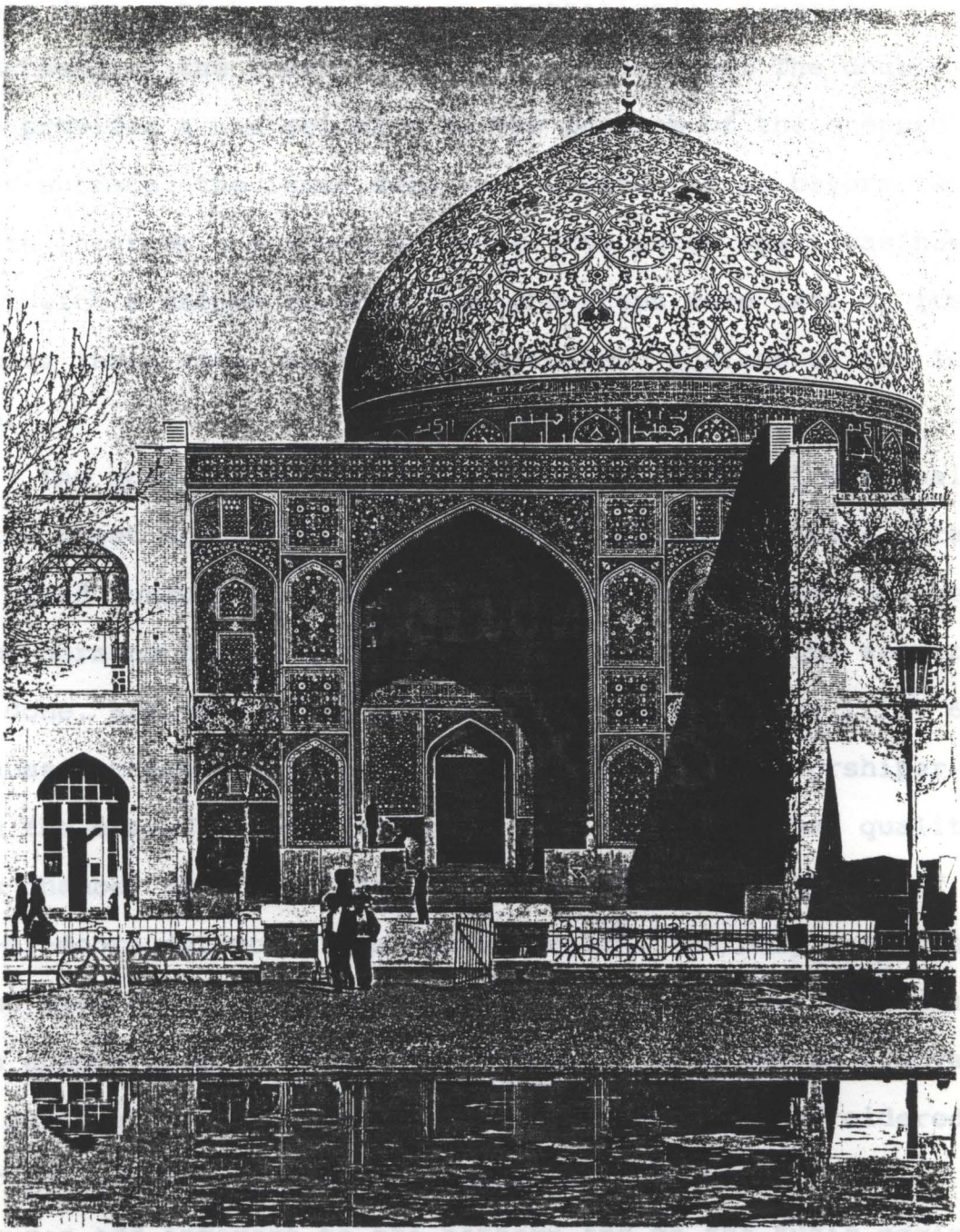

FIGURE.64 Front view, Masjid-i-shaykh Lutfullah, Isfahan

double dome, which permitted an aesthetically pleasing adjustment of the interior space, was invented. The double dome also provided a new solution to the problem of the stepped outer surface: the inner dome was constructed as before, with a smooth interior and rough exterior; the outer shell was now built with a smooth contour, and the steps were left on its concave inner side, facing the unfinished surface of the lower dome.

The mosaic tile designs on the interior wall are scaled to the great arches yet are perfect to the most minute detail. The vivid turquoise of the cable molding is repeated in the color harmony of the interior----as a rosette in the apex of the dome, and as a sheet of blue in the tiled floor (fig. 65). Because a mosque seeks to draw the thoughts of a worshiper away from the everyday material world, the self-contained quality of this chamber is significant. No views of other halls or of the out-of-doors detracts from its seclusion. The only entrance opens onto a narrow tiled corridor, and all the windows are high double grilles. A subtle pattern in blue and gold covers the surface. A floral pattern in buff stucco is embroidered over the faience tilework. A slight relief and contrasting textures add interest to the pattern and to the Kufic script. Kufic style of calligraphy appears inside the dome at different levels and inside arches, with contrast in colors of background.

The dome and zone of transition of the Masjid-i-Shaykh

Lutfullah is shown in figure 66. The diameter of the dome is 42 feet. A turquoise cable outlines the arches and squinches, but structure has renounced its primacy to decoration. No European can previously have had any idea that abstract pattern was capable of so profound a splendor. It is a richness of light and surface, of pattern and color only.

