NATIONAL COLLEGE OF ART AND DESIGN

"THE PERCEPTION OF PATTERN"

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I N T R O D U C T I O N

What is pattern? We all know to some degree what it is, but do we recognise and understand its many implications?

In this study, I am attempting to analyse this question of pattern and how it affects us in our everyday lives. Do we really have a need for pattern in our modern society? Are there different concepts of this term pattern within different cultures? What is the childs concept of pattern? How does he cope with it?

These are the major points that I will be discussing within the body of this written study.

CHAPTER I

What is Pattern?

The term pattern is extremely broad and there are many interpretations of the word. Most of the time we tend to regard it as something that is regular and organised.

The dictionary gives us several possibilities. "Pattern is (i) a decorative design; it is (ii) a particular disposition of forms and colours; and (iii) it is a design or figure repeated indefinitely". So as you can see even the dictionary gives us no cut and dry definition.

Let us take the first and third interpretations: pattern is a decorative design and pattern is a design or figure repeated indefinitely. It would seem that another well used term 'design' is closely connected with pattern. So now we ask ourselves, what is design? I think that the most straight forward meaning one can give design is that it is 'a means whereby problems are solved'. Therefore, it could be construed that pattern is one of the many 'solution tools' used in design. It creates order from chaos, by rendering it calculable.

PATTERN: A WAY OF THINKING?

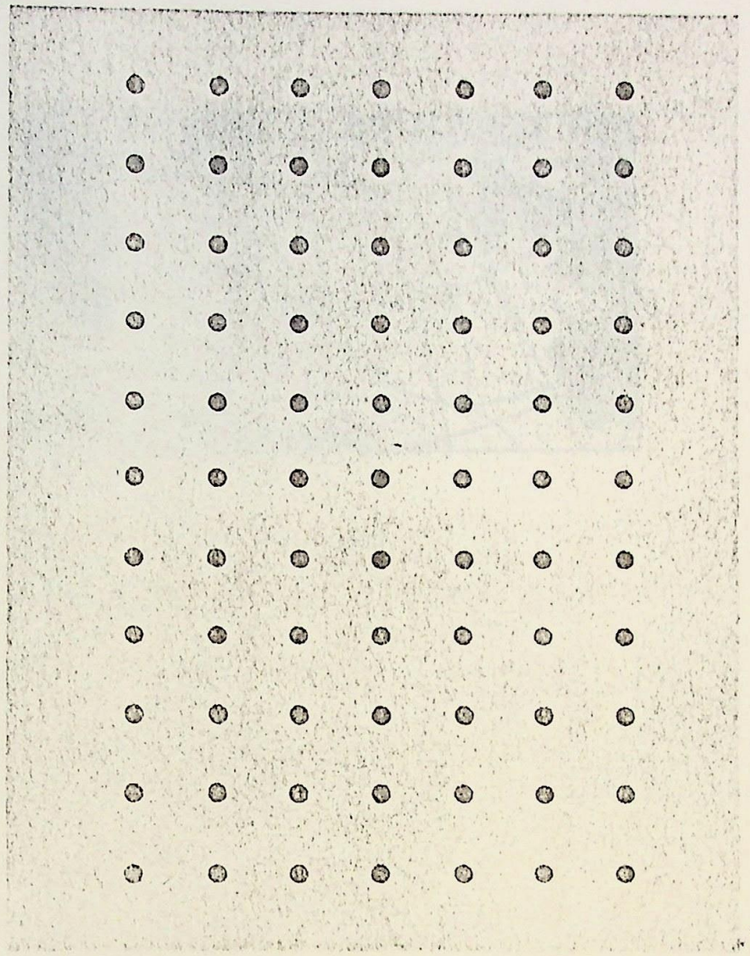
The Gestalt psychologists stressed the tendency for the perceptual system to group things into simple units. This is seen in an array of dots. Here the dots are in fact equally spaced but there is a tendency to see, to 'organise' the columns and rows as though there are separate objects. We can see something of the active organising power of the visual system while looking at this figure. (Illustration I).

This organising visual power is always active. Our attitudes and aims, both personal and cultural, determine how we will respond to certain data or stimuli. These data are of whole configurations or parts, which initially appear blurred, but which we quickly organise into significant and meaningful patterns. Any object, for example is a vast pattern of stimulation. That simple array of dots could easily be organised into a calculable whole e.g. a rectangle or square.

Pattern is qualitative, that is, the whole would possess characteristics not held by the parts. For example, an engine is made up of many parts with different functions and abilities, but it is only when these parts are assembled in some meaningful order that the characteristics of an engine can be realised.

It is only by analysing the component parts making up the whole that we can hope to create new patterns, and by linking and meshing these fresh patterns that we come to see how the nature of a process is order.

The need for order is imprinted into our brains. For example, we order our thoughts and ideas by using drawings and diagrams and while these test the feasibility of our ideas, new ideas or stimuli are being created to be ordered. (Illustration 2).



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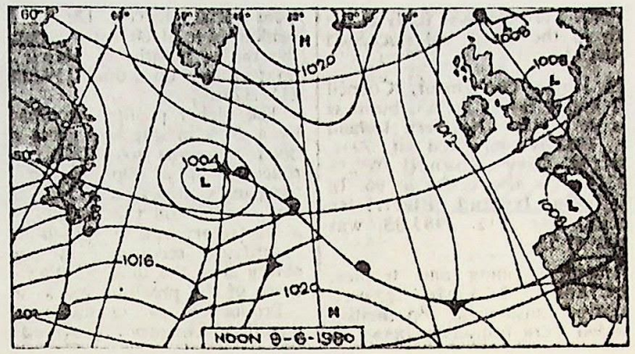

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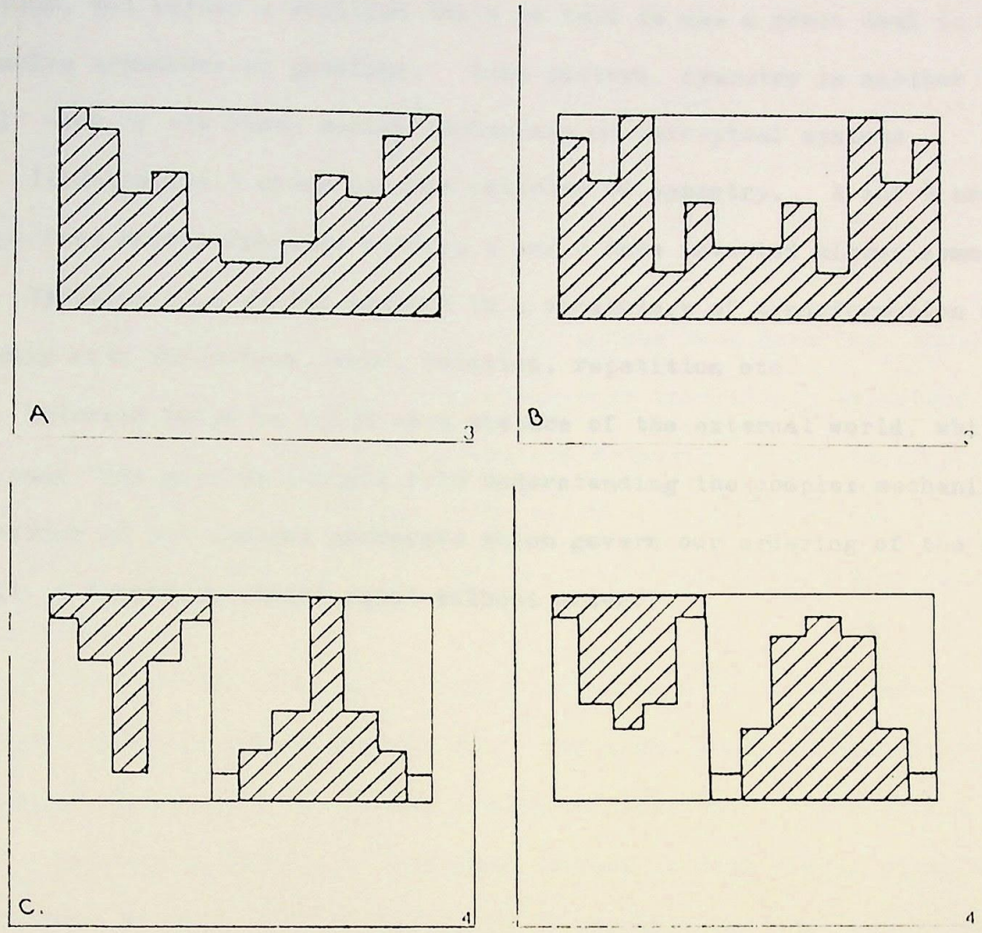


3.

Symmetry is one of the most fundamental types of ordering and may seem, at first glance to be a kind of over-ordering. (Illustration 3). As it is concerned with balance, it is perhaps the first real device we come to employ in our attempts to order experience. A symmetrical experience is not a problem, but rather a solution which we tend to use a great deal in order to solve asymmetrical problems. Like pattern, symmetry is another 'solution tool' used by the human design mechanisms or perceptual systems.

Illustration 3 gives us some examples of symmetry. A and B are examples of perfect mirror symmetry whereas C and D have inverted mirror symmetry.

Symmetry is a useful element in a vocabulary of transformation where we play with reflection, echo, rotation, repetition etc.

Ordering helps us build up a picture of the external world, while at the same time give us insight into understanding the complex mechanisms and orderings of the thought processes which govern our ordering of the external world. Processes cannot exist without order.

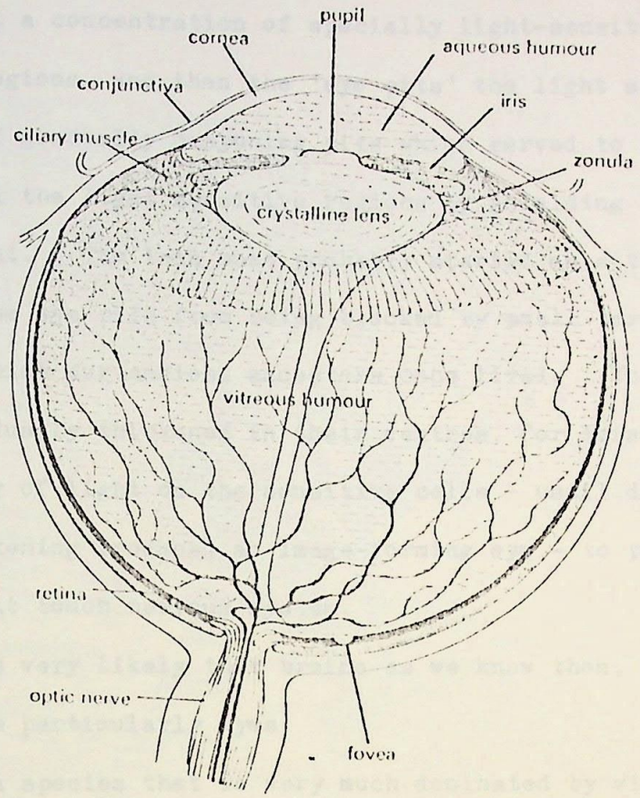
CHAPTER 2

How do we see?

If we take pattern to mean a particular disposition of shapes and colours, and if any object can be condensed into a pattern of stimuli, then how do we go about interpreting the external world? How do our brains cope with these patterns of stimuli?

In the evolution of life the first senses must have been those which could monitor physical conditions which were immediately important for survival. Touch, taste and temperature senses must have developed before eyes; for visual patterns are only important when interpreted in terms of the world of objects since the optical images in the eyes are only patterns of light!

A curious hen-and-egg type of question arises: which came first, the eye or the brain? (Illustration 4). For what use is an eye without a brain that is capable of interpreting visual information? Why should a visual brain develop before there were eyes to feed it with visual stimuli? According to R.L. Gregory (1966), it is thought that the 'touch' nervous system was taken over by the first primitive visual system, because the skin was sensitive not only to touch but also to light. Therefore, the visual response would have developed from a response to moving shadows on the skin - which would have given warning of nearby danger - to recognitions of patterns when the eyes developed optical systems.


pupil
cornea
aqueous humour
conjunctiva
iris
ciliary muscle
zonula
crystalline lens
vitreous humour
retina
optic nerve
fovea

HOW THE EYE DEVELOPED.

According to R.L. Gregory (1966), the stages of development seem to have been firstly, a concentration of specially light-sensitive cells localised at certain regions, and then the 'eye pits' the light sensitive cells forming the bottom of gradually deepening pits which served to increase the contrast of shadows at the light sensitive regions by shielding them from the surrounding light. The lens most probably started as a transparent window, protecting the eye pits from being blocked by small particles floating in the sea in which our ancient ancestors once lived. The protective windows may have gradually thickened in their centres, for this would at first increase the intensity of light on the sensitive cells - until dramatically - the central thickening produced an image-forming eye - to present optical patterns to the ancient touch nervous system.

It seems very likely that brains as we know them, could not have developed without sense particularly eyes.

We are a species that is very much dominated by visual concepts. Our problem now is to understand the world of objects without being limited by what we have learned through the senses.

A problem central to visual perception is how the brain interprets the patterns of the eye in terms of external objects. In this sense, 'patterns' are very different from 'objects'. By a pattern we mean some set of stimuli in space or time at the receptor (retina). These are used to indicate and identify objects giving rise to a sensory pattern. In other words, an object appears as a pattern of light and dark on the retina. But we actually perceive more than just patterns, we perceive objects as existing in their space and time. For example; retinal images are patterns in the eye - patterns made up of light and dark shapes and areas of colour. But we do not see patterns, we see objects.

5.

We read from pictures in the eye the presence of external objects. How this is achieved is the problem of Perception. Objects appear separate, distinct, and yet as pictures on the retina they have no clear boundaries.

(Illustration 5) In this photograph of a spotted dog, most half-tones have been lost (as in vision by moonlight) and yet we can distinguish the spots making up the dog from similar spots of the background. To make this possible, there must be stored information in the brain of dogs and thousands of other objects!

It would seem that objects can be somehow extracted from the continuous pattern at the receptors.

FIGURE - GROUND REVERSAL

Figure - ground reversal is a well-known visual effect. Here perception fluctuates between two possibilities. (Illustration 6) It shows that perception is not simply determined by the patterns of stimuli at the retina, but that there must also be very subtle processes of interpretation of those patterns.

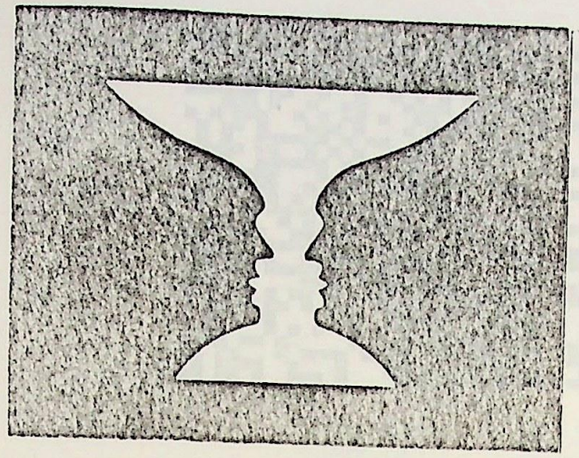
The psychologist whose name is associated with figure-ground reversal, is the Dane, Edgar Rubin. He used simple but cunningly contrived line drawings in which a pair of shapes, (either of which taken alone would seem as an object of some kind) share a common border-line.

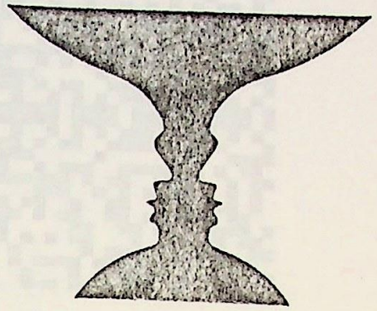
What happens is, that when joined each competes with the other. Alternately, one dissolves into the background and is hardly seen while the other dominates as the object, then this one fades away to become the background in its turn. This shows something of the dynamic nature of our perceptual processes.

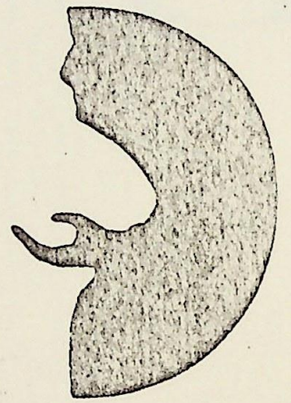
Unfortunately, there is not a lot of information about those factors which prevent figure-ground reversal. The information available, according to R.L. Gregory would lead us to believe that small areas enclosed in larger areas are taken as 'figure' or object (Illustration 7). Repeated pattern is taken as to belonging to either figure or ground, but not to both (Illustration 8). Straight lines are attributed to figure (Illustration 9).

Figure-ground reversal can take place for example when we look at roofs of houses against the evening sky, as well as those designed carefully by Edgar Rubin.

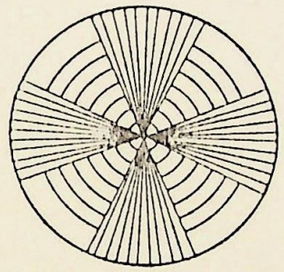
But how are some patterns established as representing objects? This is a difficult question. We often see patterns without attributing 'thingness' to them. We see patterns of leaves, clouds, of fine or coarse texture. The decorative arts present formal or random patterns, which we may see as patterns and not as objects. We may see hints of objects in patterns and random shapes, but we certainly can see patterns without accepting them as objects (Illustration 10).



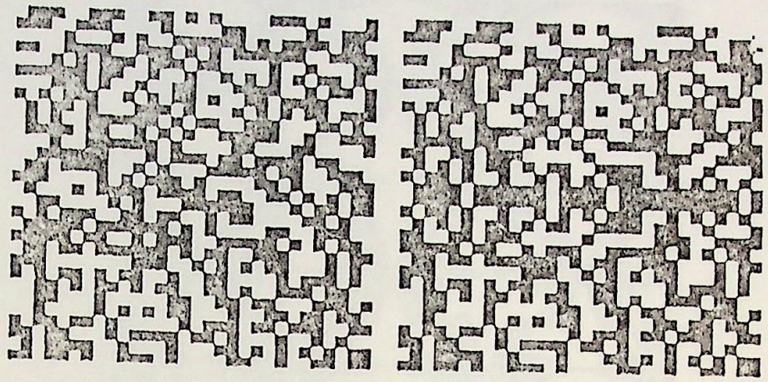




2. This is seen sometimes as a face, sometimes as something else. Perception fluctuates between two clearly defined possibilities. This is an example of visual 'reversal', by the Danish psychologist, Edgar Rubin.



3. One of Rubin's figure/ground reversing figures. Here, there are two equally held figures, which in turn are relegated to 'ground'. Regions accepted as 'figure' are subtly changed perceptually, as described by Rubin in the quotation.



