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ROCHESTER INSTITUTE OF TECHNOLOGY

A Thesis Submitted to the Faculty of
The College of Fine and Applied Arts
in Candidacy for the Degree of
MASTER OF FINE ARTS

GEOMETRIC ABSTRACT DESIGN

by

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August, 1983

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for my father

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I. INTRODUCTION

This thesis is a presentation of four grid designs. They are woven on a multi-harness loom and utilize a strip-weaving technique. The designs are based on a series of colors, and consist of three grid elements; the line, the square and the rectangle. Through the variation of colors and the repeated arrangement of patterns consisting of the aforementioned grid elements, my intention is to have a form of geometric abstraction result from my designs.

Geometric abstraction is a form of purely abstract art which is mainly concerned with geometric elements. These elements include the circle, square, triangle, and also geometric volumes.¹ Among the many geometric elements and volumes existing in nature and the human environment, those forms with a mathematical exactitude and precision are of interest to me. These forms include the square and the circle and

are of interest because they reflect an image of the world and aspects of our daily life.

I am attracted by the grids which appeared in geometric abstract painting, sculpture, and architecture that was done during the years 1917 through 1939. The art movements which did these kinds of works were made up of small groups of artists, designers and architects and were usually centered around either a particular journal or art school. Generally, the aim of these movements was to achieve a complete abstraction by means of universal geometric concepts. In doing so, they were working towards a change in the cultural environment of mankind and the redefining of the role of modern art. The two most important of the groups who emphasized geometric abstract art during this period, were the Dutch group, De Stijl, named after an art journal, and the Bauhaus, which was located in Germany. These two groups are discussed in further detail in Chapter II.

Throughout history, people have used elementary symbols such as the circle, square and line to communicate with each other or express

their inner feelings.² Of these elementary symbols, those geometric elements of mathematical precision were the ones commonly found in the modern architecture of the early Twentieth Century. In particular, they were found in the orderly arrangement of the buildings. My woven grid designs are inspired by these forms, and therefore, are mainly concerned with the horizontal-vertical scheme of the aforementioned grid elements. The grid elements are arranged in an orderly manner to express a precise, clear geometry. It is my belief that geometric patterns done with order and regulation can evoke seriousness, greatness, and beauty, in the subconscious of our mind. The aim of such designs is to seek out our innermost feelings through a simple but orderly pattern of geometry.

In the field of textiles, weaving is one way to create fabrics of various structures and textures. I chose to use loom-controlled weaving techniques. These techniques are particularly suitable for a consistent repetition of simple grid elements. Therefore, my four pieces have been woven on a multi-harness loom and are done in

either double weave or 8 harness satin weave. Both of these fabric structures are loom-controlled. To increase the variation of the grid designs, several strips woven individually, have been combined in each piece. The weaving techniques and materials used are briefly discussed in Chapter III.

In view of the above discussion, it is then quite natural to express a form of geometric abstraction by combining weaving techniques and grid system designs. The presented works are one such combined effort. Each one of the four works is a multi-colored experience that expresses a form of geometric abstraction which has been inspired by modern, architectural structure. The four works, Venetian Blind, Is There A Square?, While Morning Is Broken and City Landscape, are visually presented and discussed in further detail in Chapter IV.

II. HISTORIC REFERENCE OF GEOMETRIC ABSTRACTION

Aesthetic aims are often deeply involved with a search for ultimate reality, understanding of nature and psychic intuition.³ As Naum Gabo has said, "The search for perfection in the constructive sense is not a state but process; not an ultimate goal but a direction."⁴ In the early Twentieth Century, the direction toward aesthetic perfection was to abandon the imitation of natural appearance. To the abstract artists, resemblance to nature was at best superfluous and at worst, distracting. They were, instead, trying to seek out forces hidden in nature and to realize psychic effects by penetrating more profoundly than naturalistic art ever was able to do.

Geometric abstraction is one form of pure abstraction and is mainly concerned with geometric elements and primary colors. They are often arranged architecturally and suggest geometry. Geometric abstraction often insists on an order and control, not to banish feeling, but to make it

significant, as Josef Albers, for example, consistently did.⁵

Geometric abstract art was not initiated by a single pioneer, but by many small groups. Among the many groups and/or schools with purely geometric concepts, the Bauhaus and De Stijl groups were of special importance to modern art and architecture.

A. DE STIJL

De Stijl, one of the most influential groups of modern art, was formed in Holland in 1917. It involved a collaboration of painters, sculptors and architects and revolved around the magazine, De Stijl. This was founded by Theo van Doesburg, a Dutch painter, sculptor, architect, poet and theorist; a man as versatile as any figure of the Renaissance. All of the masters, especially van Doesburg, Mondrian, van der Leek and Oud, derived a spiritual nature from this period.