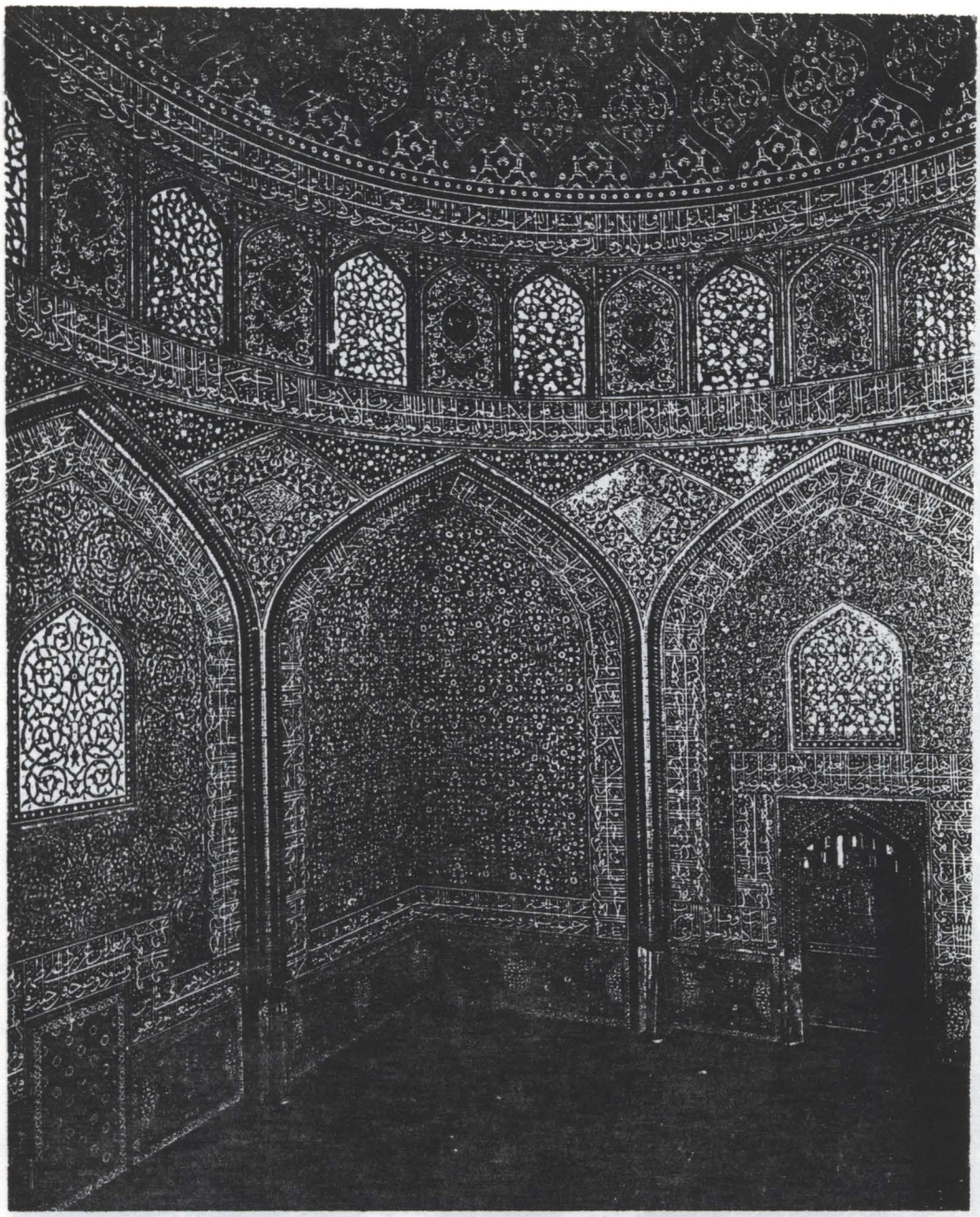

FIGURE.65 Mosic tile designs and calligraphy

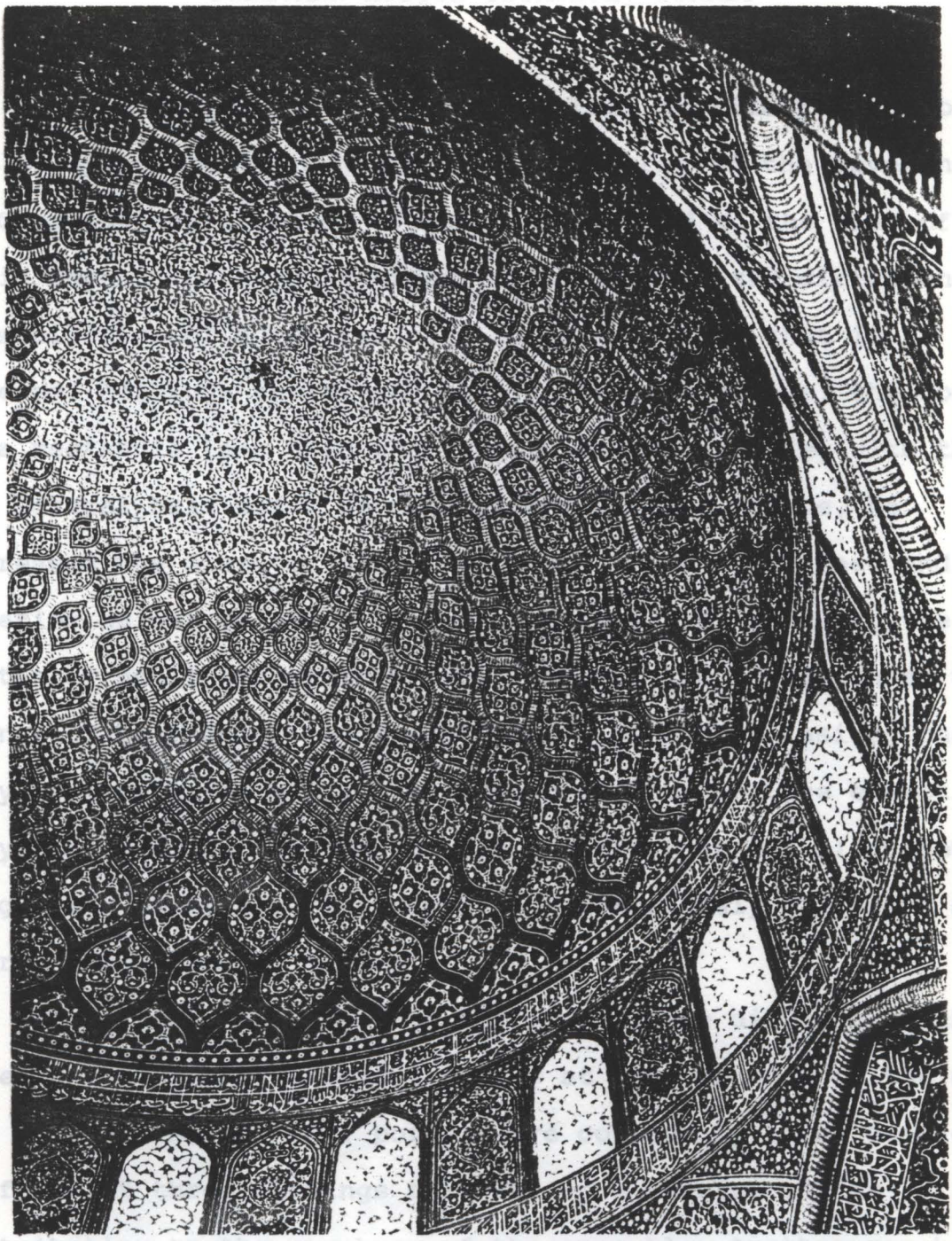

FIGURE.66 The dome and zone of transition

SULEYMAN MOSQUE ISTANBUL, TURKEY

In the mosque (A.D. 1550-1557) that architect Sinan built for Suleyman the Magnificent on the central of the seven hills of Constantinople (figs. 67,68), he returned to the plan of Hagia Sophia, perhaps in order to profit from the directional possibilities of a central nave and side aisles that it offered. Although the prayer hall is again a square, the court is a rectangle less deep than wide. While dispensing with the two lateral half domes he used in the Sehzade Mosque, he increased the diameter of the central cupola to 87 feet and its interior height to about 15 feet. He retained, however, the system of small hemispheres that increase the volume under the flanks of half domes and accentuate, viewed from inside, the play and rhythm of the curves and, from outside, the effect of a pyramidal ascent of cupolas. In addition, as the plan shows (fig. 69), there are five cupolas of alternately different size over the two lateral aisles.

The prayer hall has four portals opening directly to the exterior and situated symmetrically at the two ends of the east and west walls. All four portals are covered by three domelets in front of three openings that set up a ternary rhythm contributing to the symphony of the ensemble. Another porch, this one in the axis of the mihrab, leads from the prayer hall into the court that itself has three portals to the exterior, one in the same central axis. The main hall cupola's