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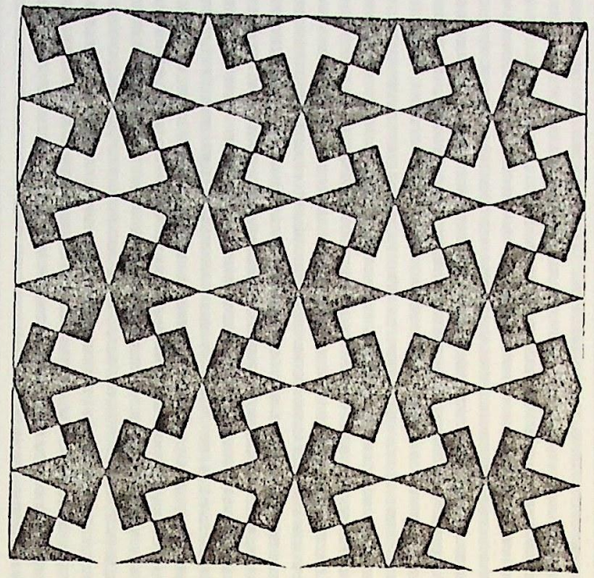

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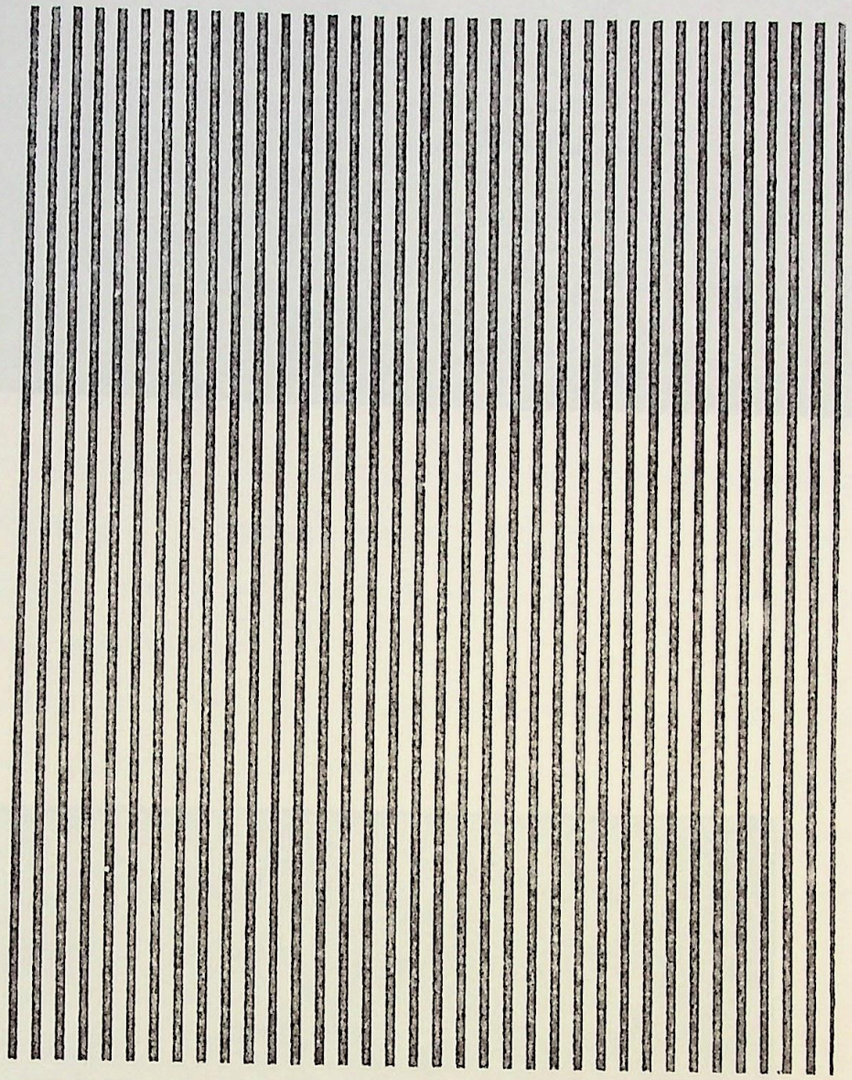

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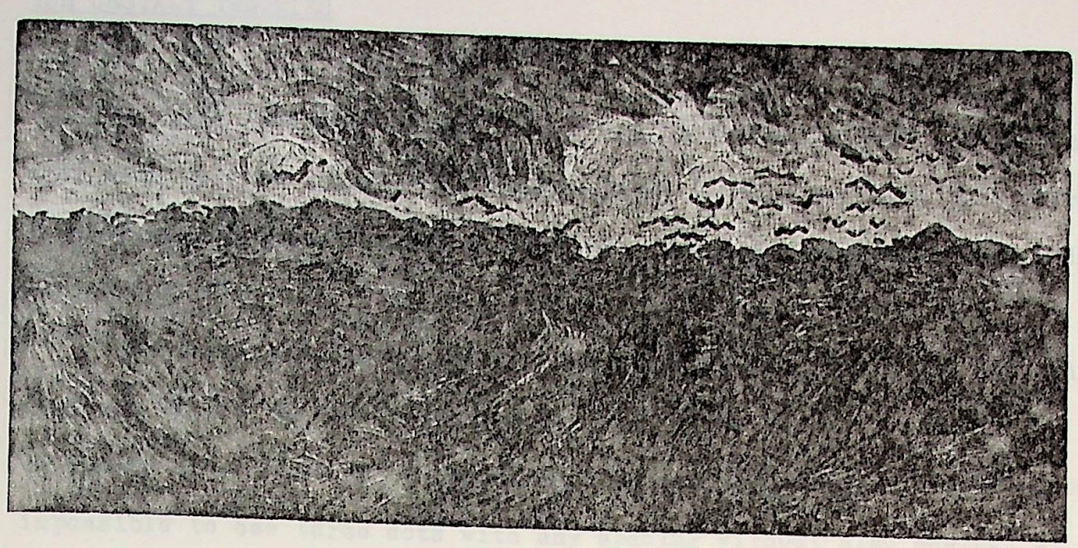
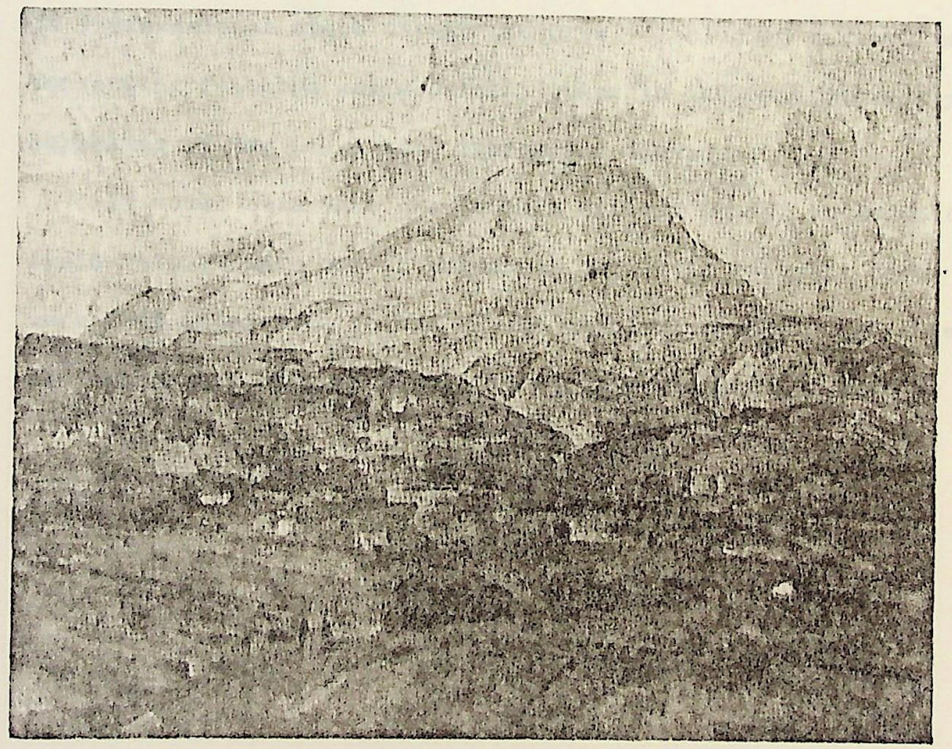




10.

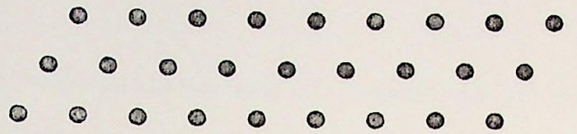
THE GESTALT THEORIES

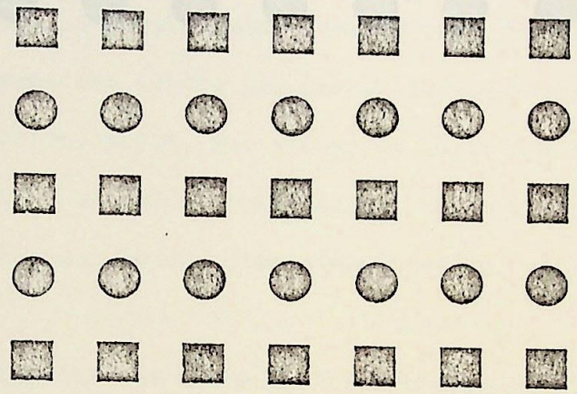
The word 'Gestalt' means 'whole' and in the early part of the 20th Century made much play of 'perceptual organisation'. They believed that there are Principles which are inherited, whereby, the human being organises stimulus patterns into wholes.

This organising into 'Wholes' was demonstrated with black and white figures, mainly patterns composed of dots. The theory was that even an array of random dots tends to be organised into configurations. It is almost impossible to see three dots with any spacing without also seeing, at the same time, a triangle (Illustration 11). In a random array we see all kinds of figures emerge; triangles, squares, rows etc. They also showed how with groups of dots, the closer dots form perceptual pairs. They are seen as belonging to each other.

In Illustration 12, lines of dots (or solid lines) which converge, are perceptually organised in 3-dimensions. Normal objects exist and are seen in 3-dimensional space though pictures - including retinal images are flat! Converging features are generally taken to indicate depth, by perspective shrinking of the image with increasing distance.

It would seem that the Gestalt writers sought to prove that the human brain made objects out of patterns, but it is probably truer to say that they were more interested in how we see patterns than in how we see objects for they generally used highly artifical visual material such as the dot patterns.





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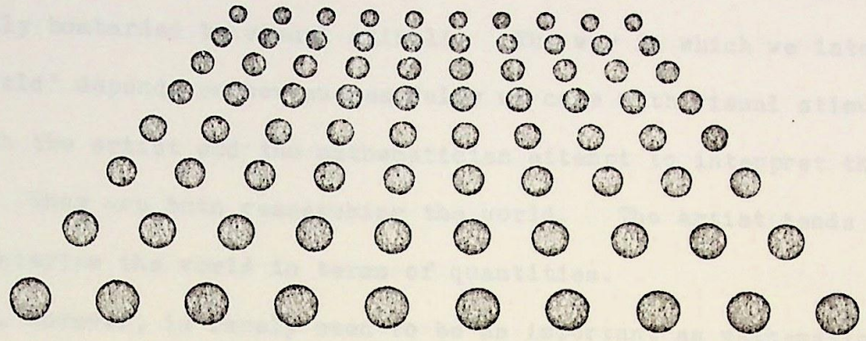


CHAPTER 3

Why do we need pattern?

The making and understanding of pattern is of especial importance in a period of increasing dependence on visual communication. We are being constantly bombarded by visual stimuli. The way in which we interpret the 'real world' depends on how successfully we cope with visual stimuli.

Both the artist and the mathematician attempt to interpret the 'real world'. They are both researching the world. The artist tends to qualify or characterise the world in terms of quantities.

Art, however, is rarely seen to be as important as mathematics. This is probably because the artist has ceased to regard his work as an on going interpretation of the world, but rather as an end in itself. His works are separated from life as collectors pieces. Art has become so individualised that many of the commonly accepted structures for communication have been forgotten.

The mathematician has shown by his exploration of the structuring of mathematics and his awareness of pattern and structure how mathematics can be used as a means to interpret mans response to stimuli. Mathematics has grown by being continually externalized and by the way it has been used to solve problems, many of the problems being simply hypothetical rather than applicable. In other words mathematics have been used for 'maths sake'! Development will still occur even when processes of calculation are removed from application as long as somewhere within the discipline stimuli of application still occur.

Where mathematics is a dynamic method of understanding our world, Art has become passive. It has become 'internalised'. It does not communicate beyond individual interpretation of the world.

If Art is to become a significant form of communication, the artist must become more incisive and tough in his thought structuring.

If pattern structures our thinking, then by developing our knowledge of pattern we also evolve ourselves. This cannot happen properly while the two greatest methods of interpretation remain at either ends of an 'intellectual pole'. There is a need for the interpenetration of both elements within our thought processes. This implies a much deeper understanding of both structures and their relation to the whole.

We have become progressively removed from dealing with and organising our own thought processes. We are slowly becoming 'pre-programmed'. The mass-media is the greatest means of reality stimulation. The patterns of visual stimuli which we receive constantly are not being transformed selectively, but are being stimulated, or pre-packed into given interpretations of reality.

Television is a 'simulator' whose virtues and vices are constantly under discussion, in relation to the material it processes. The danger of television is in the acceptance of this medium as a substitute for inter-communication. It pours out a highly simplistic view of reality and since the television process is non-referrable and impossible to modify, it can distort reality particularly in isolated individuals. By using television as a simulator of reality we reduce the imput of fresh stimuli to our thought processes. It is very important that we see this simulation as illusion--not confuse the fake with reality, but rather use it constructively in a state of 'willing suspension of disbelief' (Coleridge 1820).

If we are to survive as a rational dynamic reasoning species, the whole nature of our perceptual experience must be reappraised. There must be a return to 'Synthetic thinking', that is, a fusion of all the different branches of science and art into a whole. There must be a 'whole sense' instead of duality and dichotomy.

Western civilisation as we know it, is undoubtedly drifting towards a form of society which will be totally organised by technology. The majority will be dependent on a minority of specialists, and the specialists upon machines more complex than the data they deal with. It will emerge that the people are non-participants in the events that control their destinies.

Full knowledge of the whole is clearly impossible, yet it is only with this 'whole sense' that any part may be effectively comprehended.

The theory of Holism is not widely understood or acted upon in Western Civilisation. Holism is the theory that the fundamental principle of the universe is the creation of wholes. That is, complete and self-contained systems from the atom and the cell to the most complex forms of life and mind.

This theory goes a long way in helping us to understand our need for pattern and unity. We must look to the East, however, to see the full realisation of Holism in the structuring of pattern.

CHAPTER 4

East versus West

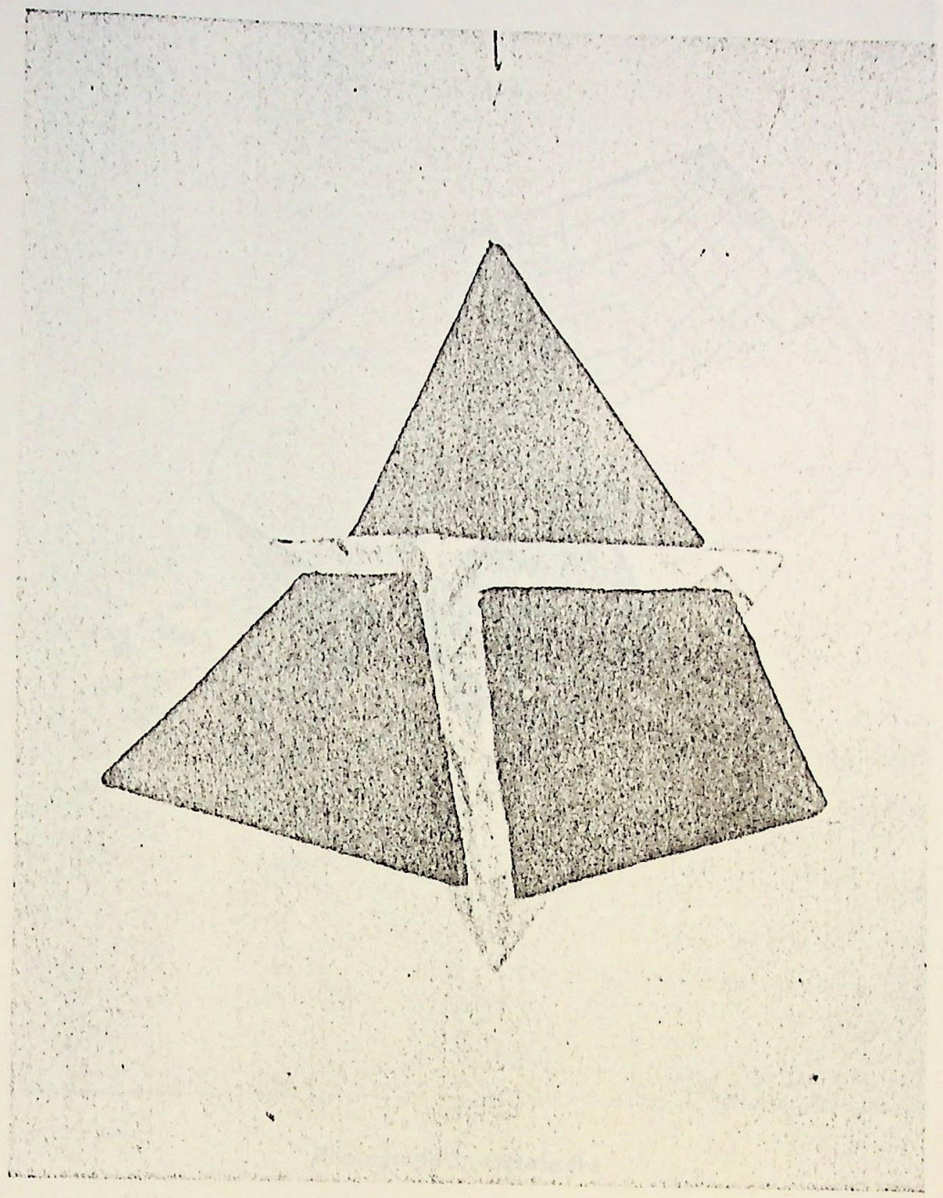
ISLAMIC CONCEPTS OF UNITY

In the tenth century, a Persian philosopher called Ibn Sina, expressed the view that the universe was a cosmos of symbols (stimuli) through which a person who sought divine knowledge must pass. This cosmos was seen as an integral part of daily living or 'being' and the essence of being was comprised of body soul and intellect.

Unlike Christian religion there was no separation between God and Man. Islamic doctrine teaches that from unity of being can come only unity. In order to make the development of this ultimate unity more easily understood, a system of 'layering' was evolved. This was a device whereby developments in the process of unity might be seen to happen.

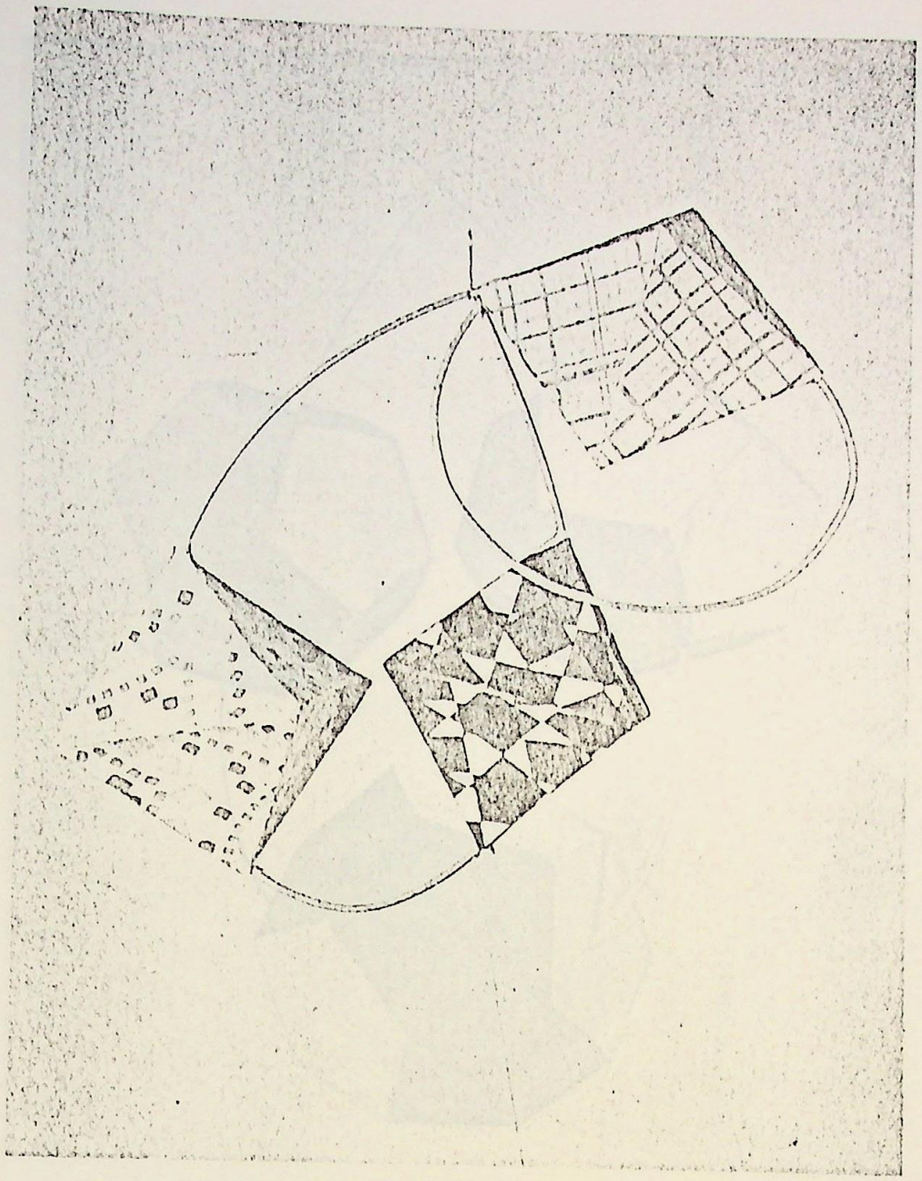
Al-Biruni, a contemporary of Ibn Sina, saw nature as a force which formed and ordered everything into a pattern of unity. Everything is necessary; nothing is superfluous. This order could be perceived, according to Al-Biruni, by many different routes. A fundamental one was the innate counting ability by which difference became evident. He did not give mystic significance to numbers, but rather he noted from observation that certain numbers appeared more frequently than others in certain contexts and series. He gave significance to those numbers.

Al-Biruni also afforded significance to certain shapes or solids; one, the CUBE, six sided and earthy; two, the ICOSAHEDRON, 20-sided (triangles) and airy; three, the OCTAHEDRON, eight-sided (triangles) and fiery; four, the TETRAHEDRON, four-sided (triangles) and fiery; five, the DO DECAHEDRON, tewlve-sided and containing all(Illustration 13). His interest in numerology was the result of acceptance of a hypothetical problem of ordering the 'unseen' orders, rather than articles of faith or dogma.