The artistic creed, which the members of De Stijl pledged to observe, was an absolute

adherence to abstraction; i.e. a complete elimination of the entire sphere of direct observation of nature. They restricted the means of plastic expression to the straight line and right angle, and to the three primary colors (red, blue, yellow) and three non-colors (black, white, grey). In other words, two fundamental elements in the work of De Stijl were the rectangular form and the primary colors.

They saw, in the consciousness of their period, a tendency towards collectiveness, depersonalization and mathematical exactitude and precision. Based on this, the members of De Stijl tried to establish a new role of art. They felt a need for a universal plastic language based on elementary laws; the laws of balance and harmony. Piet Mondrian, one of the more influential and well-known members of De Stijl, found in the reduction of Cubism a formula which allowed him to look into the inner substance of things. He reduced all physical and mental actions to a basic law of contradiction; that of the vertical-horizontal line.

De Stijl changed the environment of modern man and left its mark on numerous spheres of design and composition. The influence of De Stijl can be traced to all fields of art, whether it be painting, sculpture, craft work, architecture or graphic design. The art of De Stijl later dominated the Abstraction-Creation⁶, which in Paris, in the early thirties, proclaimed a renaissance of abstract art.

B. THE BAUHAUS

The Bauhaus, founded by the architect, Walter Gropius, in Weimar, Germany, 1919, was the result of the various socio-political currents which existed after the First World War. The school set out to train a new generation of architects and designers to be able to accept and anticipate the demands of the Twentieth Century. Many contemporary artists, like Itten, Feininger, Klee, Kandinsky and Moholy-Nagy joined the Bauhaus as professors and collaborated toward the ideal of creating type-forms that would meet all technical, aesthetic and commercial demands of the Twentieth

Century. The Bauhaus, in a sense, provided the turning point in the evolution of a philosophy oriented towards civilization and technology. During the fourteen years of its existence, the Bauhaus contributed, more than any other organization, to the reconciliation between man and his man-made environment.

The influence of De Stijl, largely brought on by Theo van Doesburg, gave rise to a veritable revolution in the character of the Bauhaus. The character transformed from the mysticism and transcendentalism of Expressionism to a clearer, more disciplined and consciously developed style of art. It was, however, Moholy-Nagy's personal interpretation of the constructivist attitude, which contributed to the emergence of a recognizable Bauhaus style: that which was mainly based on the cube, rectangle and circle. He believed that mathematically harmonious shapes, executed precisely, were filled with emotional quality and represented the perfect balance between feeling and intellect.

Although the Bauhaus was greatly influenced by De Stijl and the constructivism of Russia, it

went far beyond them, by accepting the functionalism of design. The Bauhaus tried to utilize all of its resources; technical, scientific, intellectual and aesthetic, to create an environment which would satisfy man's spiritual as well as material needs. Bauhaus design can be summarized as an eclectic fusion of abstract geometric elements with the new ideal of utilitarian functionalism.

As Moholy-Nagy wrote, "not the product, but man, is the end in view".⁷ It is this essential humanism, based on an attempt to understand man's psychological as well as his physical needs, that has been the foremost contribution of the Bauhaus to modern design and architecture. As Gropius once described its aim, "the wholeness of its approach has helped to restore the architecture and design of today as a social art".⁸

III. WEAVING TECHNIQUES AND MATERIALS

Two weaving techniques were used to make these pieces. They were double weave and satin weave and their use depended on the desired characteristics of each work.

A satin weave, in general, uses either warp or weft floats. A float is where one yarn of a system (warp or weft) passes over or under all but one yarn of the opposite system. There is only one interlocking point in a repeat. Weft face satin fabrics are smooth, have a lustrous effect and give a bright tone to the colors. Venetian Blind was woven on an 8 harness loom, with a weft face satin weave, and made use of these particular effects.

The fabrics woven in double weave have two separate layers which are locked together in any number of places on both sides of the fabric. The exchange of top and bottom layers are, therefore, freely accomplished wherever the design warrants it. For example, many patterns of stripes,

checks, spots or even elaborate figures can be woven by this method. Double weave technique is preferred when the design consists of a simple and condensed motif, whose colors appear either on the face or back in any given area. In this regard, double weave is especially suitable for loom-controlled grid patterns. It has great potential for crisp delineation, systematic color-play and positive-negative surprises from one face to the other. I have chosen to use this technique for the other three works, in light of its characteristics involving grid patterns.