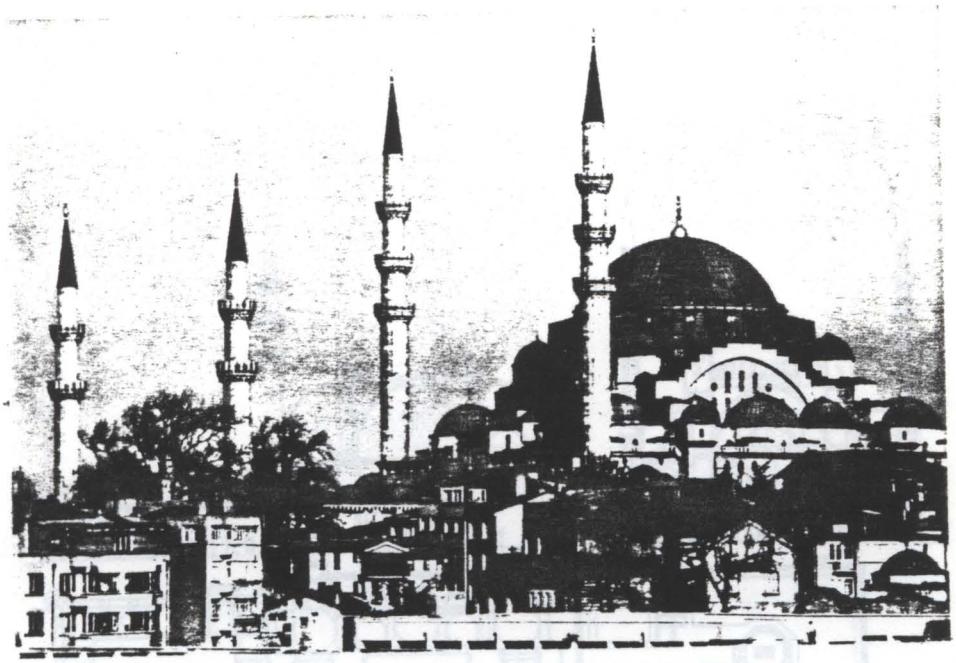

FIGURE.67 General view of Suleyman Mosque, Istanbul

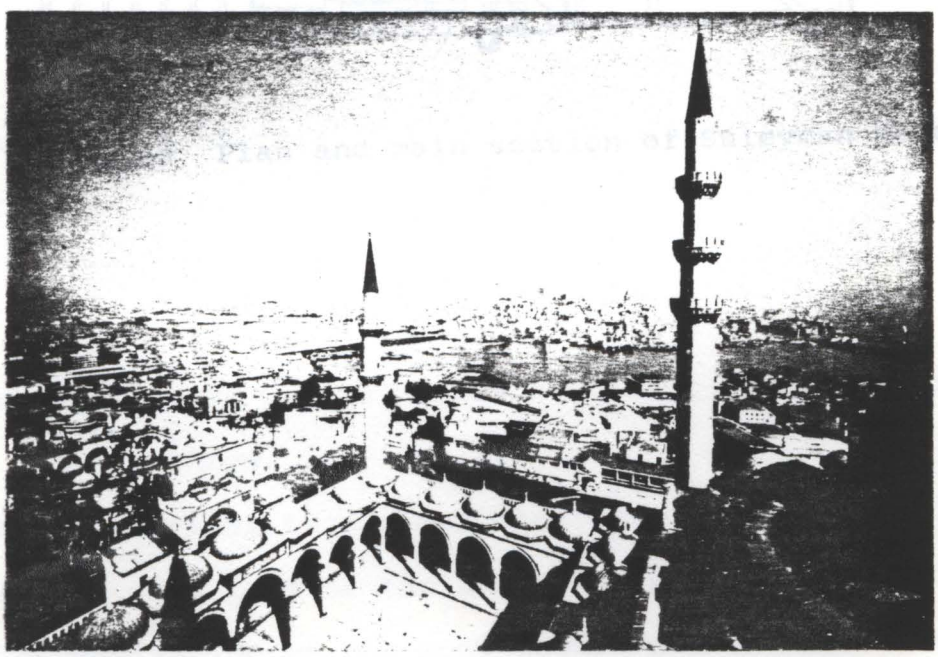

FIGURE.68 View from a minaret of Suleyman Mosque

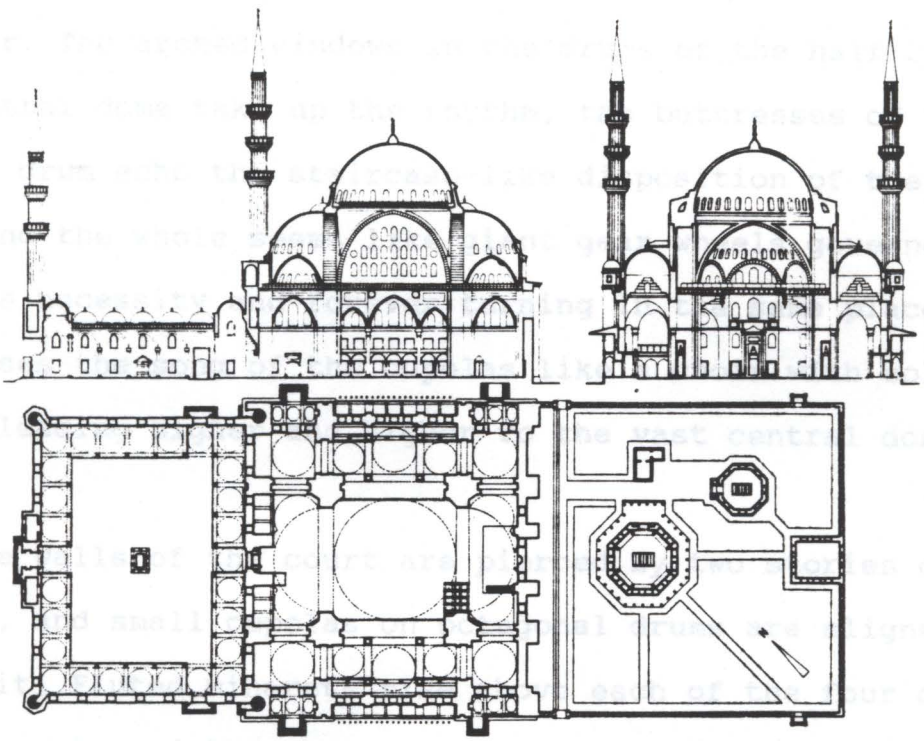

FIGURE.69 Plan and main section of Suleyman Mosque

pendentives are decorated with "stalactites" (fig. 70).

Sinan also did much to develop variety and articulation in the facade. He treated the exterior with as much care as the interior. The arched windows in the drums of the half cupolas and central dome take up the rhythm, the buttresses of the central drum echo the staircase-like disposition of the great arch, and the whole seems like giant gear wheels governed by a rigorous necessity and forever turning in the same place. Above them rises the song of the cupolas like a choir with solo voices leading higher and higher to the vast central dome (fig. 71,72).

The walls of the court are pierced by two stories of windows, and small cupolas on octagonal drums are aligned all around it. Fluted minarets rise above each of the four corners of the court, and they too play a part in the overall steplike movement. With a height of 209 feet capped by tall slender cones that bring the total height to 246 feet, the two minarets above the corners of the prayer hall loom well above the two in front. All four have a diameter of 13 feet, and the two lower ones are girdled by two balconies set above stalactities, the higher ones by three.

The resemblance to a giant staircase, a theme pervading every element and form of the monument, admirably symbolizes in stone the aspiration of the soul toward Heaven. The firmament itself is given material embodiment in the central dome, which, thanks to all the upward movement around it, gives the

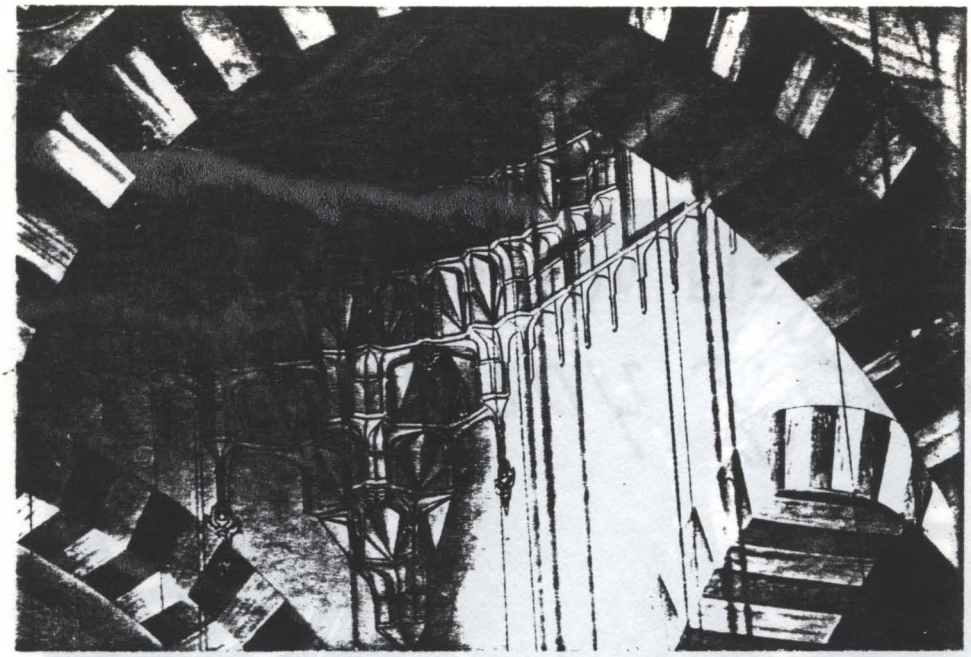

FIGURE.70 Pendentive decorated with 'stalactites'