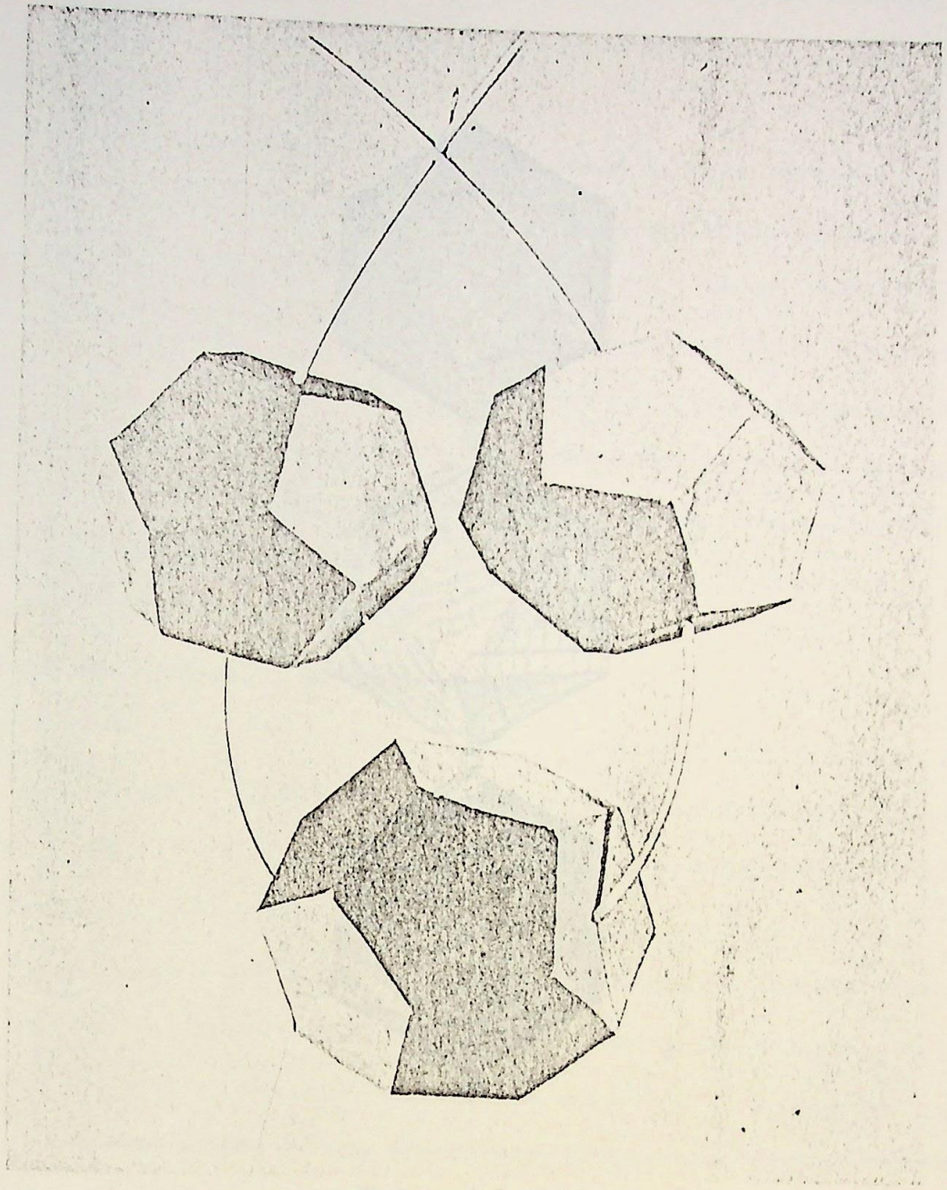
Photograph 1. Tetrahedra

13. (f)



Photograph 3. Octahedra

13. (ii)



Photograph 4. Dodecahedra

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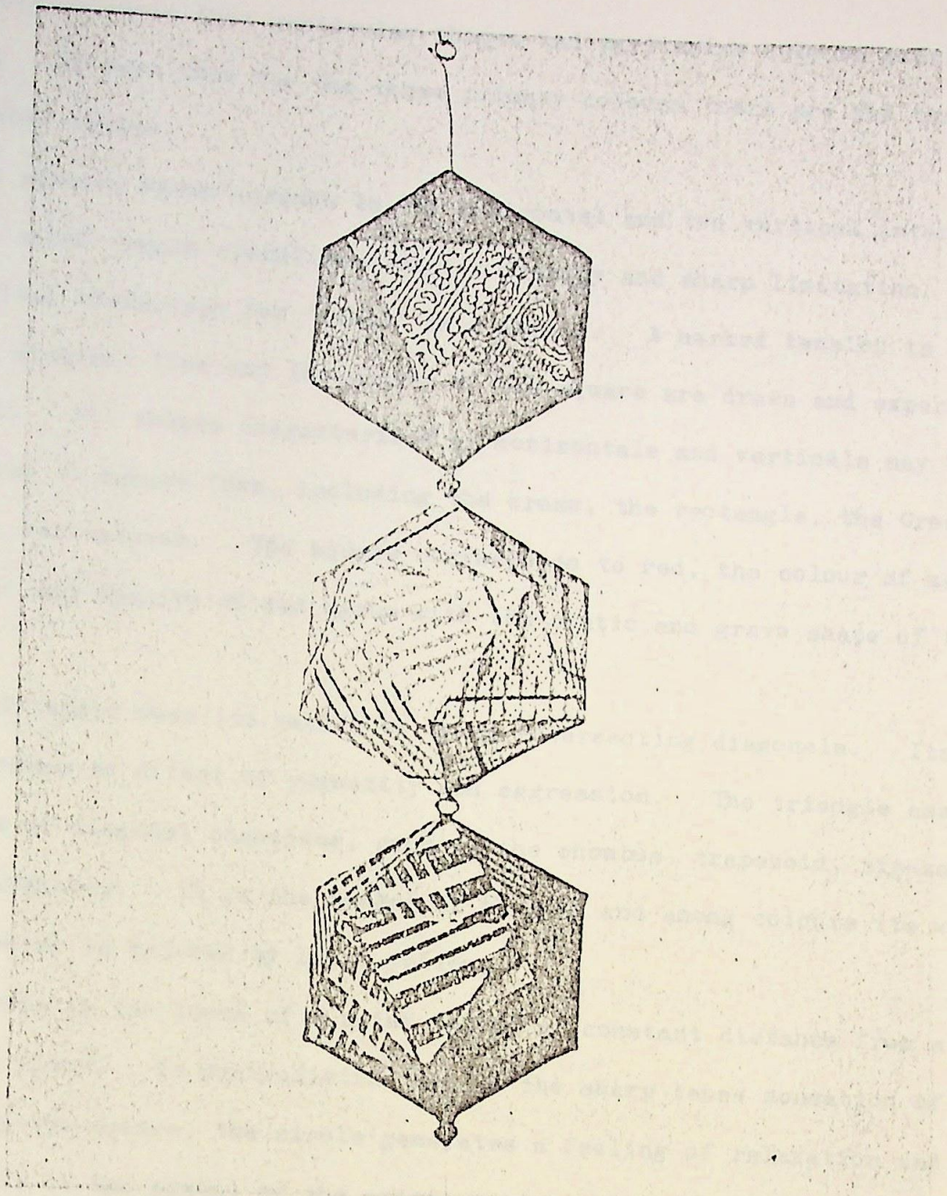


Photograph 5. Icosahedra

13. (iv).

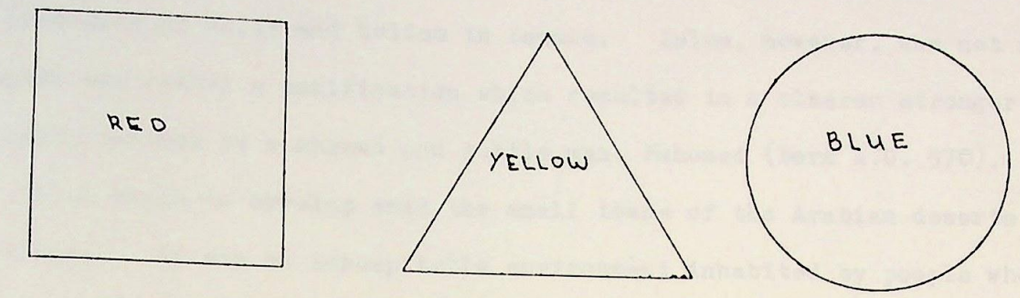
Itten believed that particular shapes had particular colours ascribed to them. He says that for the three primary colours there are the three fundamental shapes.

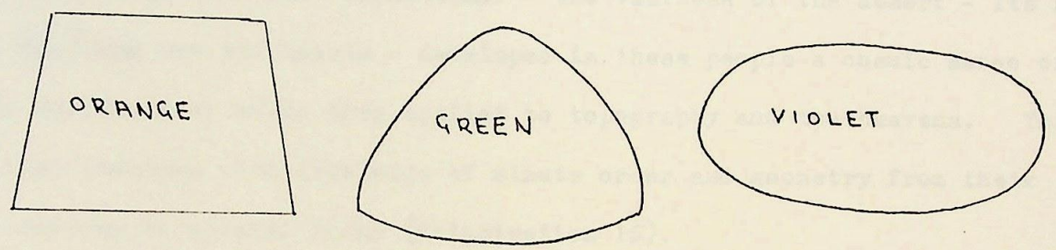
The square, whose essence is two horizontal and two vertical intersecting lines of equal length symbolizes, matter gravity and sharp limitation. The Egyptian hieroglyph for 'field' is a square. A marked tension is felt when the straight line and the angles of the square are drawn and experienced as motion. All shapes characterised by horizontals and verticals may be assimilated to square form, including the cross, the rectangle, the Greek key and their derivatives. The square corresponds to red, the colour of matter. The weight and opacity of red agree with the static and grave shape of the square.

The triangle owes its nature to three intersecting diagonals. Its acute angles produce an effect of pugnacity and aggression. The triangle assimilates all shapes of diagonal character, such as the rhombus. trapezoid, zig-zag and their derivatives. It is the symbol of thought and among colours its weightless character is matched by lucid yellow.

A circle is the locus of a point moving at constant distance from a given point in a plane. In contradistinction to the sharp tense sensation of motion produced by the square, the circle generates a feeling of relaxation and smooth motion. It is the symbol of the spirit moving undivided within itself. It is the astrological symbol of flexous cyclic character, as the ellipse, oval wave parabol etc. The incessantly moving circle corresponds among colour to transparent blue.

To summarize, the square is resting matter, the radiating triangle is thought and the circle is spirit in eternal motion. If we look for shapes to match the secondary colours, we find the trapezoid for orange, a spherical triangle for green and an ellipse for violet.





14.

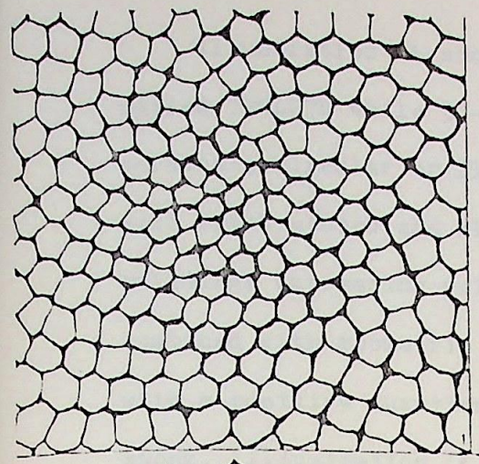
ISLAMIC PATTERN

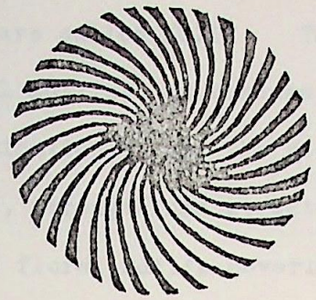
Islamic pattern makes a profound impression upon us. It is revealed to us across thousands of years and seems to embody a vision of the ultimate order of an ordered universe.

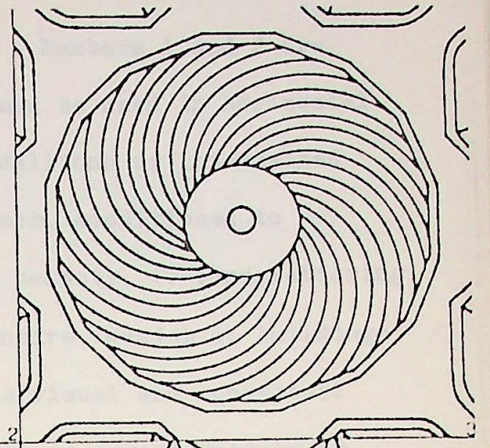
The Muslims drew their knowledge from many sources; from East and West, from Rome, Greece, Persia India, Egypt and China. All these cultures had the principle of unity and holism in common. Islam, however, was not a new religion but rather a purification which resulted in a clearer stronger vision, initially defined by a shrewd and subtle man, Mahomed (born A.D. 570).

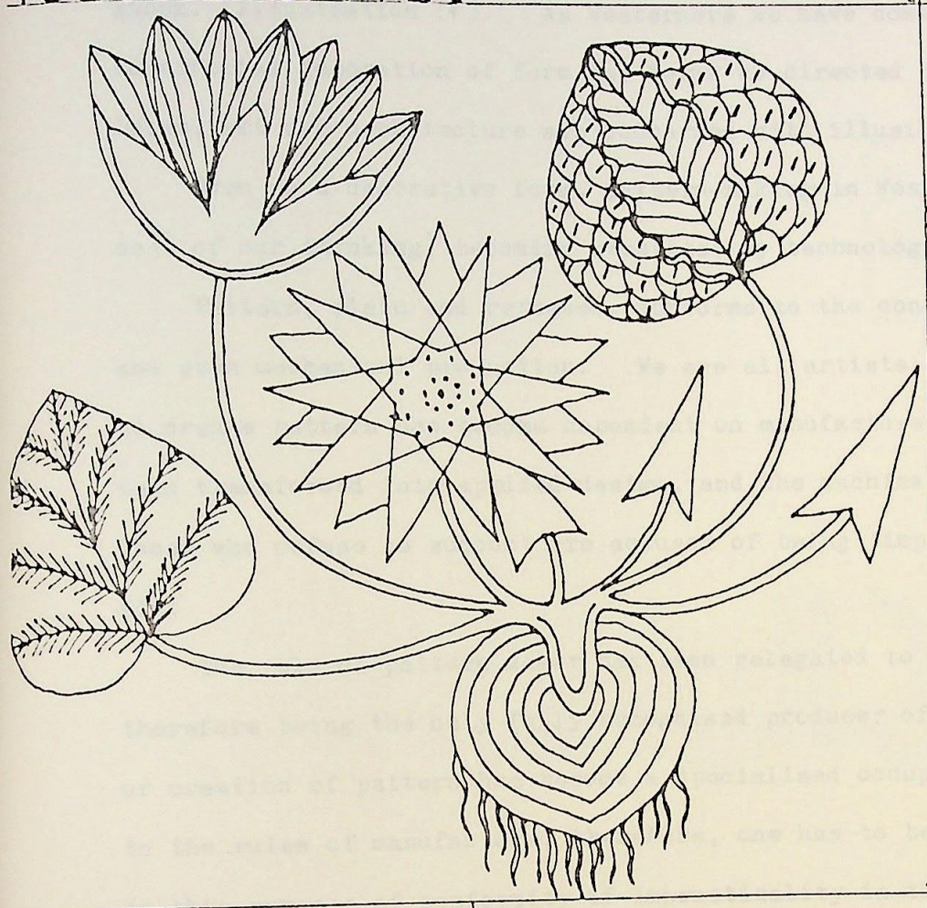
Islam began to develop amid the small towns of the Arabian deserts and scrublands. It was an inhospitable environment inhabited by people who had for centuries been a semi-nomadic race. Arabia was the crossroads of Eastern and Western cultures. The inhabitants were by no means uncultured. They held natural phenomena in great respect and in particular, noted the structure of a star, plant and rock formations. The vastness of the desert - its sheer size dwarfing men and beasts - developed in these people a cosmic sense of scale and distance which they applied to topography and the heavens. This was also combined with knowledge of minute order and geometry from their observations of natural forms (Illustration 15).

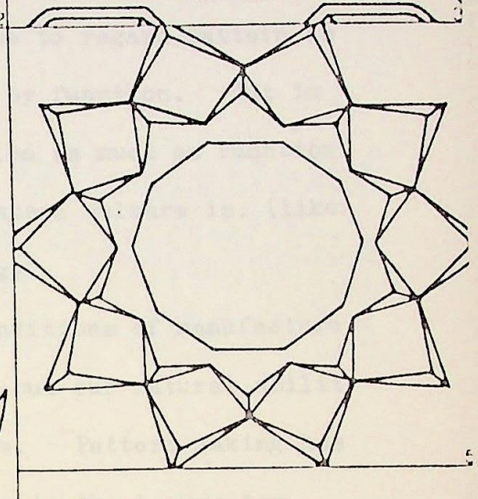
It is interesting to note how the written word is an integral part of Islamic pattern. The word has always been the medium of Gods' communication with the prophets; Abraham, Jesus and finally the last prophet, Mohamed. Arabic was of divine origin and as a result of this belief, the word, in Islam is of far greater importance than in other cultures. Arabic is a language of great flexibility fluidity and fineness of structure and its written form reflects these qualities. It is its flexibility that has ensured its survival as the only living source language. It is a musical language. The visual system of Arabic script is that it expresses itself clearly in an enormous variety of forms (Illustration 16).

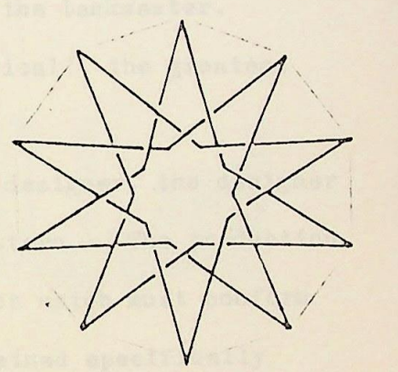


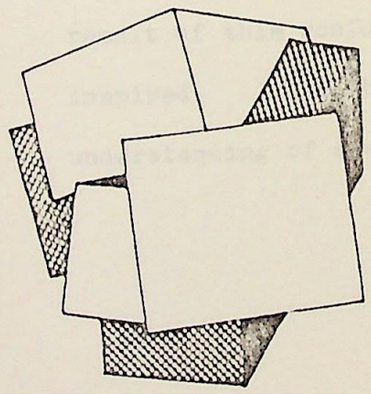


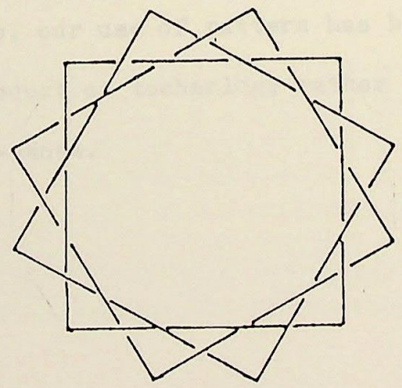












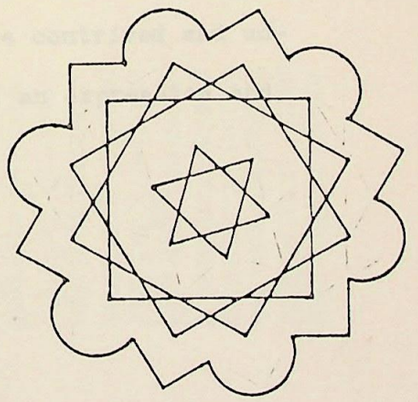


Illustration 16 shows just some of these forms. Numbers 1 and 2 are called THULUTH while 3 - 5 are called KUFIC. They can be used in horizontal vertical, circular or floral motifs; as borders, medallions or intertwined with brick stucco and illumination. For the Westerner, conditioned to buildings expressing weight, strength and structural honesty, to find lettering combined with geometric and floral motifs covering entire facades of buildings with a positive luxurience of pattern and colour is a visual and conceptual shock. (Illustration 17). As Westerners we have come to regard pattern as superficial decoration of form and forms as directed by function. But in Islam, art and architecture are concerned with illusion as much as function.

Even as a decorative form, pattern-making in Western culture is, (like most of our thinking) becoming simulated by technology.

Pattern, plain and repeated, conforms to the conditions of manufacture and even mechanical production. We are all artists but our natural ability to create pattern has become dependent on manufacture. Pattern making has been transformed into applied design, and the machine is the taskmaster. Those who refuse to succumb are accused of being 'impractical', the greatest sin!

The role of pattern maker has been relegated to the designer, the designer therefore being the only fully recognised producer of pattern. The production or creation of pattern has become a specialised occupation which must conform to the rules of manufacture, therefore, one has to be trained specifically to this purpose of conformity if impracticality is to be avoided. As a result of this conformity, our use of pattern has become contrived and uninspired. It is the product of technology rather than an expression and understanding of a whole-sense.