Design and color in weaving are, in general, somewhat restricted according to the number of available harnesses. These restrictions can be partly eliminated by using the method of strips, where several strips are woven separately and then joined together. Since each strip represents only a part of the whole design, one is able to increase the variation in design and color, while at the same time simplifying the weaving process. Each strip is carefully controlled, calculated and measured so that there are no accidents or

unanticipated effects, allowing one to preserve the integrity of the whole design.

Materials, because they directly relate to structure, texture and color, are another important component in weaving. In Venetian Blind, chenille, lurex and cotton were used for weft and warp, respectively. Chenille, a raised fiber, is soft and textured. When the weft thread is closely packed in by satin weave, it can cover the warp thread, and give the effect of luster, fullness and depth of tone. The rest of the works were woven with cotton yarn in both warp and weft. Cotton, commonly used in weaving, is suitable for a plain weave structure. Mercerized cotton, which is stronger, was used to give a shiny color, brighter appearance and smoother, flatter texture.

IV. WORK DISCUSSION

Habitation reveals the ideas and aims of man.⁹ Buildings are visual representations of man today. When we see a hundred identical windows in a building, in terms of form alone, we see repeated geometry, symmetry, pure proportion, and precision. In terms of significance, such a set of windows could suggest a leveling action of our society, or perhaps, a lack of individuality in the pattern of daily life. Such are the overtones of meaning which man-made structures provide, as we look around us for the means to communicate ideas.

Even with a set of identical, geometric shapes, we may find many interesting variations of patterns, depending on the point of the viewer or the light which it is seen under. Each of the four works have been constructed from the view point of modern buildings. The lines, squares and rectangles, as well as colors, were selected from my basic visual language of design. The designs

were drawn on graph paper, after the geometric shapes, arrangements and color relationships were precisely calculated.

The use of color was also important in establishing both the compositional and emotional sensitivities of the works. The selection of a specific color relationship for each piece was not only intuitive and experimental, but also meant to be a reflection of my inner experiences.

The four pieces, Venetian Blind, Is There A Square?, While Morning Is Broken and City Landscape, are discussed separately.

A. VENETIAN BLIND

This piece is inspired by venetian blinds. I have found interesting patterns, depending on the condition of the venetian blind; i.e. open, half-open, closed, up or down. When each pattern is unified into a whole, it provides a dramatic and exciting grid design. The pattern creates a rhythmical movement stemming from the changes in the gradation of lines and its proportion of space.

This piece is composed of six woven strips, each 6" wide and 43" long. The strips are woven by using a weft face satin weave technique which emphasizes the line effect, as shown in Figure 1.

The line is the simplest, most basic tool of visual performance, and is used frequently in geometric grid designs. The use of the line, however, requires a deep knowledge of our visual reactions. When I worked on the line construction, I felt a certain excitement which aroused my innermost patterns of experience, and yet it seems difficult to explain in words the feelings that straight lines can produce.

Since I wanted to express a strong, contrasting effect between the line and the space, I selected two of the non-colors: black and white. The third non-color, grey, appears through the gradation effect between black and white and depends on the increase or decrease of linear activity. The spaces of solid black or white give visual tension between the line constructions. This is, therefore, an attempt to achieve rhythmical movement and a vivid interplay between forms.

B. IS THERE A SQUARE?

This piece is composed of twelve strips, each 7" wide and 64.5" long. They are woven with double weave technique. In this piece, I chose to express the geometric abstraction derived from a group of buildings viewed at different angles. The frame is bent at 90 degrees, in a zig-zag fashion. Each strip is connected at the same angle, thereby giving depth to the squares. All of the squares seem to be breathing and alive.

A square alone is a mere trifle, but when given a color, it begins to reflect power. The action of the colored squares is strongly visualized in my mind and leaves a sudden impact there. The repetition of the squares is like a poem written with contrasting colors; the emphasis of the piece centers on an investigation of the effect of intense, complementary color juxtaposed with optical change. Although each of the squares used is geometric and static, together they become dynamic, performing exciting movements through orderly repetition, color interaction and

gradation of shape. This color study becomes a manifestation of rhythmical, dynamic effect which has been derived from the various conditions of changing light.

C. WHILE MORNING IS BROKEN

This piece is composed of four strips, each 10" wide and 54.5" long. It is woven on a 16 harness loom and uses double weave technique. It is motivated by the image of buildings changing with the light. When the sun is rising, for example, the forms of buildings vary with rhythmical movement. They begin to possess a certain force having the complexity of visual image, which may then be identified as an interplay of colors, forms and spaces.