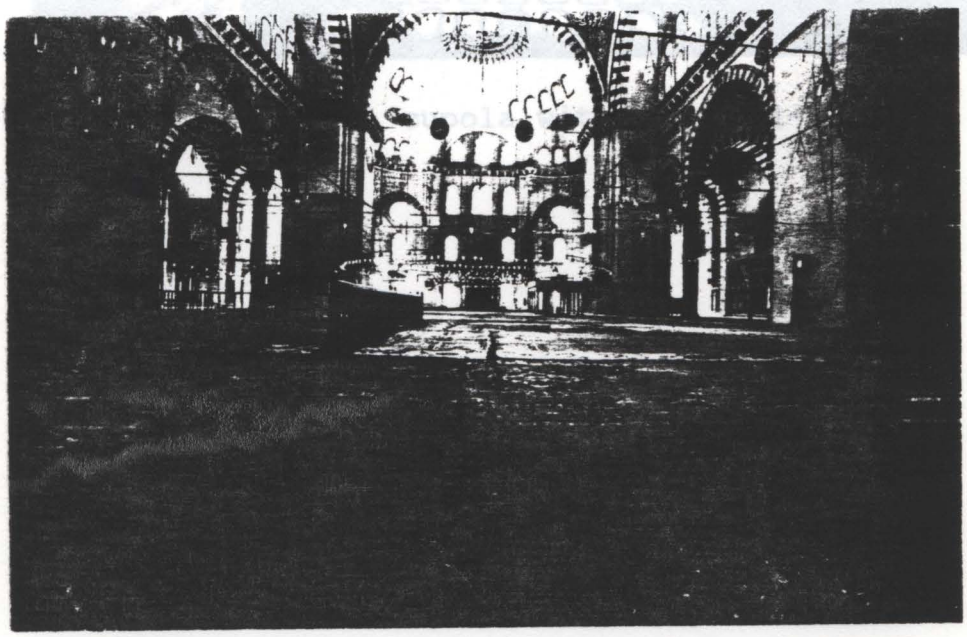

FIGURE.71 Interior of the Suleyman Mosque

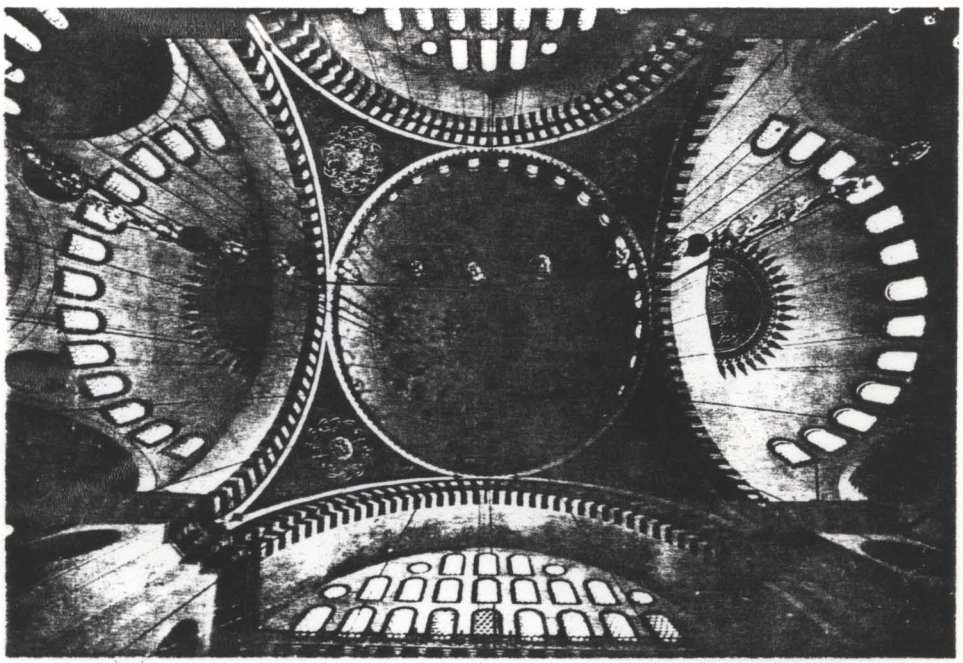

FIGURE.72 Central cupola with two semi-cupolas

impression of an extraordinary lightness and, indeed, seems to float above the great building.

CHAPTER.7

CONCLUSIONS

Islamic design----in its quest for a new structural expression, new uses of materials, new ways of treating large wall surfaces, and a fresh concept of interior space----has a particular kinship with post modernism.

Islamic art developed steadily, and in this development, a spirit of creativity prevailed. Originality was never sacrificed to an arid reiteration of the past. Islamic architects sought fresh solutions to the challenges of differing climates and building materials and of diverse aesthetic and social requirements. Yet they used the traditions of the past to maintain a framework and basis for their creation. Thus Islamic architecture through the ages is identifiable yet each work is fresh and creative. No two oriental rugs are the same.

Materials may alter with technical discoveries, but the importance of using a particular material honestly and with a feeling for its potentialities endures. Brick architecture of Iran expresses function at the same time that it explores all the possibilities of its medium. During its great period, this style is an almost perfect statement of the aesthetics of architecture. A discipline that will compromise neither with prettiness nor with the domination of structure is rare----its fulfillment is an inspiration to any era.

Structure, when expressed honestly and powerfully, as in

the northeast dome chamber of the Masjid-i-Jami at Isfahan (fig. 73), is exhilarating as well as beautiful. The simple assertion of the towering Gunbad-i-Kabus (fig. 74) finds stern conviction in its austerity. The mosaics swirling through the dome at Malayta (fig. 75) interpret and dramatize form, as color becomes an integral part of architectural design. The brick decoration has several pleasing features. Since the clay was locally produced, the monument harmonized with simpler buildings around it. The designs vary with the viewpoint, and fresh images hold the interest. Minor changes in the manner of laying bricks, or in the size or shape of the sections, produce surprisingly strong results. Patterns in considerable relief present even greater flexibilities as sunlight moves across a surface, stressing first one segment, then another. The juxtaposition of two rough materials (such as the brick and stone of the Muradiye complex at Bursa) is also extremely effective. Here, too, slight modifications in the design enliven details of the facade within a total unity.