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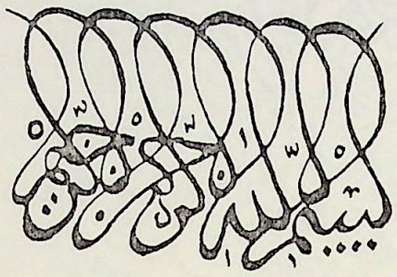
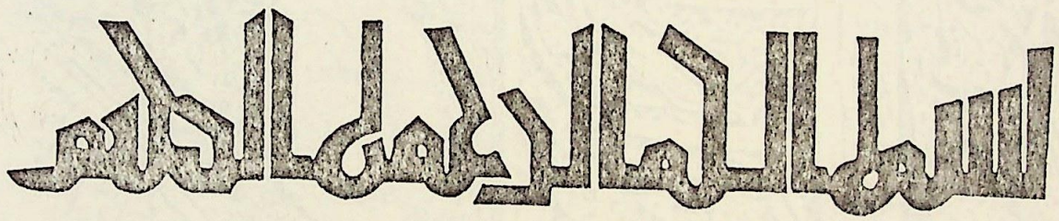
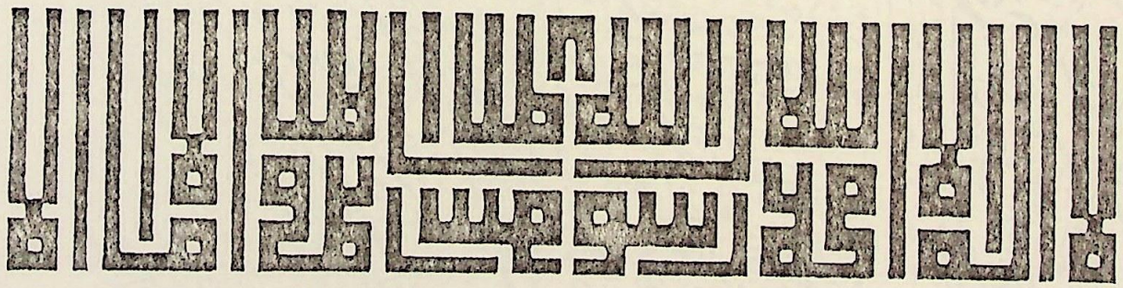
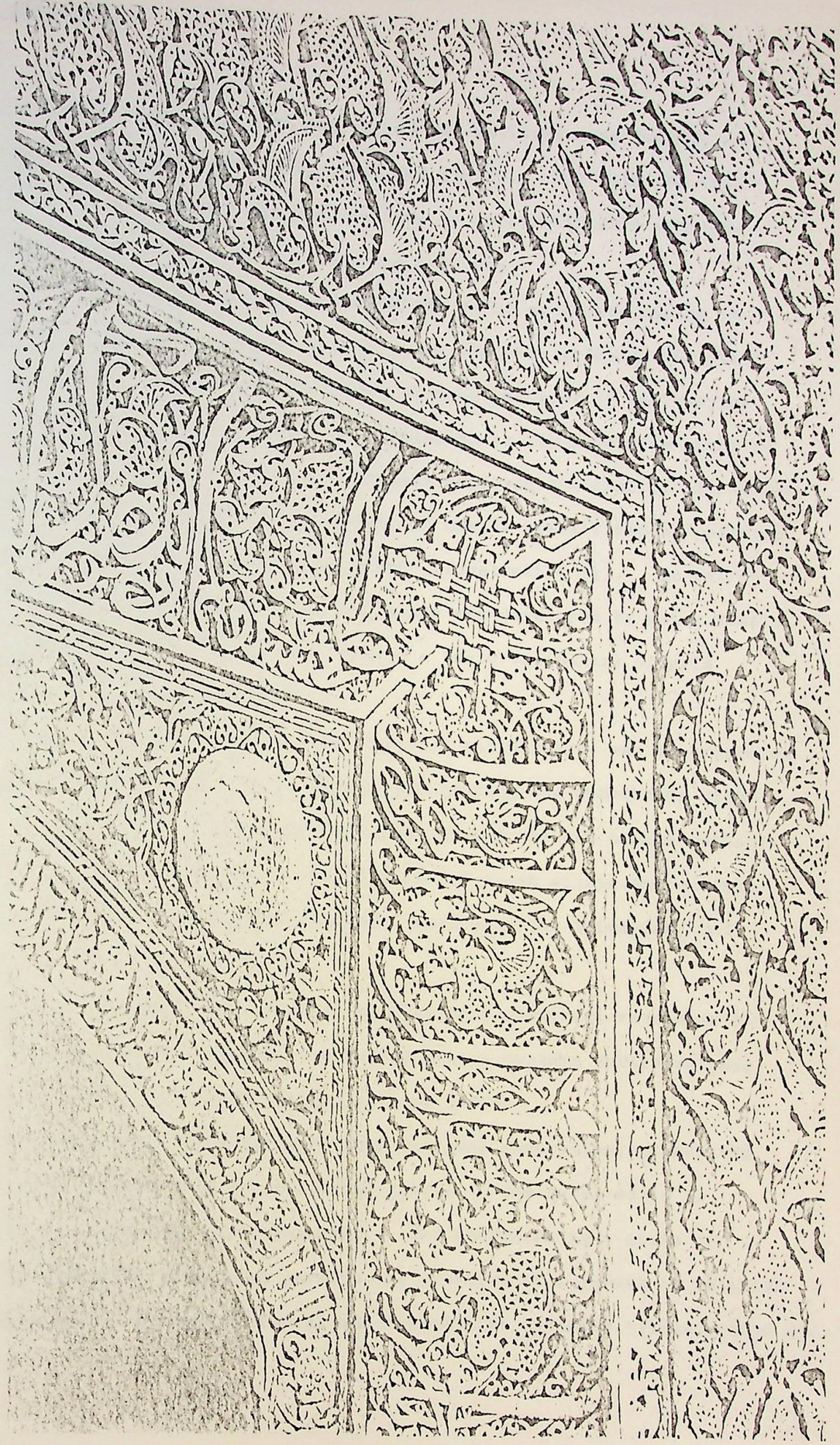








ISLAMIC DECORATION

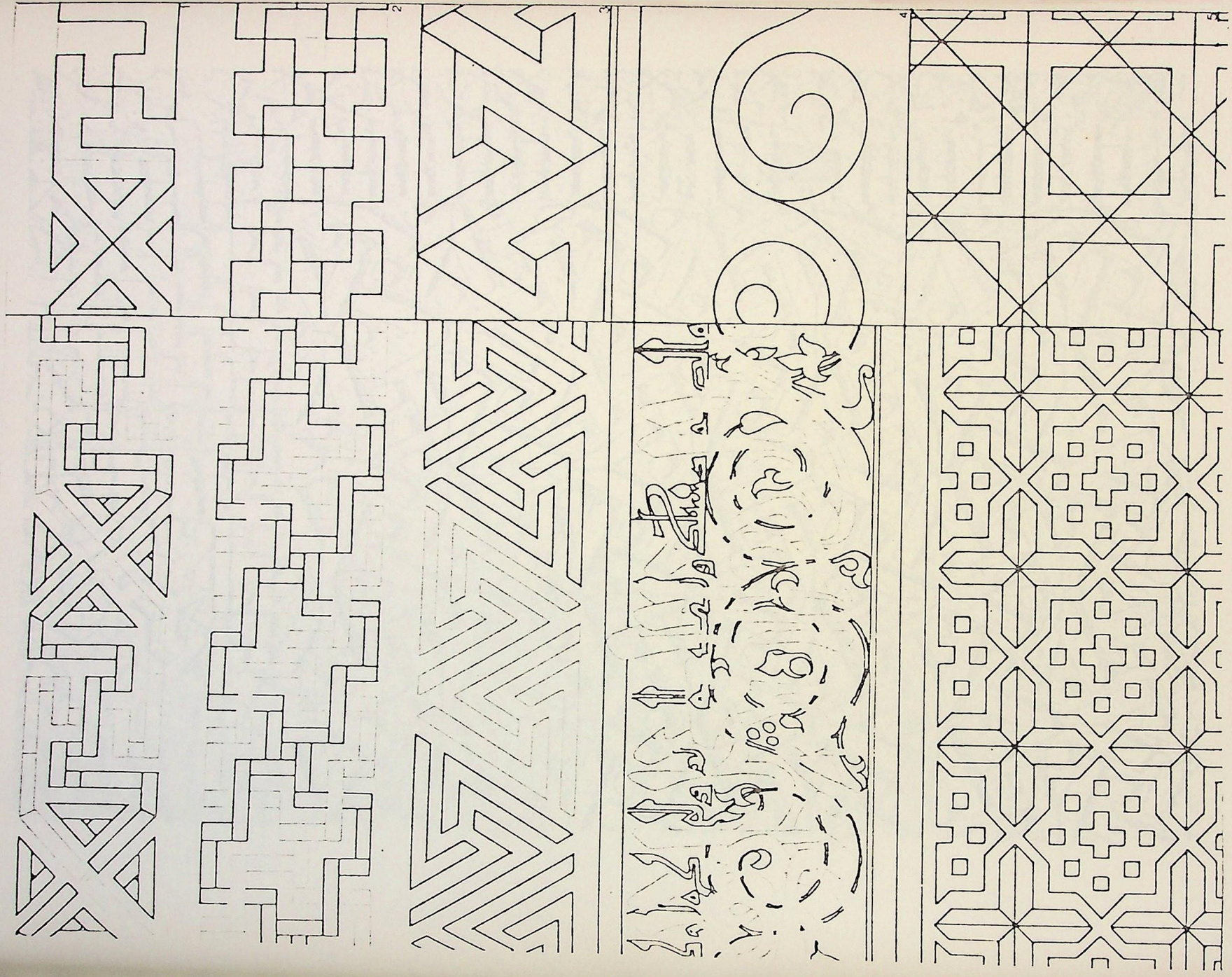
Early Islamic decoration took many forms and utilized many techniques from the native traditions of carved stone and stucco. But with the brick-work and coloured earthenware mosaics, we come to an identifiable language of Islamic decoration, owing little to previous cultures.

The early forms of decoration exploited the brick as a unit laying it on in vertical, horizontal, angular and circular rhythms, exposing the joint in different widths and at different depths to make the most of the varying densities of shadow. This brickwork is unparalled in its inventive exploit-ation of a single process. In early monuments achieved the desired illusionary effects of surfaces, by using a wide variety of simple overall repeat patterns combined with numerous strips of border motif (Illustration 18). An extra-ordinary richness of movement of light and shade was developed by using simple geometric patterns. During the 11th Century a basic vocabulary of grid pattern was evolved in brick and stucco.

In the 14th Century faience (glazed coloured earthenware) was incorporated as highlights to the patterns of brickwork, punctuating the monochrome with spots of intense colour. Gradually the colour spread and the broken surface was closed by a sheath of mosaic. The illusion of depth within the surface was retained by use of interweaving patterns based upon the brickwork, but now richly coloured (Illustration 19).

The surface of Islamic architecture appears as a continual recession of planes. These planes and precisely contrived vistas contain subtle volumes. It is as if the surface of the building had many depths.

We have been so far concerned with only external decoration, within the Islamic building is open-plan and multi-functional. The outer world is separated off by high walls and colonnades. The enclosure is a means of increasing the meditive state, and permits the creation of a garden in relation to the architecture - a blend of floral and crystalline patterns (Illustration 20).



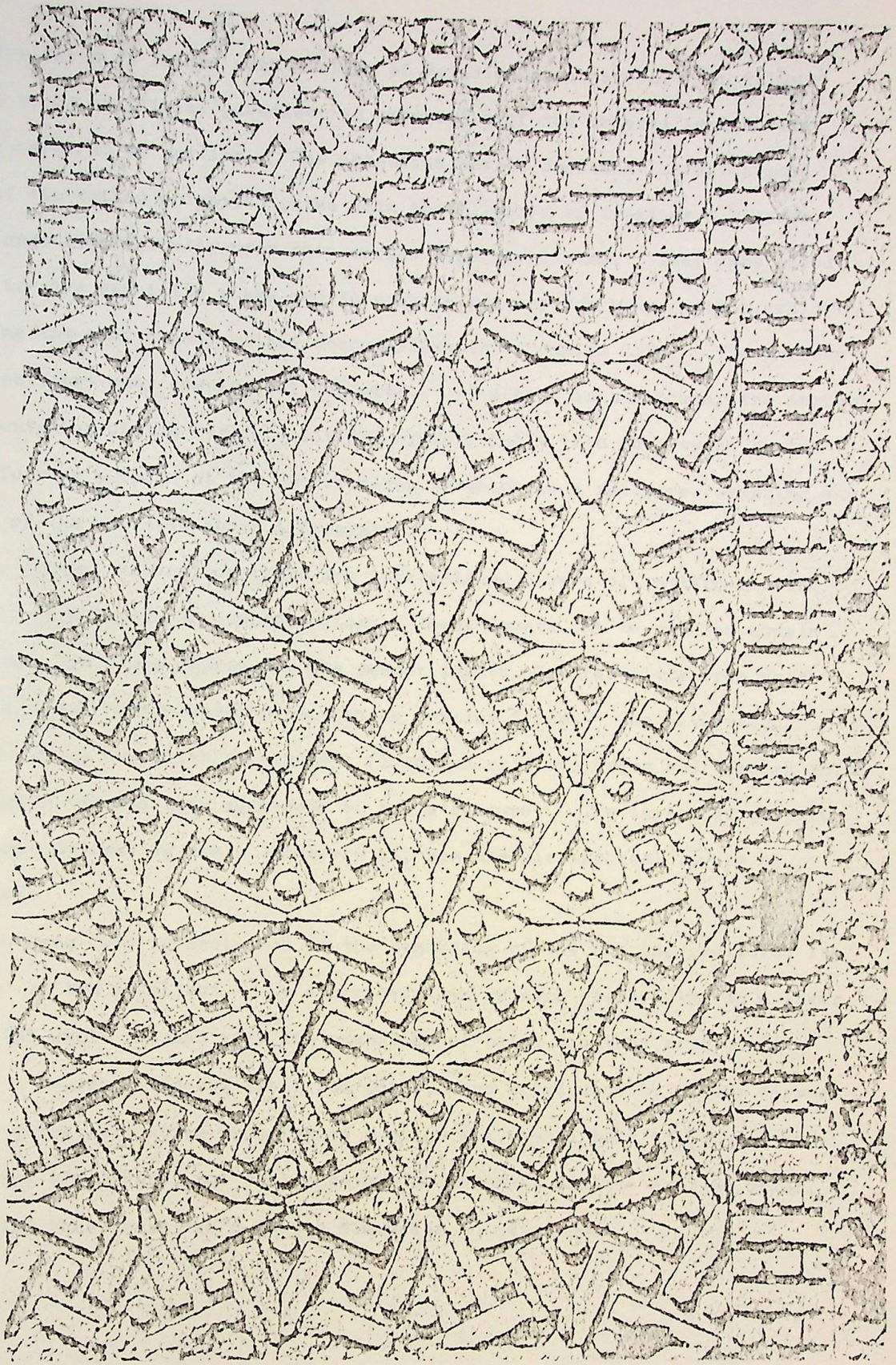
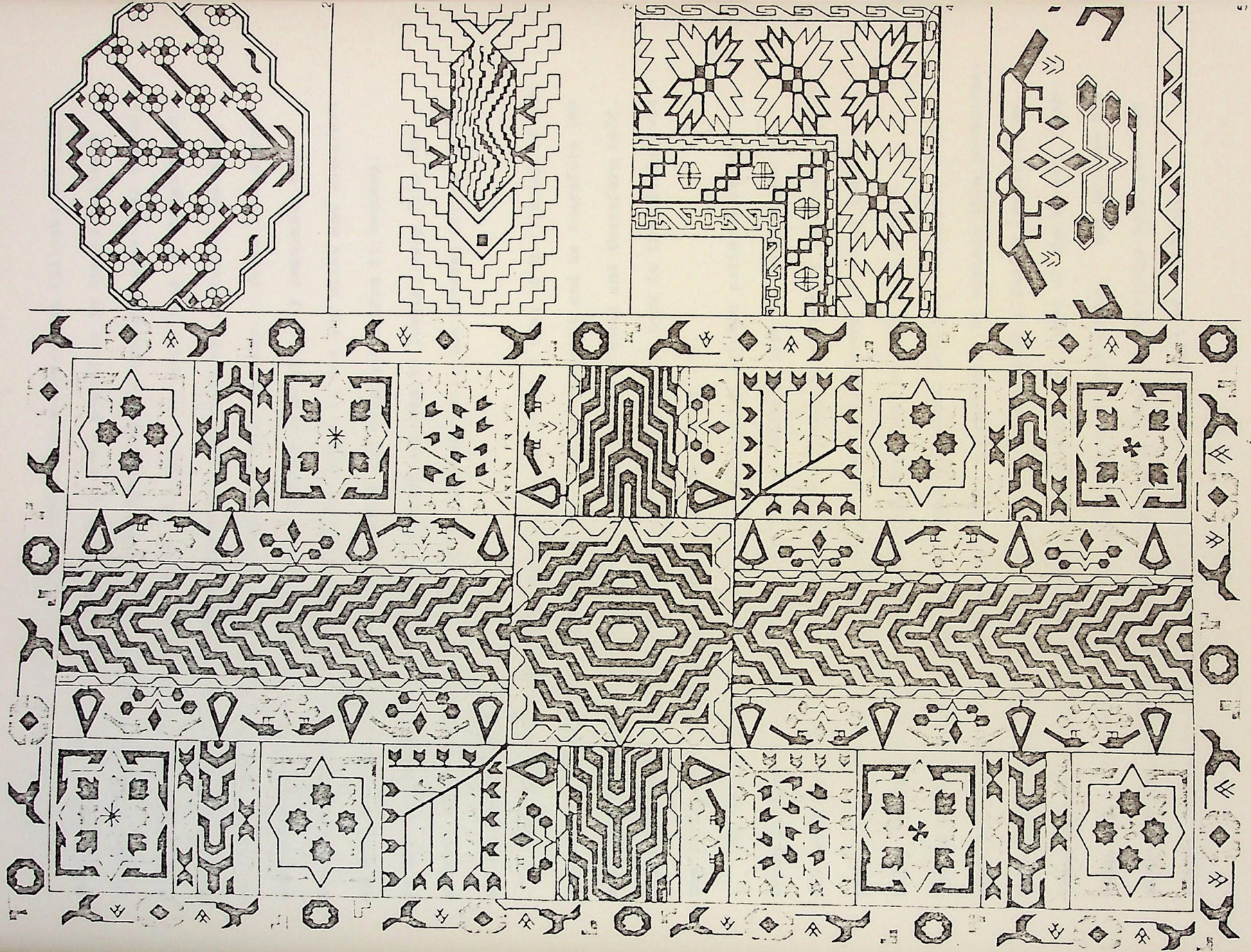


illustration twenty-three shows motifs from a garden carpet from North-West Iran.

The Koran is filled with visions of Paradise as a garden. An Islamic garden is an artificial paradise, an expression of the ordered instability. I have referred to earlier. The intention was to create a living carpet, so that one walked on raised paths with the illusion of treading a blossom. Positioned strategically upon this carpet were pavillions. They were sited so as to give exquisite views and to provide privacy for conversation, which is among the most highly prized accomplishments in Muslim life. The gardens also contained many comological concepts. It echoed in particular the ancient representation of the world be divided symmetrically into four zones by two axes, forming a cross at the intersection of which is a pool, representing a vision of the universe and a life symbol.

In Islamic decoration there are interrelated layers of pattern linking directly with layers of understanding. These layers can be seen as models of thought processes expressing the deeper layers of personality from which experience and memory develop increasing complex forms. The integrated personality is one which maintains a fluid and creative order and through this development retains some awareness of its structure. The layers of pattern in Islamic decoration would therefore express the hierarchical layers of existance.