A rectangular shape is interpreted as the projection of energies acting upon our bodies. A rectangle, on its long side, represents stability and rest. Standing, it presents a vertical motion and thus, has an upright impact.

Geometric form, consisting of rectangles, provides a basic law of contradiction; that

between horizontal and vertical movement. This principle of contradiction is revealed, in its most concentrated form, in this piece. When the numerous velocities are attained, through the repetition of vertical-horizontal movement and interaction of color, they appear to reveal a rhythmical configuration which has exciting, fluid movement.

D. CITY LANDSCAPE

This piece is composed of five strips, each 7-9" wide and 60" long. It, too, is woven on a 16 harness loom, using double weave technique.

A geometric pattern is established for a city landscape through a rhythmic composition of geometric elements and color variations. The horizontal and vertical bar lines are achieved by a contrasting effect in the grid design. Through the repetition of the elements and color interaction, the design shows an elegance. It is also meant to achieve a musical implication reminiscent of the music of Bach or Mozart. Harmony and unity of design are brought about

through proportionality, symmetry and rhythmical arrangement of geometry. A positive-negative colorplay, resulting from the use of double weave technique, gives a different, yet mutually interrelated feeling to each side of the woven piece.

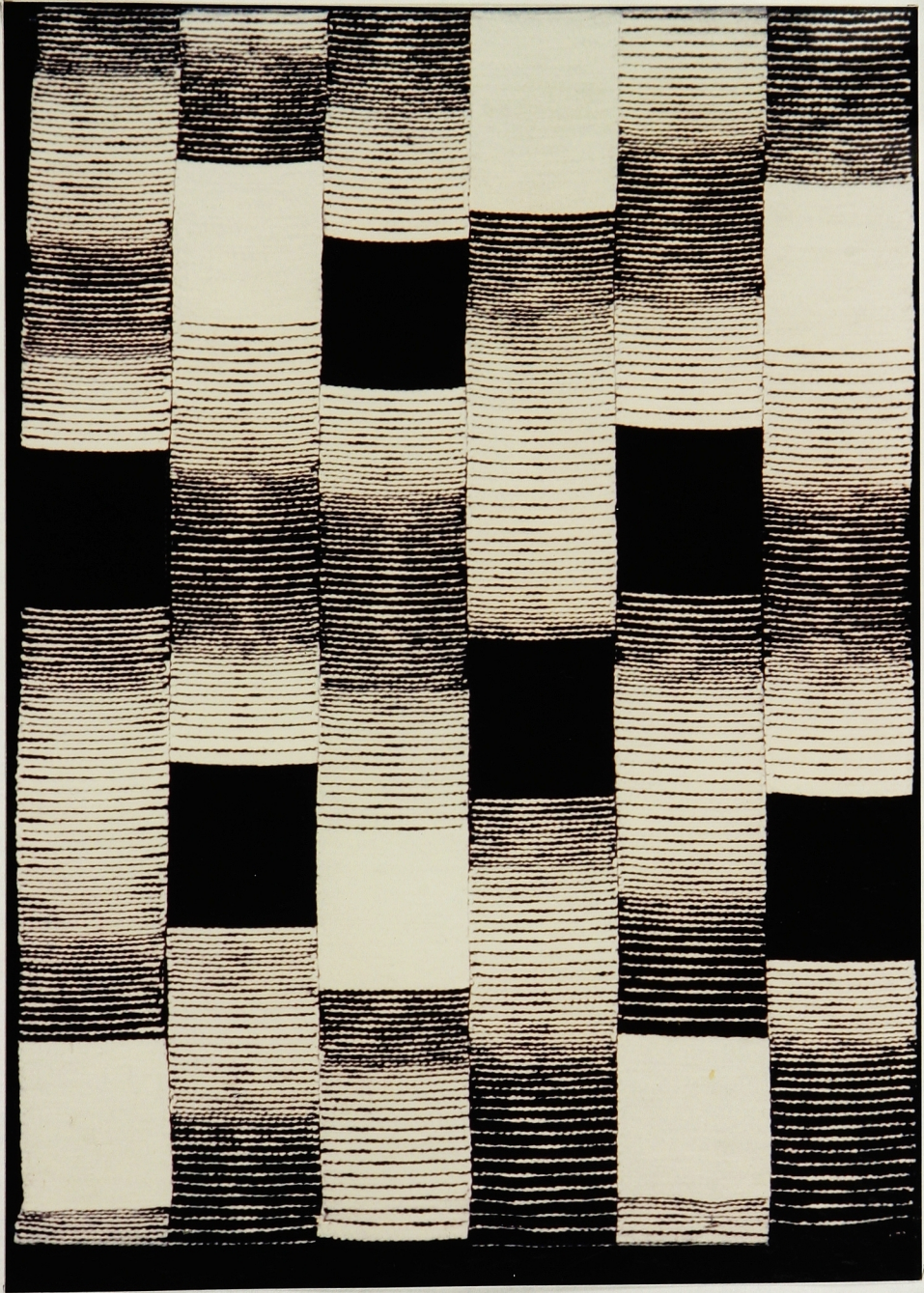


Fig. 1. Venetian Blind.