Color used in striking accents or in gentle variations---- or brilliantly employed to cover an entire monument----played a vital role in Islamic architecture. Glazed brick was first applied in Iran to enhance the brick patterns. The Gunbad-i-Surkh in Maragha (1147-48) presents an early example of color decoration in Iran; here, this new feature was concentrated around the portal. Fifty years later, also in Maragha, the Gunbid-i-Kabud was encased in a decoration of brick and blue

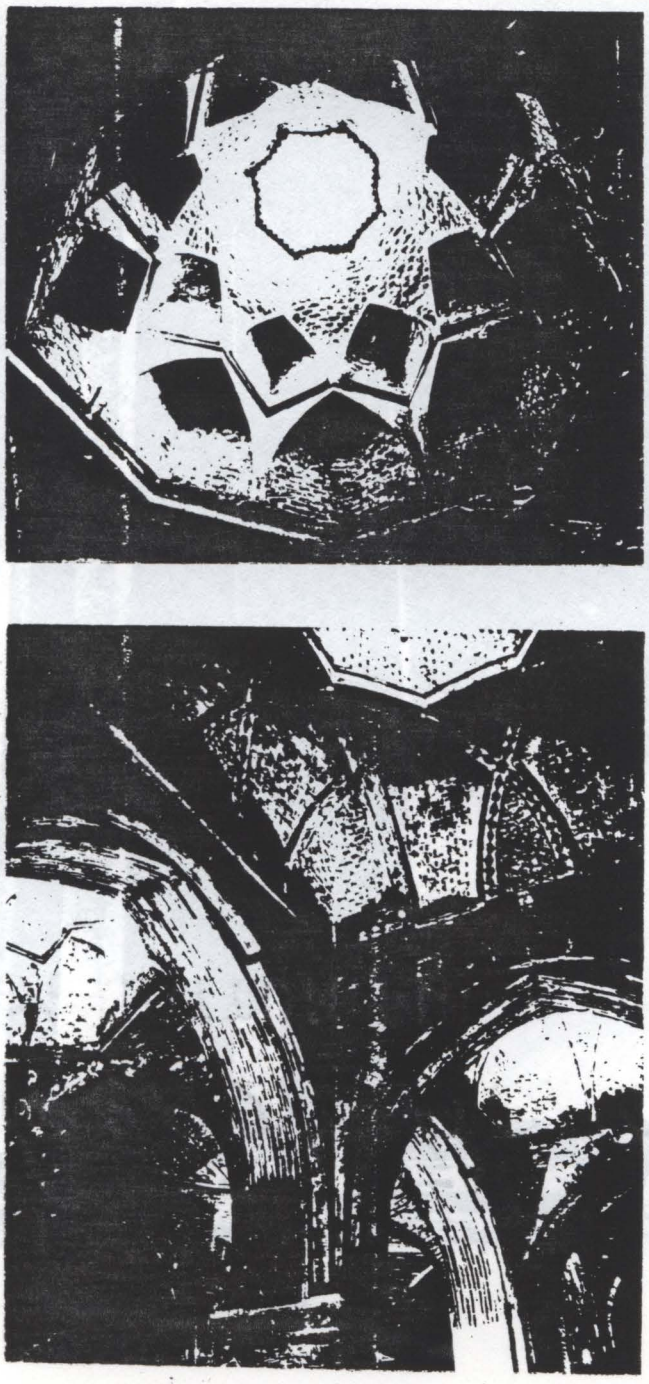

FIGURE.73 Dome chamber of the Masjid-i-Jami, Isfahan

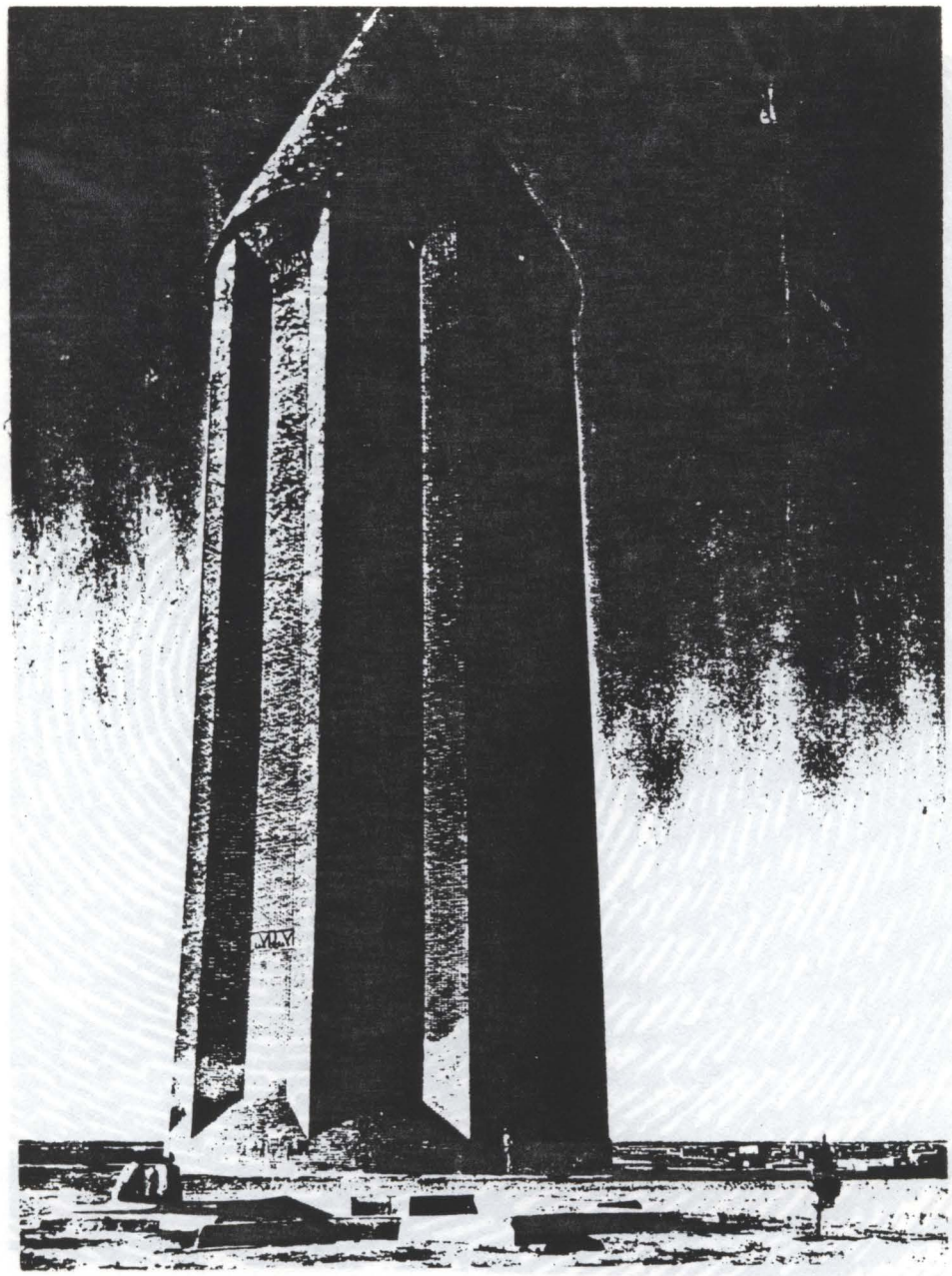

FIGURE.74 Gunbad-i-Kabus

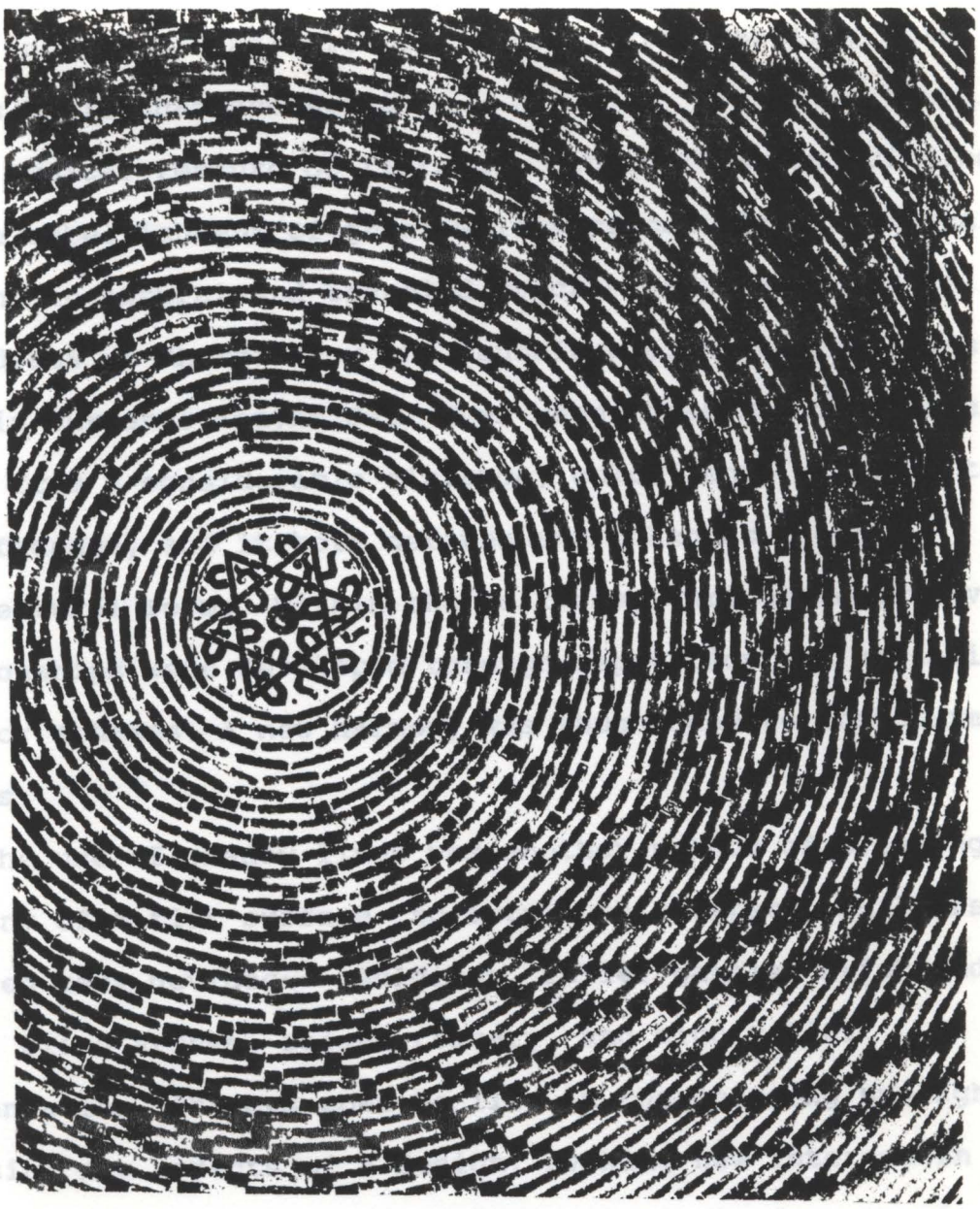

FIGURE.75 The dome at Malayta

tile. Gradually, the proportion of enameled to natural brick or stucco increased, until it culminated in the dazzling tile mosques of Isfahan and Meshed.

A typical feature of fifteenth century Iranian building was the embellishment of great wall surfaces with large scale patterns in natural and enameled brick----as, for instance, in the madrasa at Khargird or the Mausoleum of Ahmad-ibn-Allah Hasan in Turbat-i-Shaykh Jam. Even when these buildings are viewed from a considerable distance, color lends vitality to their facades, and it both defines and enhances their architectural forms. Within the edifices, various decorative relationships were developed through repetition and variation of color schemes. A new harmony was thus added to structural rhythms.

The use of shadow lines was another method of breaking the monotony of a flat surface: to obtain this effect, builders employed many devices----moldings, relief panels, brick end plugs, blind arches, raised tracery, and high relief ornamentation. Shadows come to life in the changing sunlight, stressing new aspects of a design, evoking new interest in it. With these techniques Islamic architects devised an amazing variety of fresh and imaginative ways of handling decoration.

The treatment of spaces----in terms of both regal proportions and human scaling----had interesting developments in Iran and Turkey. The harsher climate of Turkey precluded the use of open courts for worship, and the entire mosque had to be