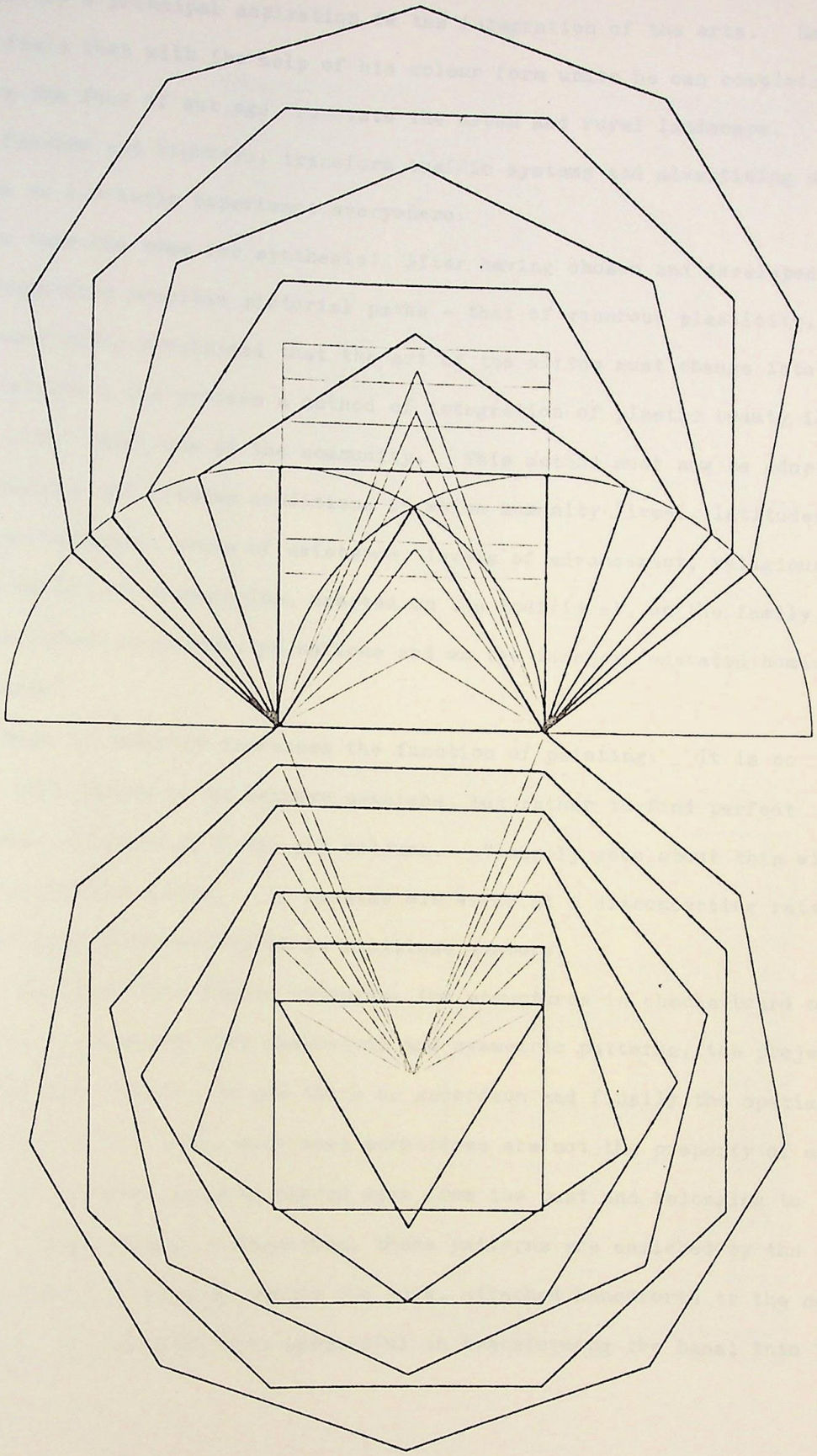
Ibn Sina (who is mentioned at the beginning of the chapter) believed in 'orders' of the intellect. He described them as each one leading to a lower order, the whole infused with the emanation of being and thus ordered by nature. He described how the first point, when acted upon by nature formed a line, which when acted upon formed a plane and then a body (3-D). However, he did not stop there, but seeing nature as movement and the soul as order, he implied that there was a fourth dimension to existence.



Ibn Sina believed that nature could be categorised as follows: hot and moist, cold and dry. He constructed a model according to how he believed natural forms developed. This model depicted a concentric spherical development away from the centre or source of life. He noted that as things moved away from the centre, movement decreased, and there was a gradual lessening of the hot and moist and the increasing of cold and dry. Forms like stones and crystals were cold and dry and therefore substantially inanimate but developed intensity towards the organic (which is hot and moist and therefore animate i.e. generating life) the nearer the original source it becomes. He saw the Earth as having fallen through successive levels, away from the source, and having cooled down in the process until the mineral solids fused at the lowest level..

When Ibn Sina uses the circle or square it si a clue to his vision of the universe. The circle expresses a continuum of movement and is therefore the most perfect of forms, the square is rigid and earthbound and therefore cold, but could return up through the layers of development back to the circle, via the pentagon and expanding polygons (Illustration 21).

We can see, therefore, how in the decorative Islamic patterns we can trace processes which offer an infinitely variable type of development. All phenomena are related through different levels, as matter is moved towards perfection (the source; the whole). When the governor of being (nature) fails temporarily to order and balance then what we call evil occurs. Man is a microcosm of this cosmological principal (Holism) not merely matter with life added. The Muslims developed a hypothesis to explain this phenomena. They believe that when man has understood the world of illusion (pattern) he travels towards the true reality until the heat and light of the source transform him. Physical disorder for him, can no longer occur. And because his soul, in its ordering capacity, illuminates areas of knowledge both past and future events, his knowledge and his being become part of the Whole!

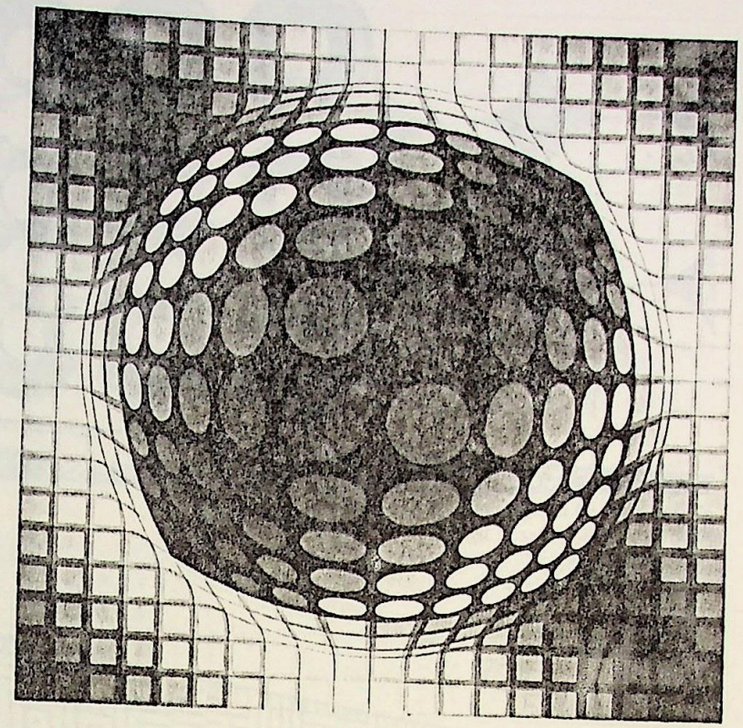


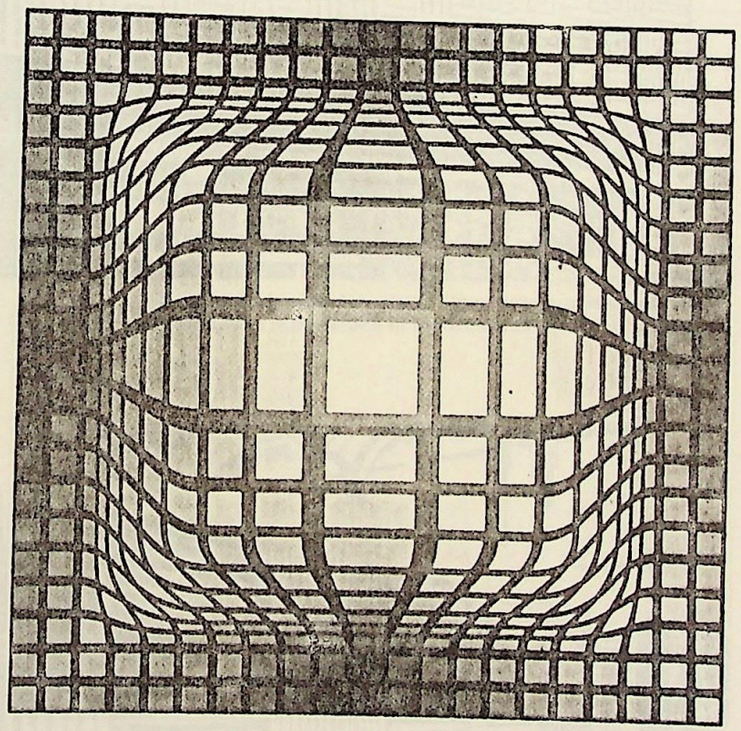
Vasarely's principal aspiration is the integration of the arts. He rightly feels that with the help of his colour form units he can completely transform the face of our age, renovate the urban and rural landscape, enliven facades and highways, transform traffic systems and advertising and introduce an aesthetic experience everywhere.

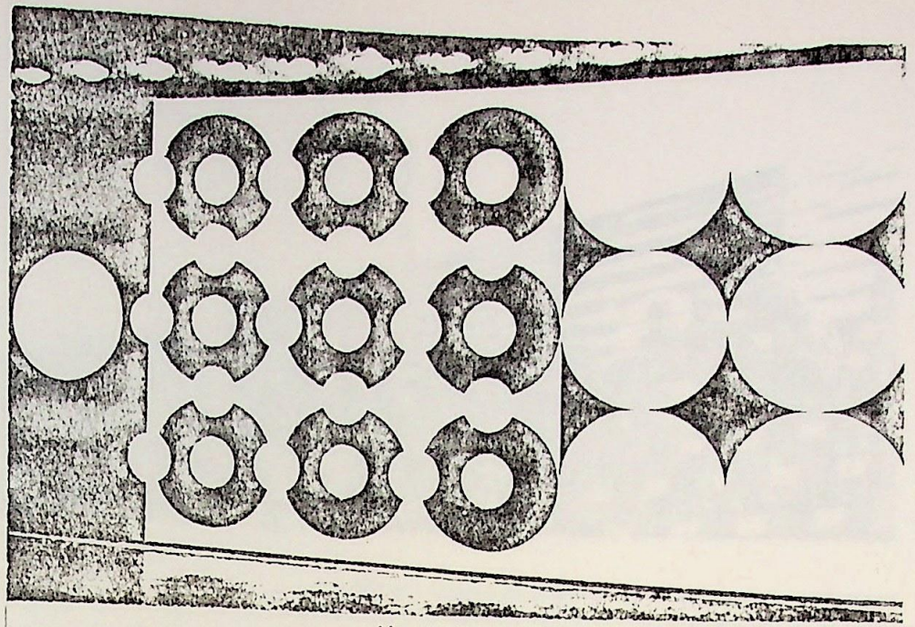
"The time has come for synthesis! After having chosen and developed - among innumerable possible pictorial paths - that of generous plasticity, after having wearilessly proclaimed that the art of the elites must change into a common treasure I can propose a method of integration of plastic beauty in the combined vital functions of the community. This method must now be adopted to the numerous and diverse conditions in which humanity lives; latitudes, landscapes, climates, means of existence, levels of advancement, religious, cultural, political acendencies, exerted on the individual, on the family, on groups, on ethnic groupings, on nations and on the immense federated human conglomerates!

The work of Vasarely expresses the function of painting. It is no longer to evoke moods or to express passions, but rather to find perfect balances and contrasts of forms and colours. Vasarely goes about this with a wholly scientific method. He creates his works at a disconcerting rate and disseminates their multiples in limitless numbers.

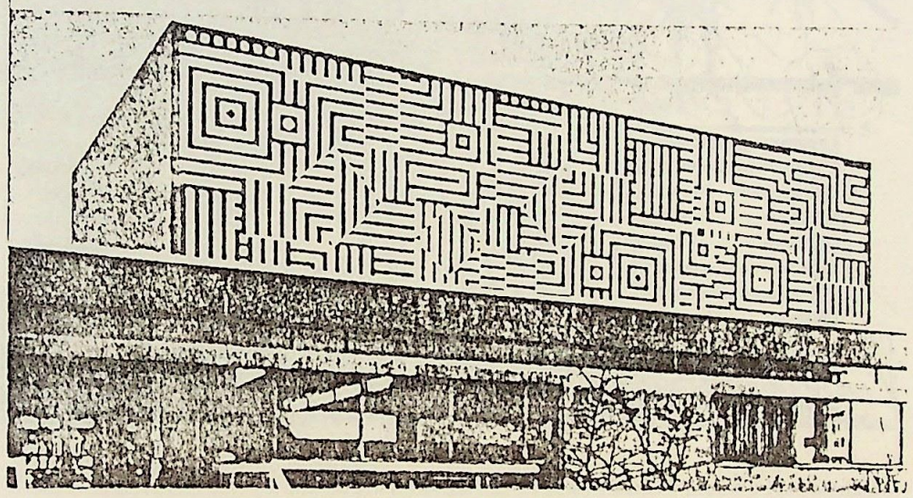
"The simple crossed linear networks, the structures in checkerboard or parametrics, in hexagons, the assymetric and symmetric patterns, the projecting and hollowed out reliefs, in saw tooth or accordeon and finally the spatial transcriptions of the above mentioned structures are not the property of an artist but the common patterns handed down from the past and belonging to everyone. Being points of departure, these patterns are enriched by the plastic invention of quality become the work, attached henceforth to the name of an artist, who has been more successful in transforming the banal into the phenomenal."



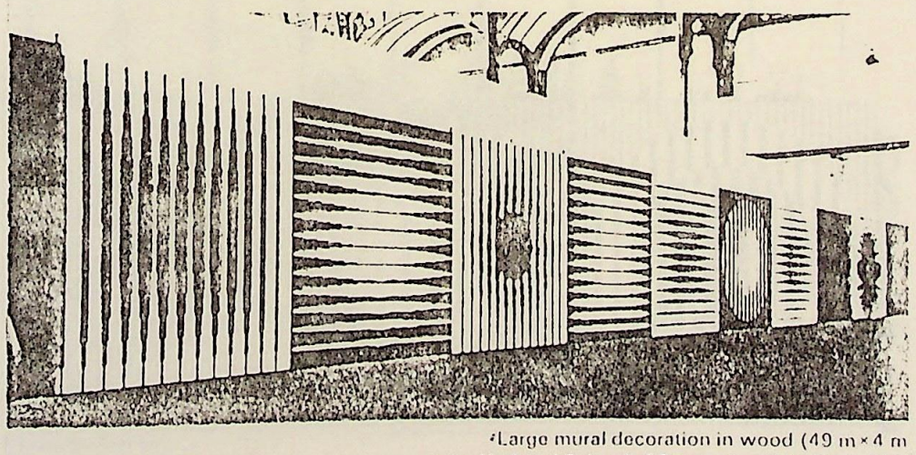




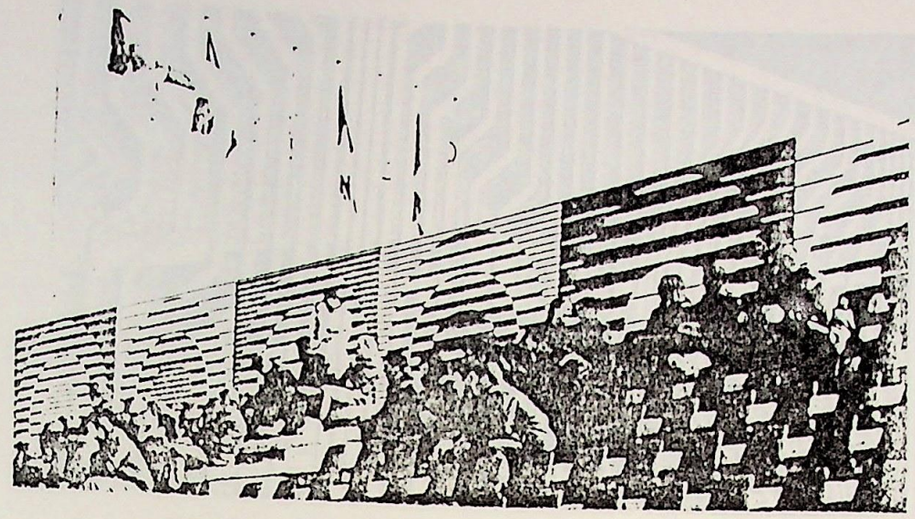
Mural integration (7 m × 4 m), Padagogische Hochschule
Essen (Germany) 196(



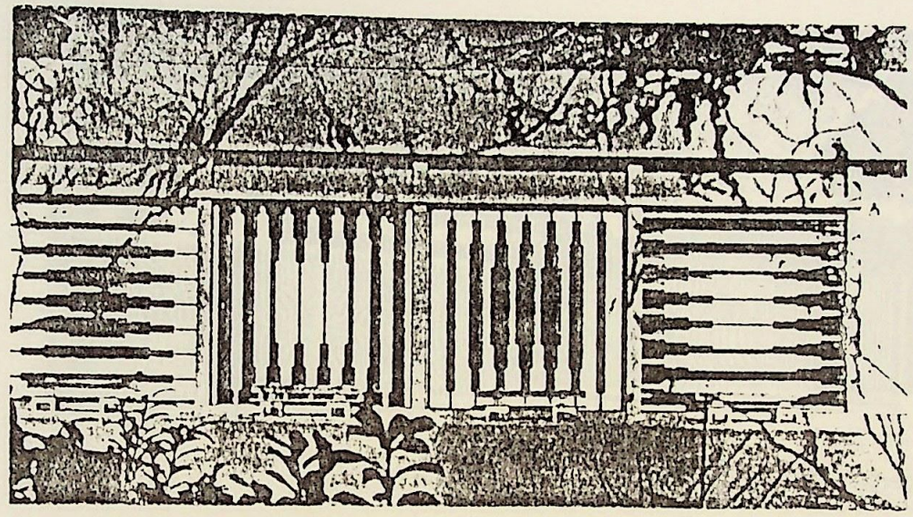
Black-and-white integration, in concrete-glass agglomerat(
(22 m × 7 m) on the main façade of the University of Bonn (Germany)



Large mural decoration in wood (49 m × 4 m
at the National School of Decorative Arts, Paris, 196



300 m² integration, in aluminium strips, on three surfaces of
the platforms of the Speed Ring (Grenoble, Olympic Games of 1968)



300 m² integration, in aluminium strips, on three surfaces of
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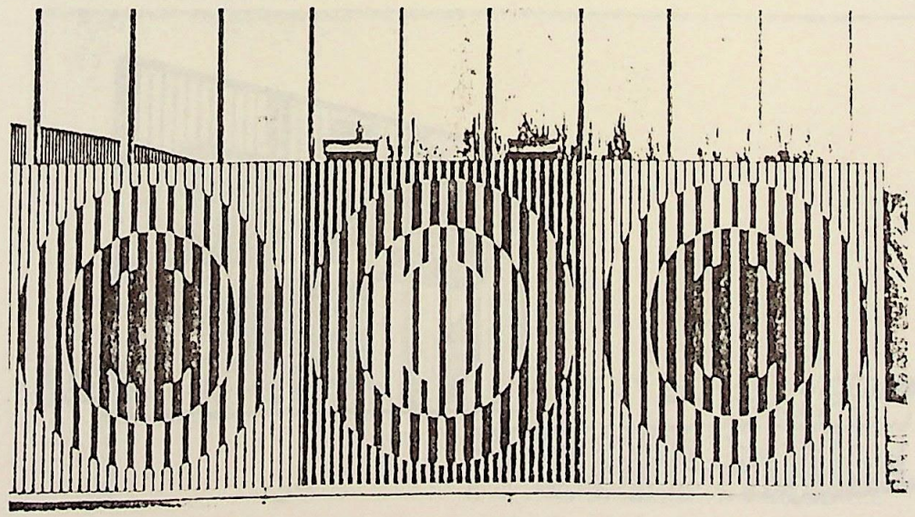
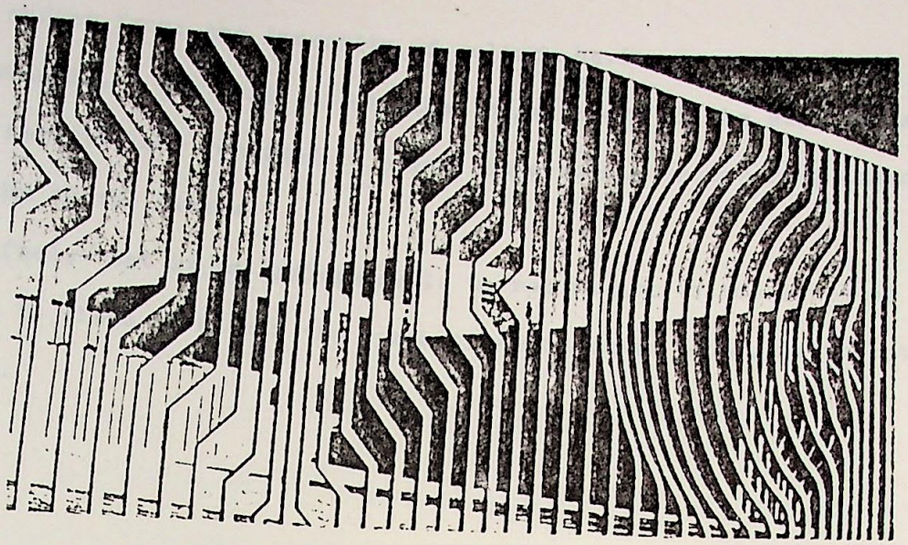
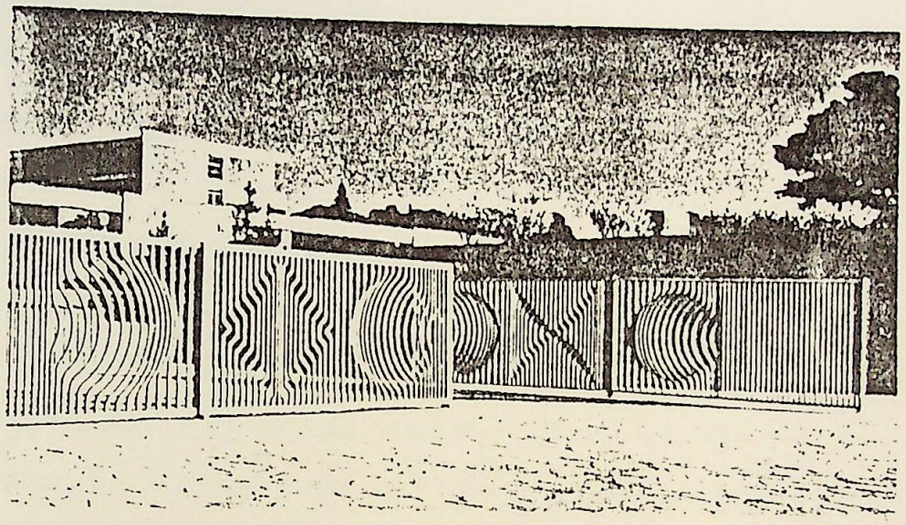
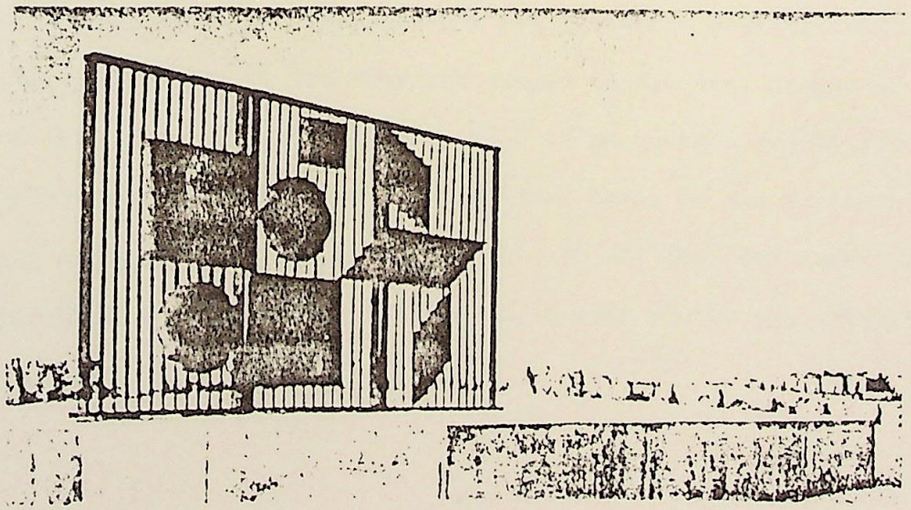




ntrance gate (executed in metal bars, 22m × 2.15 m) to the
aculty of Letters and Human Sciences, Montpellier (France) 1966



)eep kinetic work in steel strips (4.50 m × 2.50 m),
erusalem Museum (Israel), 1967



23 (iii).