enclosed. For the congregations of imperial Istanbul, an interior space both vast and majestic had to be developed. Sancta Sophia presented a challenge rather than a solution, for muslim ritual needs differ basically from the christians. Sinan, chief architect to Suleman the Magnificent, designed great domed chambers whose interior plan was adjusted to muslim requirements and whose harmonious proportions created repose.

Turkish Islamic architecture differs greatly from that of Afghanistan or Iran, largely because of climate, available building materials and artistic traditions. All three countries, however, make a significant contribution through their sincerity of structural statements, inventiveness of design, appreciation of relief and texture, and feeling for proportion and use of color.

CHAPTER.8

RECOMMENDATIONS

In this thesis, the attempt has been made to present the reader with a review of techniques and themes of architectural decorations used in Islamic architecture.

On the basis of studies made during the course of this thesis, the following recommendations have been made to inform, guide, and update professional architects, students, and educators.

GEOMETRIC PATTERNS

The term patterns implies a formal arrangement of repeated elements. The essential preliminary in pattern construction is to establish the supporting framework. This necessitates the "division of plane". It is a curious fact that a complete equipartition of a flat surface can only be effected by those regular polygons whose internal angles are 60, 90, and 120 degrees: the equilateral triangle, the square, and the hexagon. The nets or grid thus produced may further be traced back to two distinct forms of circles in contact with axial alignments of 90 and 60 degrees (figs. 76,77). Since the hexagon itself may be constructed on a triangular grid. The triangular and square grids are sufficient as the underlying structure of the majority of the patterns. The usefulness of these two basic grids is increased by doubling the number of gridlines.

Other groups of plane-filling figures are worth mentioning

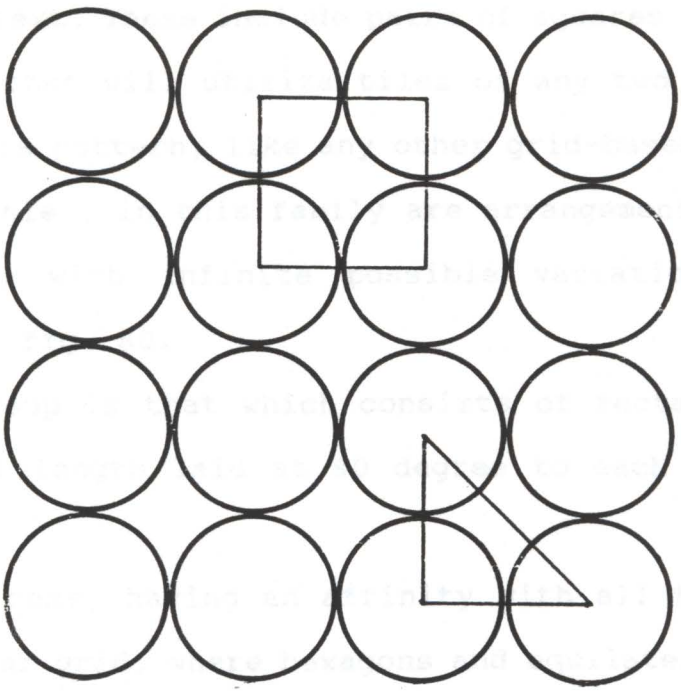

FIGURE.76 Geometric pattern-square grid

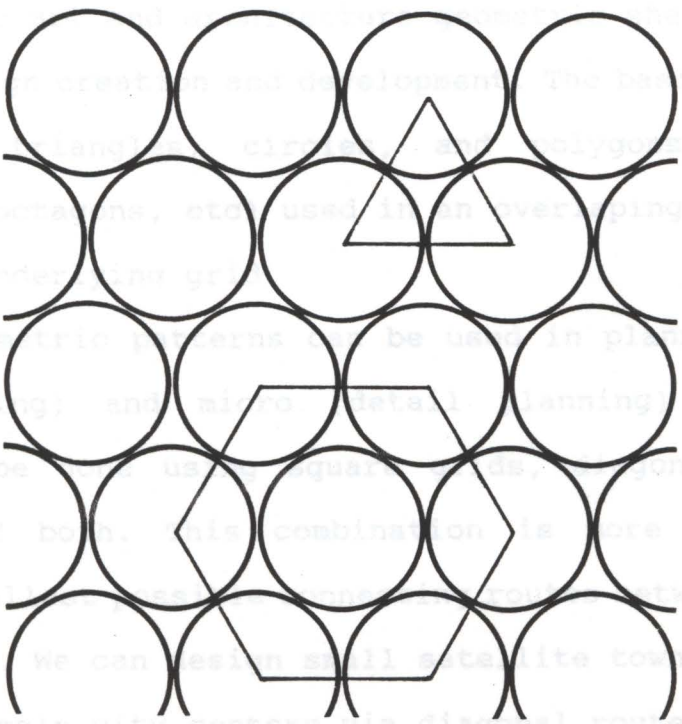

FIGURE.77 Geometric pattern-triangular grid

in a design context. These include pairs of squares in any ratio, an arrangement that will utilize tiles of any two given sizes, figs. 78,79. This pattern, like any other grid-based pattern, is readily deformable , in this family are arrangements of squares and rectangles, with infinite possible variations in their relative sizes, fig. 80.

Another group is that which consists of rectangles of the same or unequal length laid at 90 degree to each other (figs. 81,82).

A special case, having an affinity with all these, occurs on the triangular grid, where hexagons and equilateral triangles in an infinitely variable series will fill the plane (figs. 83,84).

In Islamic art and architecture geometric shapes are basic sources of design creation and development. The basic shapes used are squares, triangles, circles, and polygons (pentagons, hexagons, and octagons, etc) used in an overlaping manner based on a smaller underlying grid.

These geometric patterns can be used in planning at macro (master planning) and micro (detail planning) scale. Land division can be done using square grids, diagonal grids and combination of both. This combination is more efficient in finding the smallest possible connecting routes between different activity areas. We can design small satellite towns which could be connect to main city centers via diagonal routes and also to each other (fig. 85). This will be helpful to decongest our

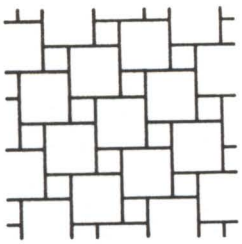

FIGURE.78
Geometric pattern

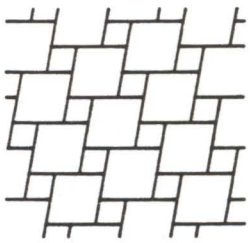

FIGURE.79
Geometric pattern

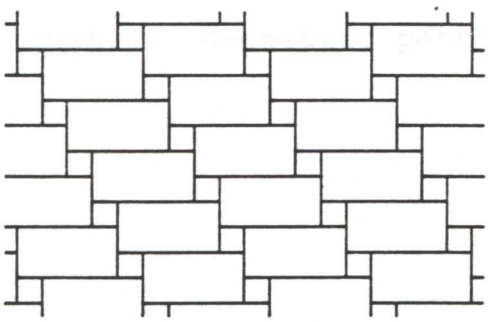

FIGURE.80 Geometric pattern

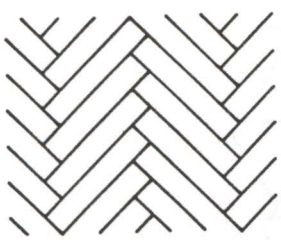

FIGURE. 81
Geometric pattern

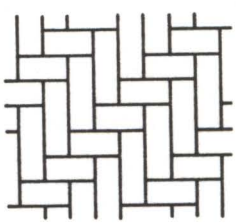

FIGURE.82
Geometric pattern

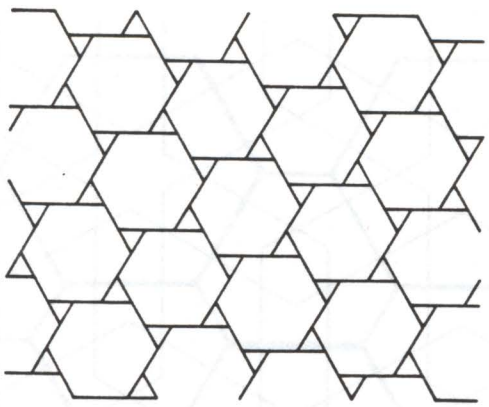

FIGURE.83 Geometric pattern

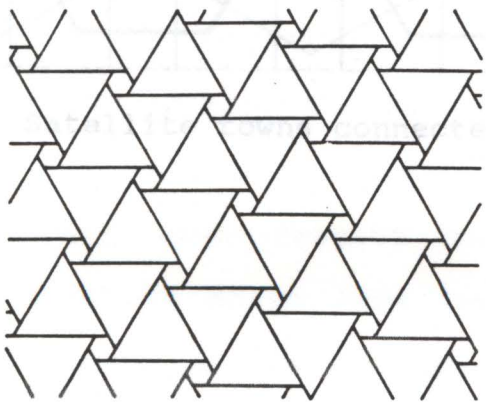

FIGURE.84 Geometric pattern

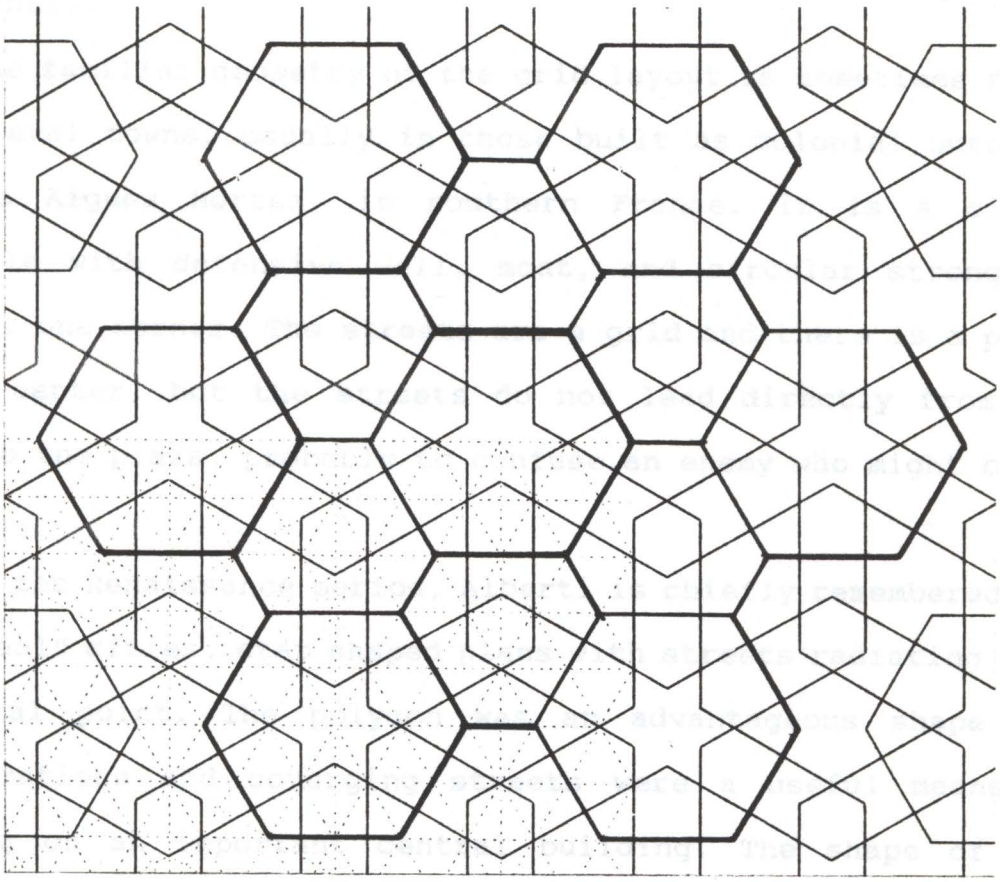

FIGURE.85 Satellite towns connected to city

cities when smaller towns should have their own business centers to be planned properly and also be connected to the main city efficiently.