"What we suffer from; the immensity of culture having become in part useless and unusable. The institution, the transmitters of the superannuated culture, have nevertheless remained in place, dangerously encumbering consciousnesses and paths to the future."

Vasarely feels that it is indispensable to return art to the level of daily life and to place it within the reach of every human being, in the street, in the factory.

CHAPTER 5

How the Child learns to perceive the World

THE INFANT

Until now, this thesis has discussed the use that Man makes of patterns in order to help him interpret his world. How and when does this ability begin? To answer these questions it is necessary to look to the infant for some clues.

By the time the child is born, the physiological structure of his eyes and optical nerves is fairly well developed (Ref: Chapter 4). Yet, what the child makes of the visual patterns that reach the brain is a very different thing from the adult. He can see a sudden light shining into his eyes and reacts to it by starting and blinking. In the first few weeks, his two eyes may look in different directions, but by the end of the second month he can focus both eyes accurately on objects dangling in front of him. If the object is moved he follows it with his eyes, at first in an unco-ordinated manner, but soon his eyes become more accurate. Thus it seems that very early on in life the child is capable of seeing, especially if the object is bright and moving. These things stand out in space and are therefore distinguishable from their background. But to him they are simply things that happen to him in the same way that something touches his skin, or he hears a sudden loud noise. He makes little distinction between sights, sounds, touch or the fullness or emptiness of his stomach. It is quite plausible to say that the infant is conscious of patterns of light, sounds, touches, tastes and so on, without any connection or any known causes.

However, it seems probable that within the first few months of his/her life, the infant becomes aware that some of these events occur at regular intervals, and that some of them will occur frequently together, at the same time and possibly in the same place or direction. For example it could be said that in the first few months of life, the infant regards his mother as a combination of patterns; touch, sight, sound and taste, patterns he begins to recognise and associate together because they occur regularly in conjunction with the pleasurable experience of feeding.

However, according to R.L. Fantz, in a paper called 'Pattern vision in young infants', the visual perception of simple patterns and discrimination between patterns begins to develop at a suprisingly early age. Fantz found that during the first few weeks of life, infants constantly looked longer at patterned surfaces, such as a draught-board, than at plain unpatterned. This would seem to reinforce the Islam theory that we are born with a need for and an affinity with pattern. In later experiments Fantz showed how the infant, when presented with two different types of pattern side-by-side, tended to look longer at one than the other. In the first week of life, a half-black, half-white surface was preferred to a plain surface and also to more complex patterns. Infants up to about seven weeks preferred to look at patterns of a low complexity; but after that they looked more at a sixty-four square checker pattern than at less complex ones. It appears that as the age increases, infants are able to observe more complex patterns and to scan their details and that it takes them longer to explore the complex patterns than the simpler ones.

There is also evidence that during the early months, infants begin to realise that certain sensory patterns belong together. Gesell in America and Plaget in Switzerland, observed that at about three months, infants look at the objects from which the sounds are coming - human beings and their voices for example, and appear to realise that they belong together. It was observed however, that this co-ordination was not present in the earlier stages of infancy.

The infant does not look at an object placed in the hand until he is at least three months old. But at four to five months infants look at a toy held in front of them, reach out and grasp them and then begin to manipulate them whilst still looking at them. These observations indicated that the infant realised that certain tactile and visual stimuli may belong together. This, therefore, is the real beginning of all experimentation and observation which children carry out to discover what the world and the objects in it are like.

THE TALKING CHILD

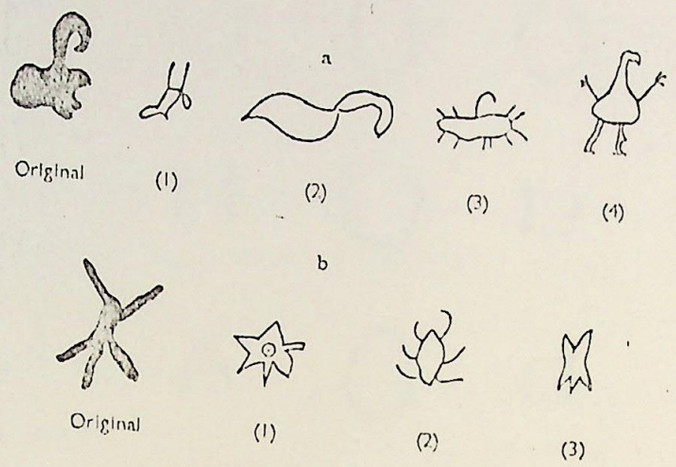
The ability to classify and order objects with their qualities and appearances, is greatly facilitated by the development of speech and language. For example, the infant usually accompanies his actions with babbling sounds. Eventually the child learns to associate a name with an object. Thus naming becomes a useful method in obtaining what he wants. He finds that everything has a name and so he tries to name everything he sees.

Again, the child may classify objects in accordance with the personal feelings they arouse. It often appears that the child attaches more importance to these emotional classifications than to the shape characteristics which appear more obvious to adults.

It is probable that the child learns more easily the shapes of familiar objects which are useful or interesting to him, and by the end of the first year is able to recognise their characteristics with sufficient clarity to allow him to identify them in different special positions. But he has little natural interest in meaningless shapes and indeed may often see them as representing real objects; i.e. the circle as a ball, the triangle as a roof of a house etc. Even older children show a strong tendency to see shapes as suggesting real objects. Thus children of nine to eleven years shown the original shape in Illustration 24 gave it the following names; (i) a boat with a stripe (ii) a duck on the water (iii) a water cock (iv) a bird.

Inability to perceive details of shape is shown in copying meaningless shapes. This is not entirely due to a lack of drawing skill. Piaget found that up to about four years of age, children tended to reproduce all closed shapes in a roughly circular form, whether they were circles, triangles or squares. They could distinguish, however, if one shape enclosed another.

The discrimination of more complex shapes develops slowly (Illustration 25). E.J. Gibson (1962) required children of four to eight years to match shapes against other quite similar shapes but containing small deviations.


a
Original
(1)
(2)
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b
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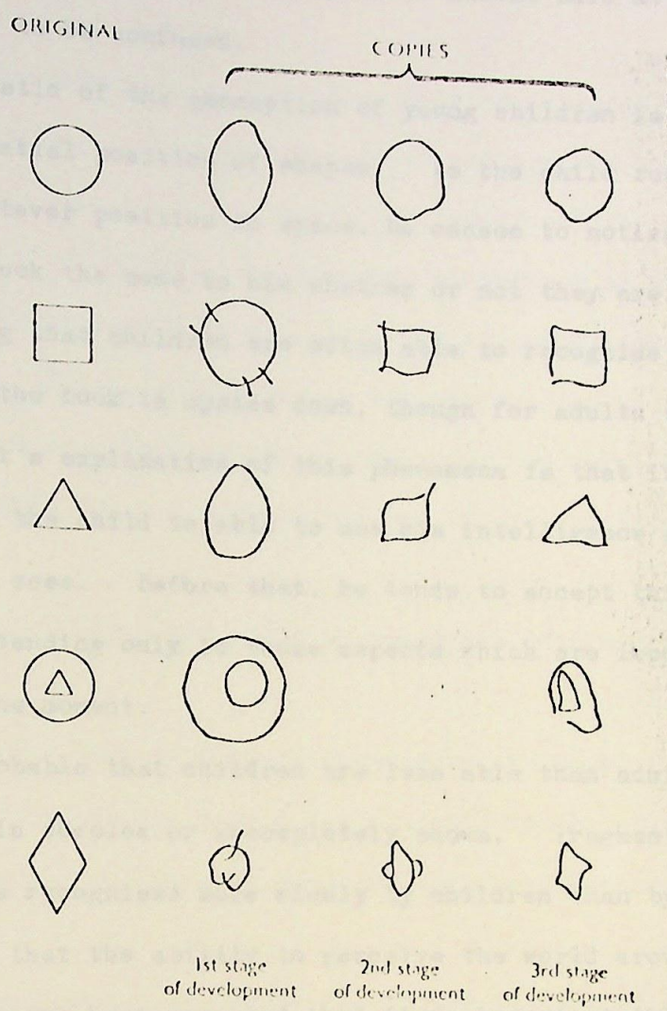

ORIGINAL
COPIES
1st stage of development
2nd stage of development
3rd stage of development

It was found that errors in matching decreased rapidly between four and eight years. Thus, there were few confusions between straight and broken lines; confusions between straight and curved lines and between rotated and reversed shapes were frequent at four years but decreased to almost zero at eight years. Tilted shapes continued to be confused.

Another characteristic of the perception of young children is their apparent lack of attention to spatial position of shapes. As the child recognises and identifies objects, whatever position in space, he ceases to notice what position they are in, and they look the same to him whether or not they are upside down. Thus it is not suprising that children are often able to recognise pictures in a book, as easily when the book is upside down, though for adults this is often very difficult. Piaget's explanation of this phenomena is that it is only as he grows older, that the child is able to use his intelligence actively in reasoning about what he sees. Before that, he tends to accept things passively, as they come to him, attending only to those aspects which are important and interesting to him at the moment.

Again, it seems probable that children are less able than adults to guess what a shape is, if it is complex or incompletely shown. Fragmented pictures of objects are as a rule recognised more slowly by children than by adults.

So it can be seen, that the ability to perceive the world around us can and often is a slow, painful business, and that it is important that this difference is imperative if they are to develop a stable and 'whole-sense' concept of reality when they, in their turn, reach adulthood.

CHAPTER 6

Pattern Making for Children

The making and understanding of pattern should be an integral part of every child's basic education. An understanding of pattern can enable a child to interrelate ideas and concepts concerning himself and the world about him. If a child is aware of pattern, (having been encouraged to make pattern) then he has crossed the first hurdle in his quest for an understanding of what existence is all about. It will be his key to his exploration of the world. Our knowledge of the world in reinforced by literacy and numeracy, and what then is language and mathematics but complex chains and arrangements of interrelating patterns.

It is important that children are given an awareness of the origins of pattern making.

When did it all start? What kind of patterns were produced? In this final chapter I am attempting to put before the reader a series of starting points which could be developed into more detailed and comprehensive lessons in pattern making.

It is not enough that a child is simply taught how to make pattern. He should understand why he is making it. He should be shown that pattern has always existed and always will exist while man has creative faculties. Pattern is part of his world, and unless a child is made aware of his heritage, his own pattern making will appear barren and futile.

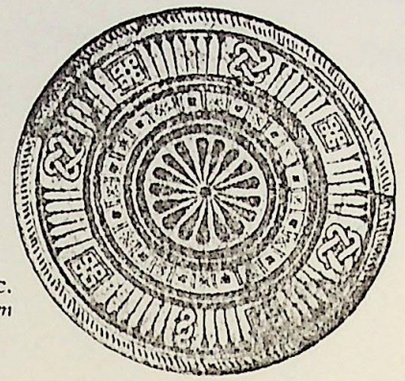
Patterns come about as a natural outgrowth of repetition in every case the lines of its construction may be traced. Geometry is the basic source of all pattern making. Geometric pattern grew, of course, out of methods of primitive workmanship. In fact, long before pre-historic Man ever made his life-like paintings of animals on the walls of caves in France and Spain,

others had carved lines into geometrical forms on horn and bone. In the Moravian Museum in Brno there is a mammoth tusk 25,000 years old which is engraved with these patterns in the form of a woman (Illustration 26).

Later, as civilization developed, geometrical pattern was put to more use. It was used in weaving, on pottery, on weapons and armour, in jewellery, in the decoration of clothing and architecture. It is found in every kind of society and nation; in Stone Age tribes, Classical Athens, among the Eskimos and South Sea islanders, on Chinese and African native works of art. It stretches around the world as well as into mans remote past.

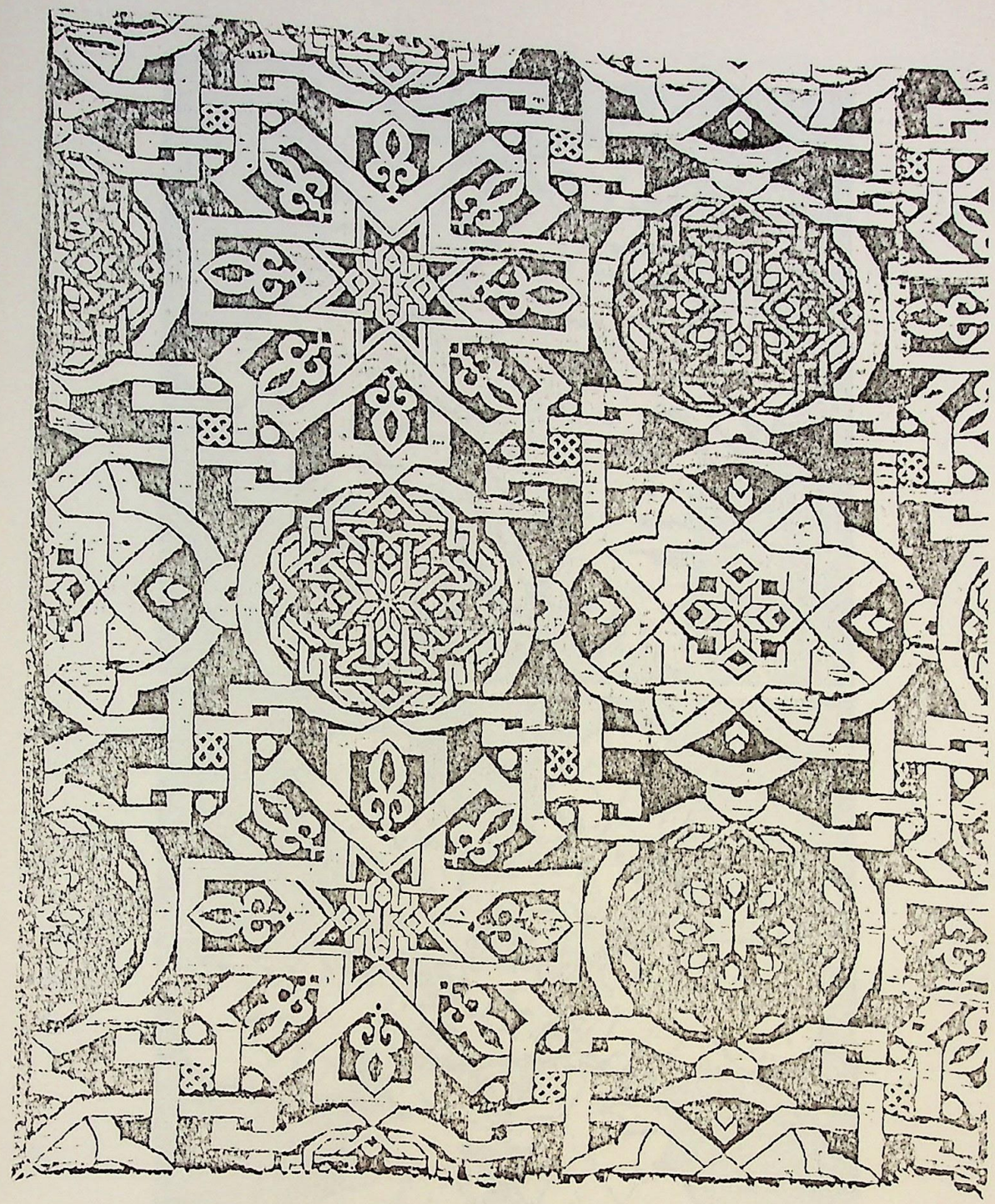
This does not mean that the use of geometrical pattern has been completely exhausted. One of the surprising facts about simple geometrical figures is the seemingly limitless variety of shapes which can be made from them. New uses for these shapes is constantly being discovered. Television provides a fresh example of a new use of geometrical pattern; moving translucent cubes and prisms in front of the camera create complex and ever-changing geometrical patterns on our screens. This technique is familiar to viewers of the popular weekly programme 'Top of the Pops'. In nature, the infinite variety of pattern is overwhelming when contemplated; the snow crystal - which is based on the hexagon, the daisies on a lawn, pebbles on a beach, dead leaves on a path, the branches of the trees, naked twigs against the sky, the clouds that mottle the blue sky by day, the stars that appear at night, all make perpetual pattern, all demonstrate the possibilities of invention. The grain of wood, the veining of marble, the speckling of granite, rocks are covered by shellfish clustering into pattern, the surface of the sea is rippled as the sandy shore is rippled, footprints as we walk, even our breath on a window pane crystallises into pattern. Take any form at random, and repeat it at regular intervals, and whether it is wanted or not we have pattern!

Geometric pattern making is a form of drawing which anyone who is able to use a ruler and compass can enjoy. Nevertheless this does not prevent the work from being original and creative. These simple instruments can be considered as the tools of creation.

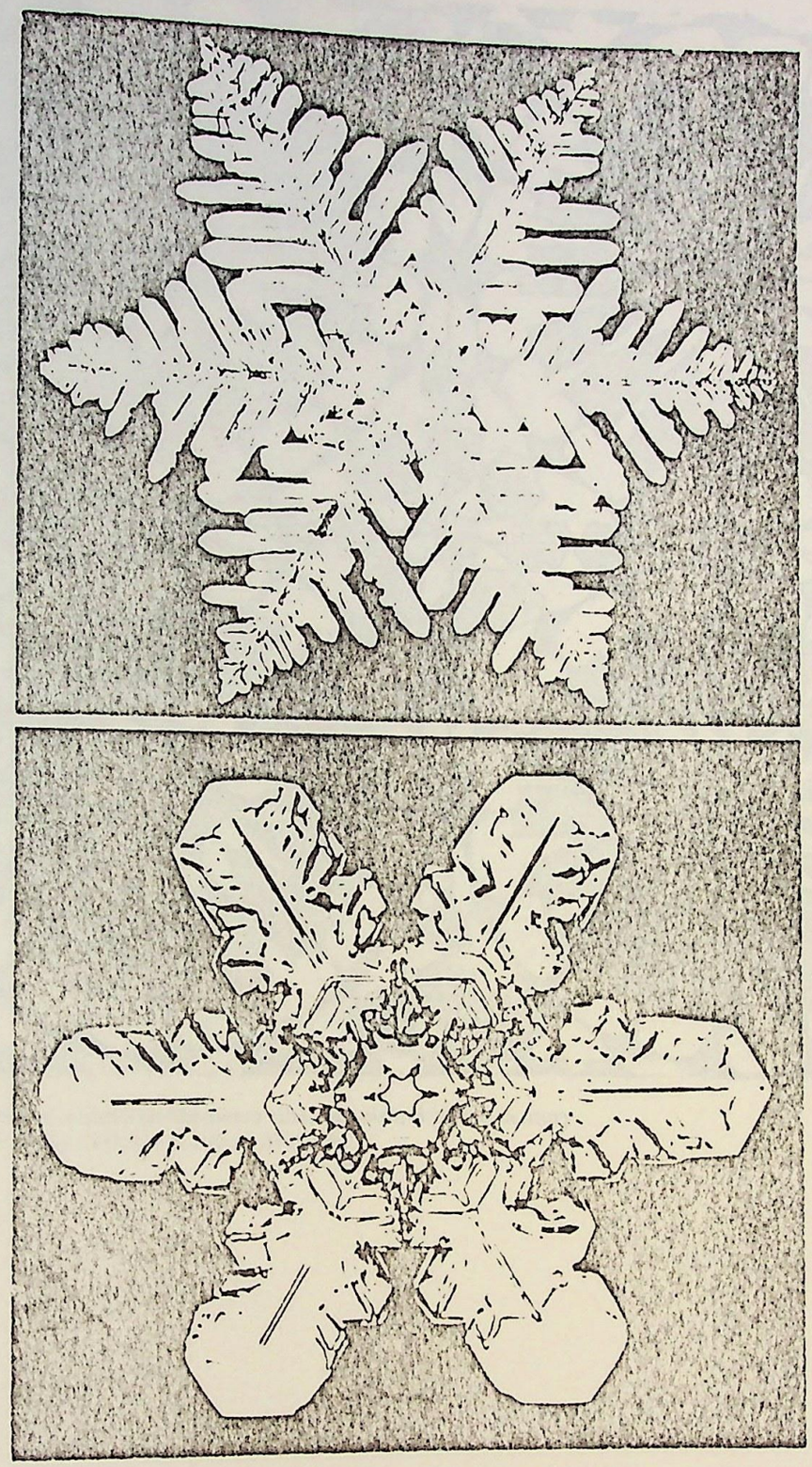


Dish from Camirus, 650–600 B.C.
By courtesy of the British Museum

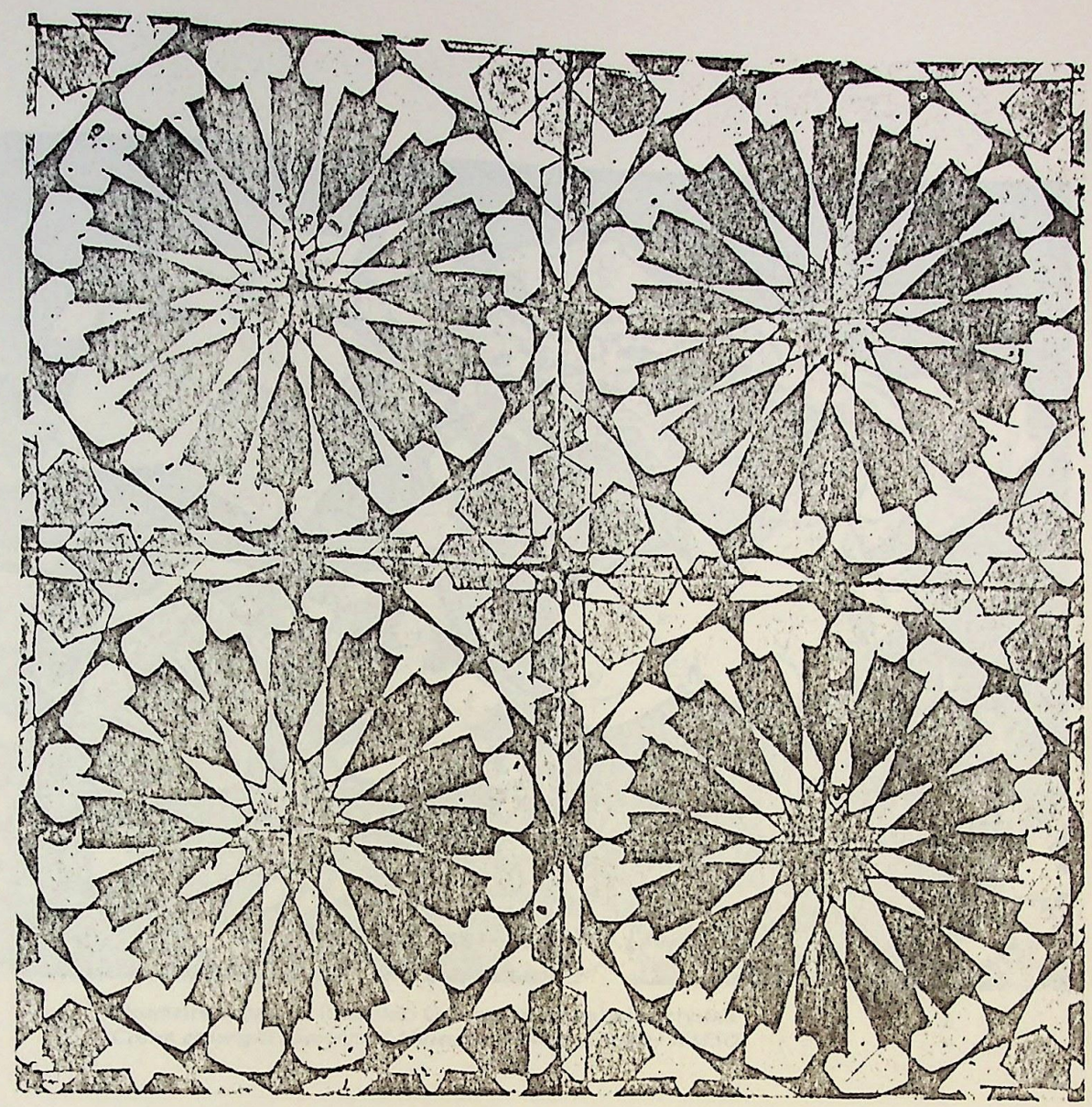
Line patterns are easy but interesting to draw. Those illustrated are based on the square, but line patterns can be based on any plane figure. Lines can also vary in thickness spacing and type. There are really only two kinds of lines, straight and curved. From these, all other kinds of lines are constructed, But as Goya said once - "What lines! I see no lines". Berger in 'Ways of Seeing' (1972) also says, "The relationship between what we see and what we know is never settled. Each evening we <u>see</u> the sun set. We <u>know</u> that the earth is turning away from it. Yet the knowledge, the explanation, never quite fits the sight."



Silk tissue, Spanish, fifteenth century
By courtesy of the Victoria & Albert Museum

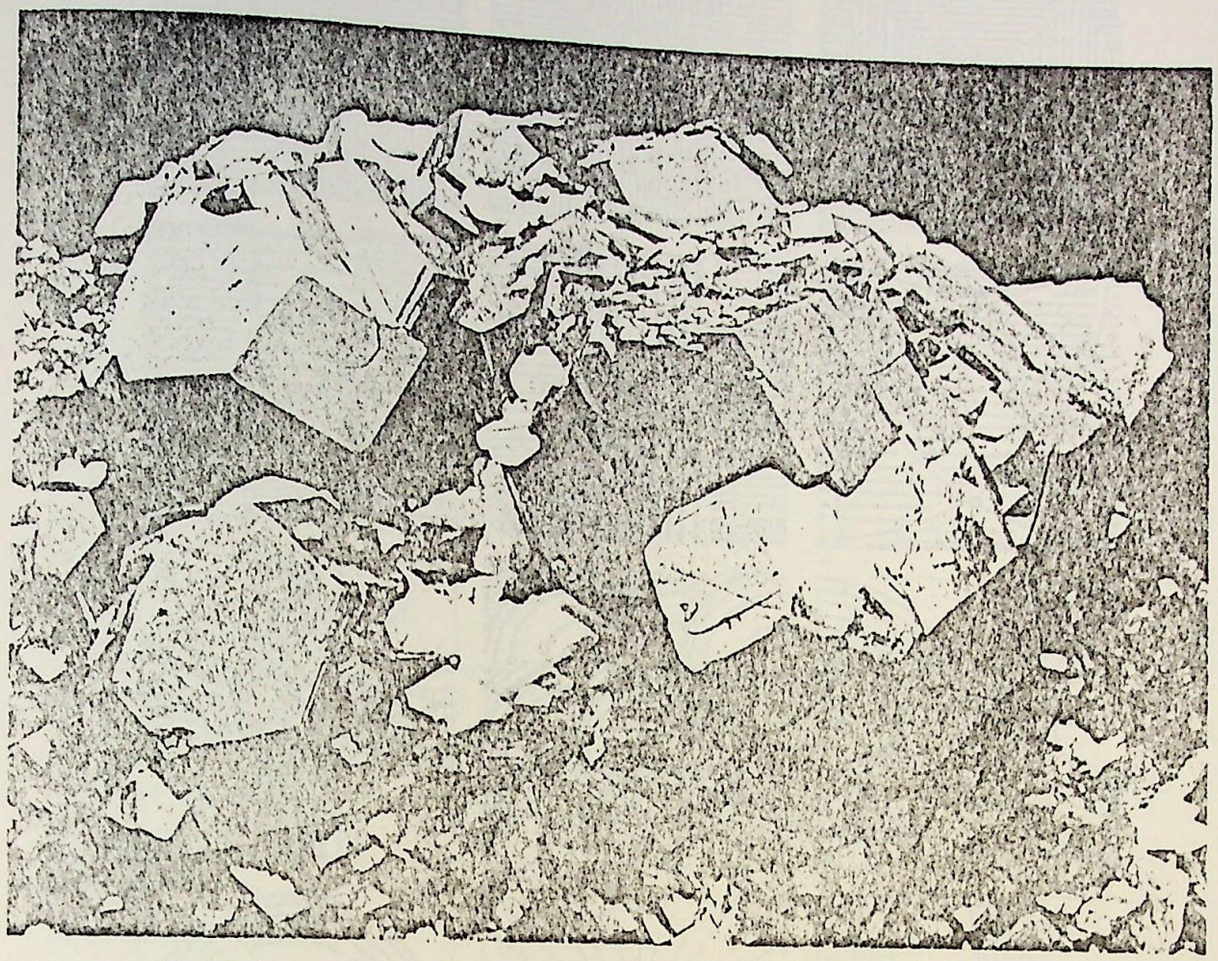


Geometrical pattern in nature: snow crystals

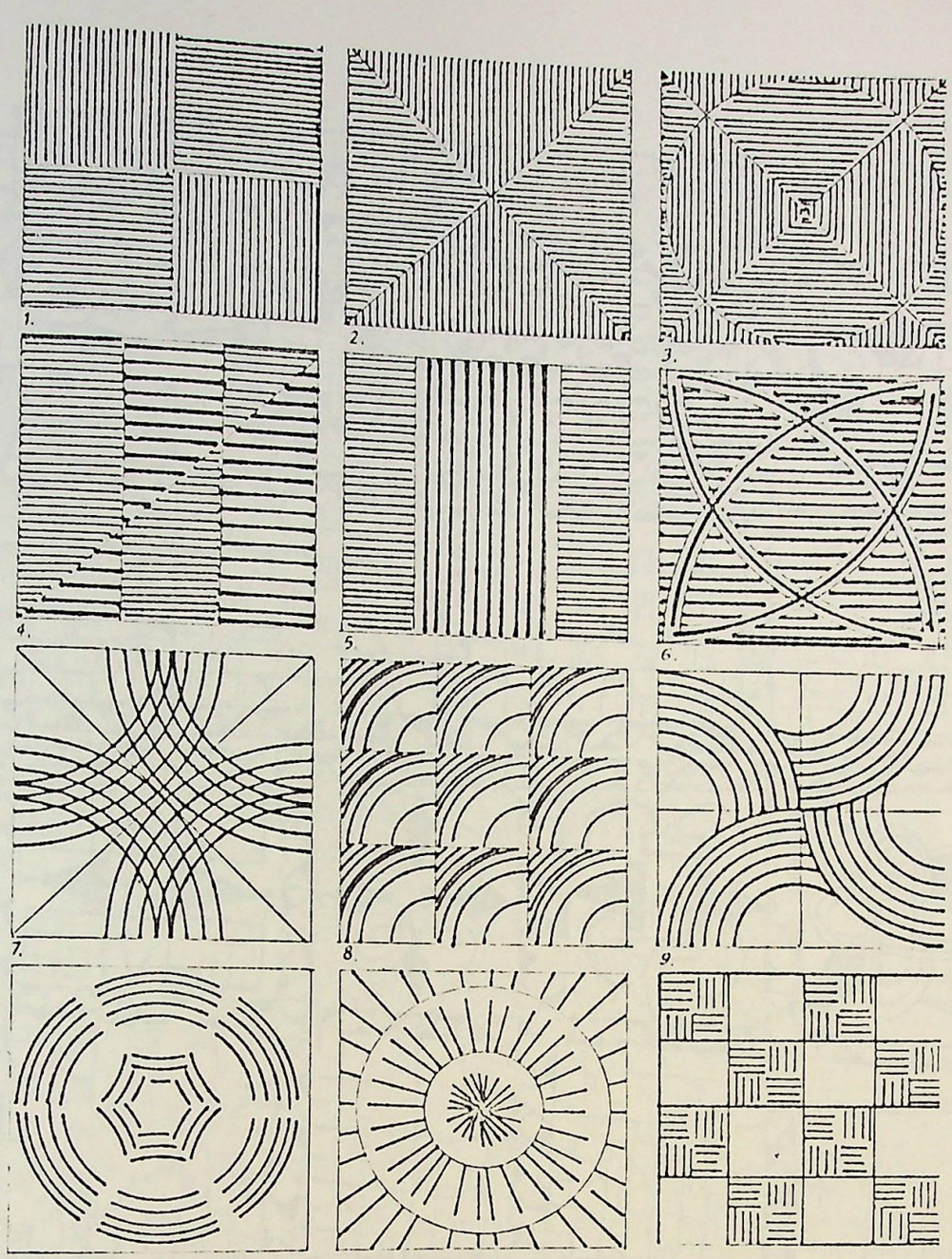


From a panel of sixteen earthenware tiles, Spanish, fifteenth century
By courtesy of the Victoria & Albert Museum

29.

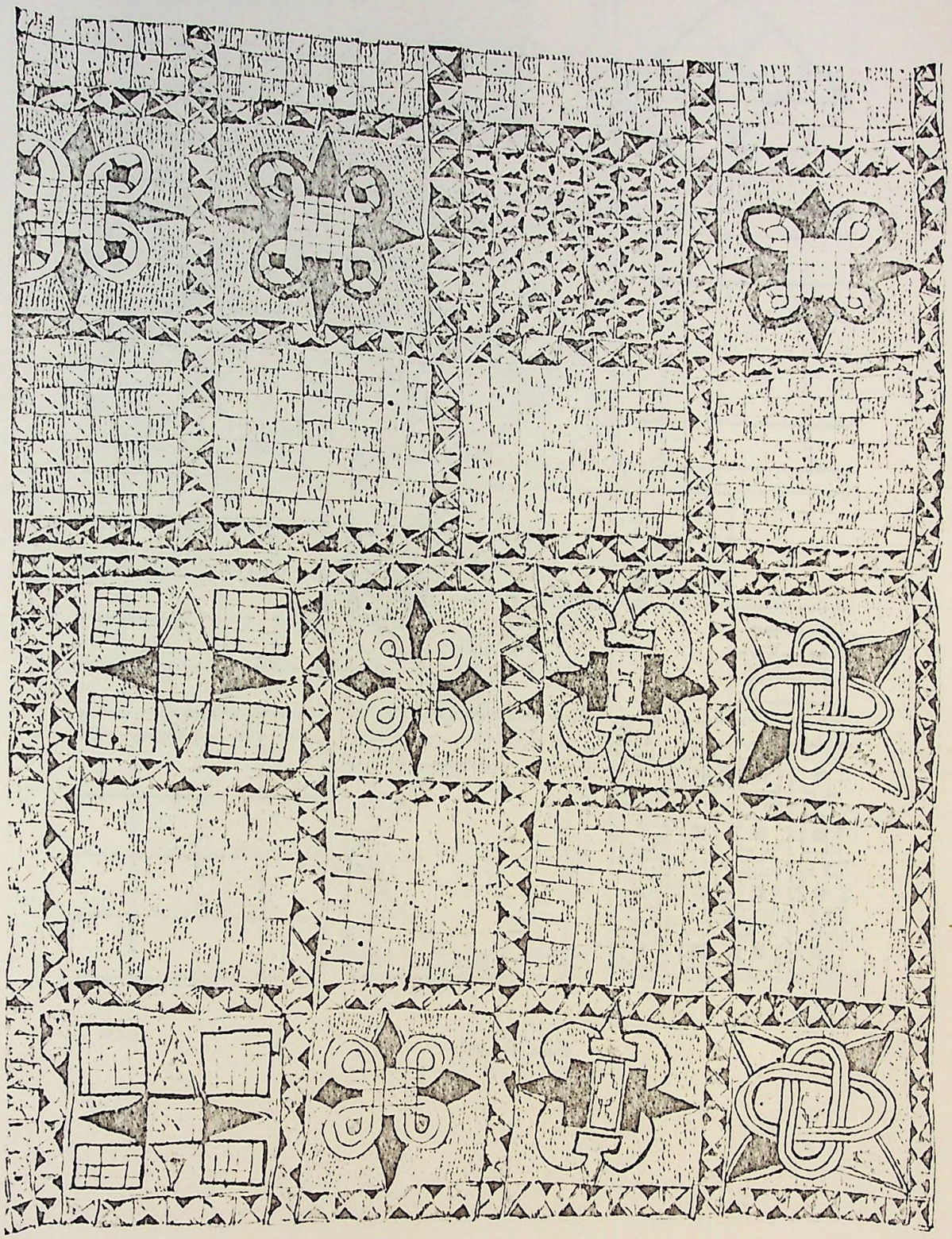


Geometrical pattern in nature: Galena, cubo-octahedral crystals
Crown copyright (Geological Museum – Geological Survey HMSO)

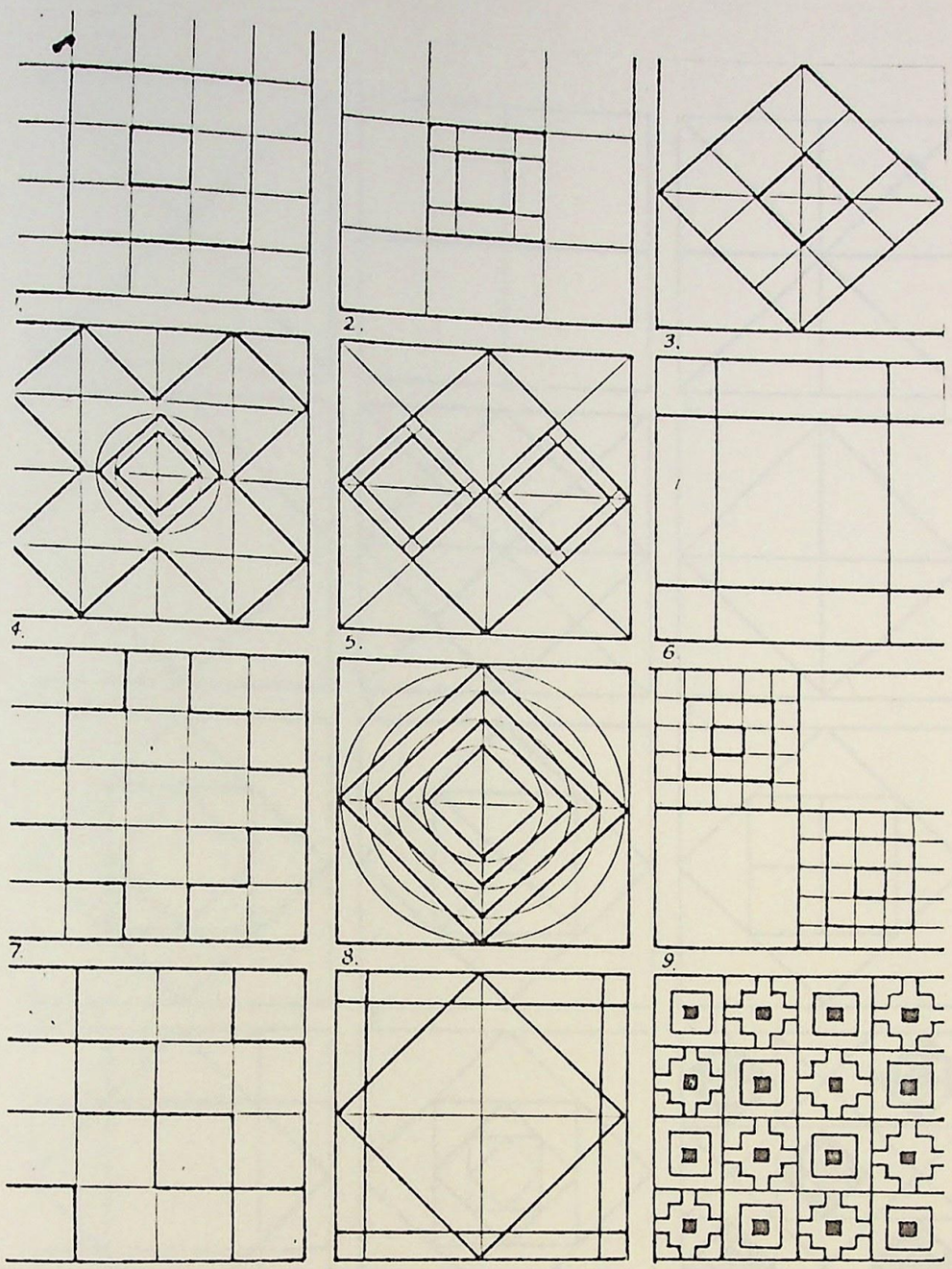


31.