The familiar geometry of the grid layout is sometimes found in Medieval towns, usually in those built as colonial outposts such as Aigues Mortes, in southern France. It is a simple rectangle with defensive wall, moat, and circular stronghold tower at one corner. The streets are a grid and there is a plaza at the center, but the streets do not lead directly from the gates to the plaza, probably to confuse an enemy who might break in.

In the Renaissance period, Alberti is chiefly remembered for his "ideal" cities, star shaped plans with streets radiating from a central point. The polygon was an advantageous shape for fortifications and coverging streets were a useful means of focusing on an important central building. The shape of the Pentagon in Washington recalls a long military tradition of fortified cities.

Urban forms vary with respect to their circulation implications. The first is sheet form, akin to our spreading suburbs----like the shape of Los Angeles and Tokyo. It is a spread of undifferentiated growth without focal centers, without majors routes or particular relief in form. Second is the core----a city as a dense and vital center with surrounding development (Seattle and Denver). Most of American cities of a million population are such forms. Third, the galaxy is a series

of cores arrayed in the landscape at functional distances from one another (cities of North Germany, and cities of Ohio). The satellite form is a variation of the galaxy----a galaxy with a predominant central core. Most of our older cities that are spreading out and enveloping what were independent townships represent satellite forms. The ring is a linear form which closes on itself. The cities of the San Francisco Bay area and the principal cities of Holland form rings. The star is a core city with linear radials. Boston, Copenhagen, Washington D.C., St.Louis, and San Antonio are, or have been at certain stages of growth, star forms. Finally, the polycentered net is a widely spread city with differentiated foci, dominant and minor routes, built-up and open spaces----the whole an articulated spread.All of above the polycentered planning is ideal. This shape is nearly matched with many oriental rug design, which gives an idea of open planning.

A new small town can be designed by using, basic geometric forms, a circle and a square. The center of the circle acts as the generation point of concentric circles. The outermost circle is enclosed by a square, which can act as the outer road, inside we have circular roads. Inside the inner circle we can design business or government buildings and a park or lake. Then in the next rings we can design residential lots. These inner circular roads give us a sense of continuity (fig. 86).

Houses and small scale projects can be designed in circular and many other polygon shapes, because these forms cover lesser

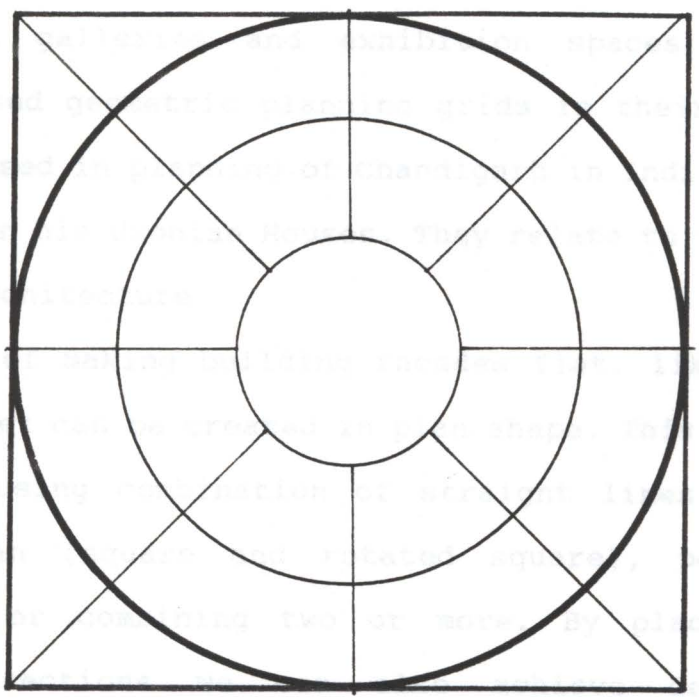

FIGURE. 86 Concentric plan of city

area as compared to a square. As in a circle there is no corner externally and internally, so the design looks more dynamic. These circular designs are more appropriate especially for museums, art galleries and exhibition spaces. Many modern architects used geometric planning grids in their projects, as Le Corbusir used in planning of Chandigarh in India, Frank Lloyd Wright used in his Usonian Houses. They relate to the principles of Islamic architecture

Instead of making building facades flat, like boxes, some sort of off-set can be created in plan shape. This effect can be produced by using combination of straight lines and diagonal lines in plan (square and rotated square), polygon shapes individually or combining two or more. By placing walls in different directions we can also achieve desired window orientation. Larger exterior and interior surfaces of public and industrial buildings which are mostly flat, can be treated with blind arches, geometric patterns and various types of monograms and sculptures.

Concrete panels for cladding can be designed in modular units, so the smallest units (1'x 1') can be used as individuals and in groups to make a bigger unit, having the same geometry and proportion. When bigger unit (4'x 8') of concrete are used in same size for cladding purposes they produce a visual harmony, but if size is changed then, it creates a discord in harmony of elevation. This effect can be used to break monotonous look, or for focusing on the entrance to a building. Diagonal lines can

be grooved on these large concrete panels which give a sense of continuity. Vertical lines produce height and horizontal lines give an expansion left, right and attachment to the ground plane.

Many designs of decorative screens can be made in concrete and wood, which must be used in areas where sun rays have to be blocked from penetrating windows. To cover up these windows, we can design small screen panels with many geometric shapes such as squares, triangles, circles, pentagons, hexagons, octagons, star or rosettes and combination of these shapes to produce a visual and more practical solution to control sun rays penetration. These screen panels can also be use for interior purposes, specially in lobbies of hotels, public buildings, and houses for segregation between different activity areas.

The geometric pattern can be used as tool for creating proportioned elevations for small to large scale buildings. Glazing panels can be made of same module as cladding so they can maintain same grid line and create a visual harmony. If we place the glazing panels in recessed manner the cladding surface creates shadows on this glazing surface.

The various types of circulation patterns (pathways) can be created by using the same or different size of bricks, tiles, and concrete blocks in squares, triangles, circles, and polygons or combination of these. The color of these materials can also play an important role in creating these designs. We can apply one color to the main design and the other contrasting color to the border in the same material. We can also apply heterogenous

materials with various colors. A variety of designs also can be created by using one material and by rotating the axis of small units. If the main design of a pattern is a rotated square or rectangle we can make its border with squares or rectangles at right angles.Geometric patterns and caligraphy can be created on parapets and facade of houses and public buildings and used as decorative elements, the best example we have is "New Seattle Art Museum" designed by Robert Venturi.

Geometric patterns and grids played a vital role in Islamic architecture. Patterns in considerable relief present even greater flexibilities as sunlight moves across a surface, stressing first one segment, then another. Variations in the method of laying brick created linear patterns and textures; designs were sometimes in quite high relief. Use of a single material for both structure and decoration contributed to the unity of a building, while skillful handling precluded monotony. The adoption of these principals to modern construction materials and methods could continue this rich heritage of design.

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