Line Patterns

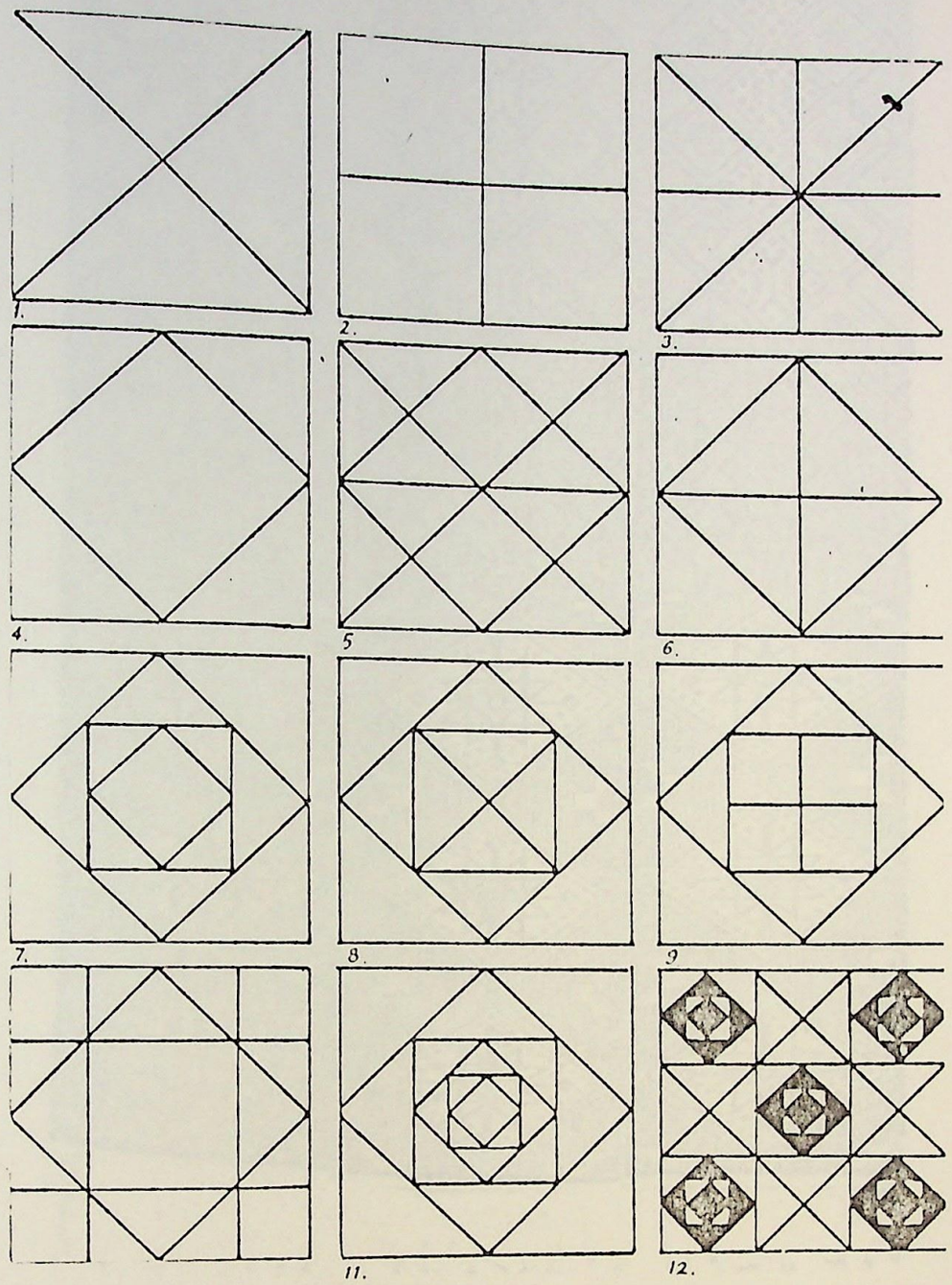


Ghanaian cloth with a painted design
By courtesy of the British Museum

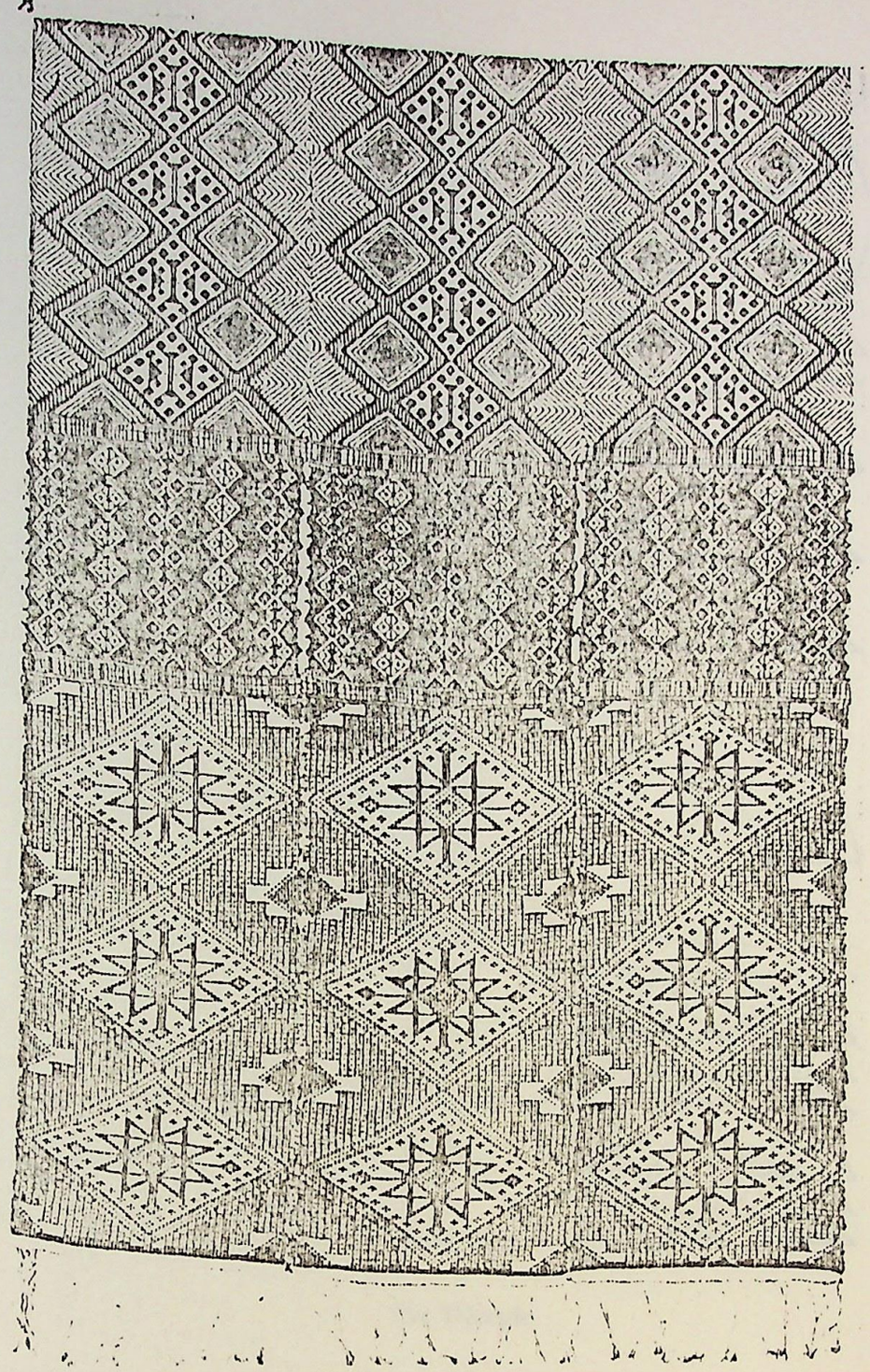


33.

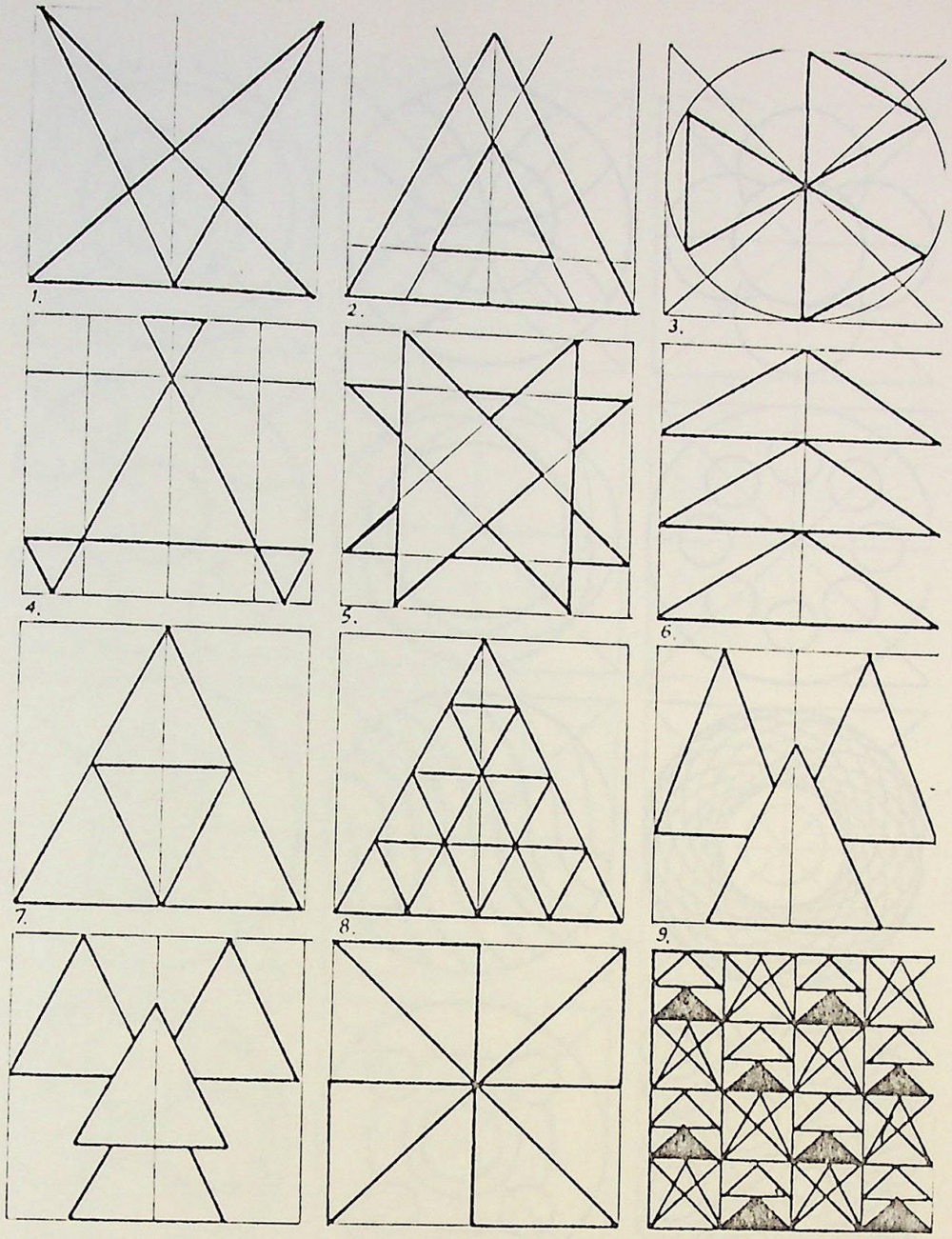
The Square



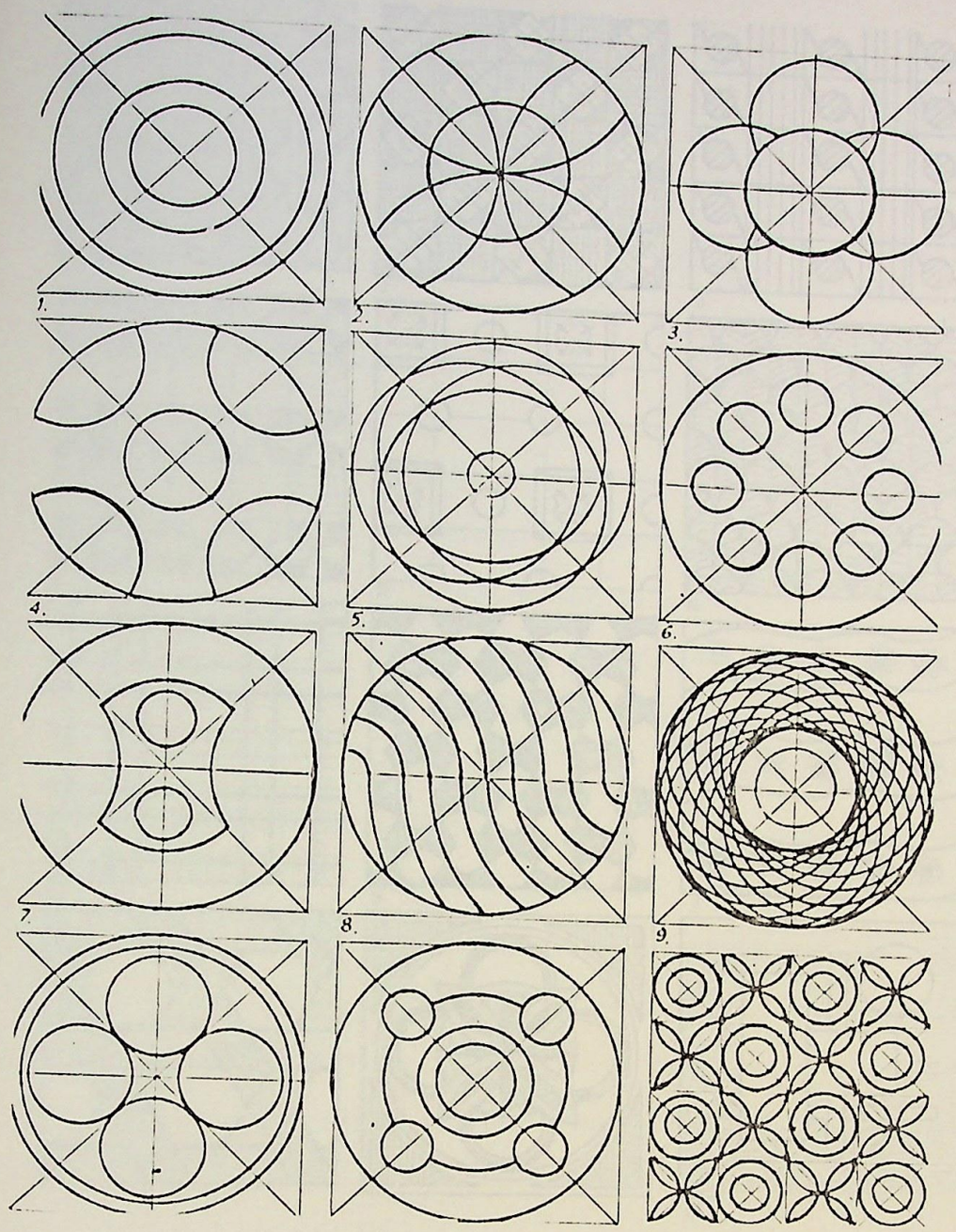
Some natural divisions of the square



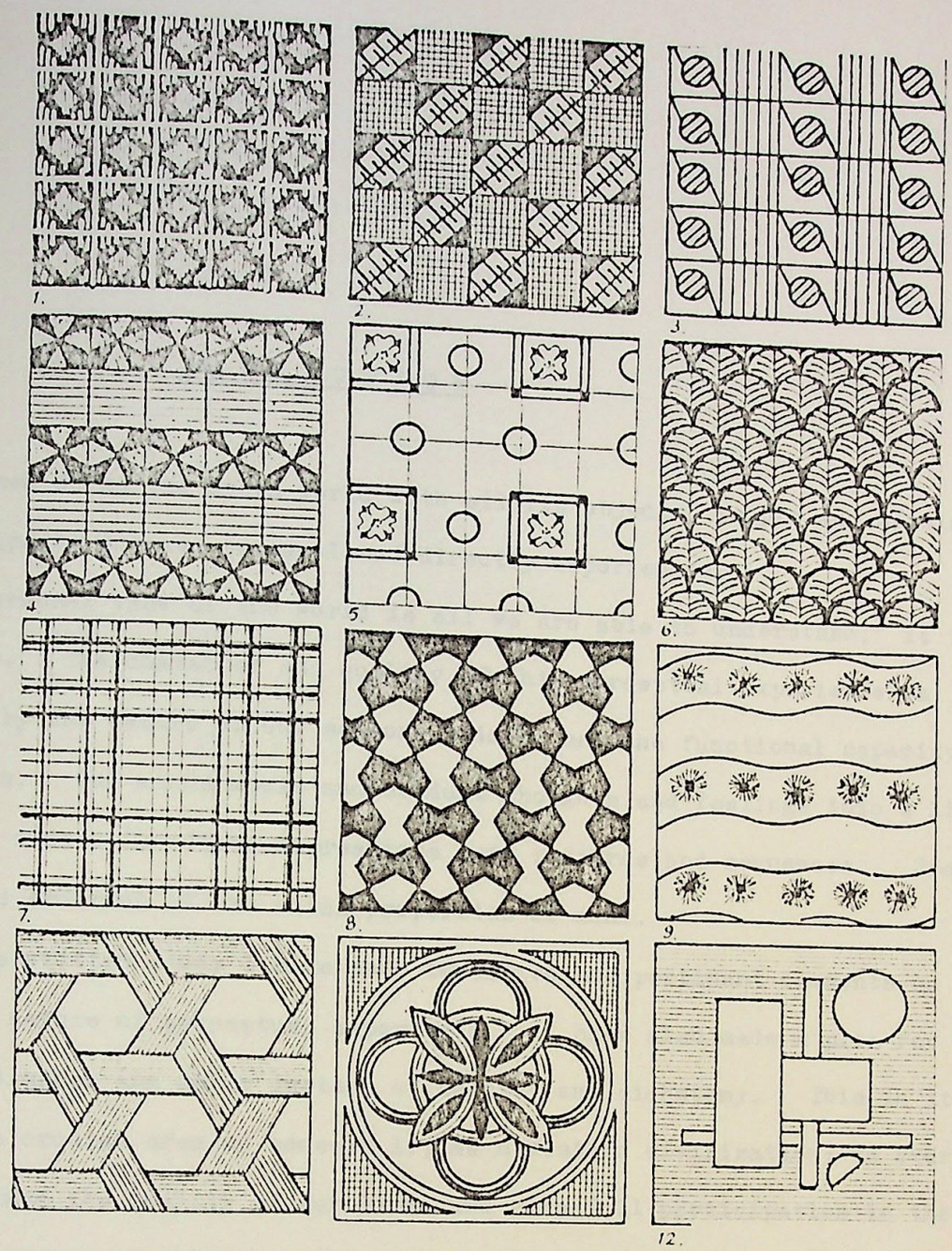
Black and white woven textile of cotton from Upper Senegal
By courtesy of the British Museum



The Triangle



The Circle



Some types of pattern

CONCLUSION

For each of us the known world with all its objects, people and special relationships is unique, personal and directly experienced.

Our personal view of the world is all we are able to understand; it is our reality. The character and quality of this perceptual experience is determined by the nature of our sensory stimuli and the functional capacity of our brain. Our minds mould and conduct thoughts and feelings into a life style which orders immediate impressions into patterns and sequences. Scanning the data and ordering it are vital properties of mind.

In this written study I have made tentative but pertinent comments on the quality and nature of perceptual experience. I have also made a plea for a need for wholeness and unity instead of duality and dichotomy. This in itself represents a crucial area of concern if, as a Western civilization, we ever hope to improve the quality of our lives and gain full participation in the events which are controlling our lives.

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