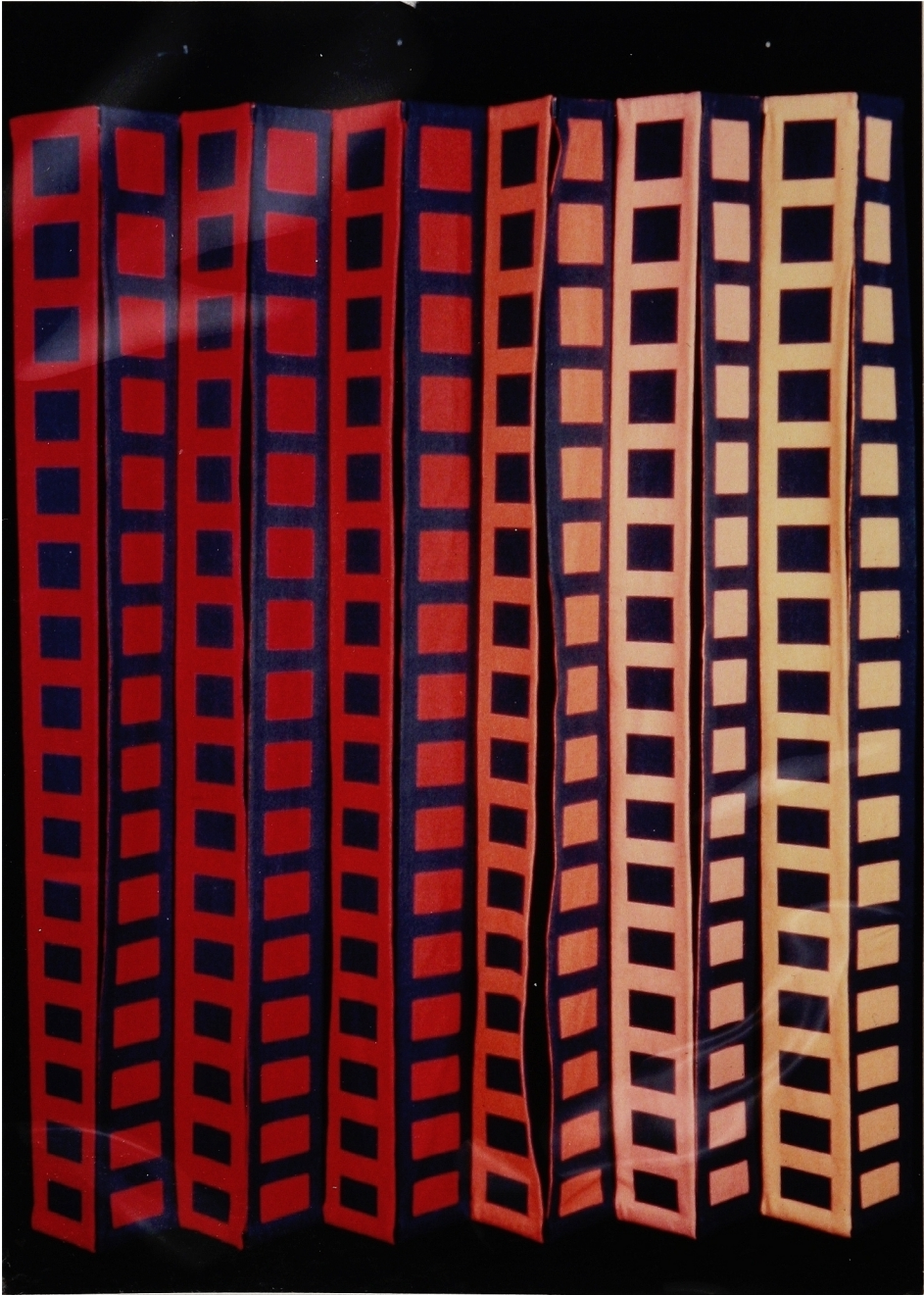


Fig. 2 Is there a square?, front view.

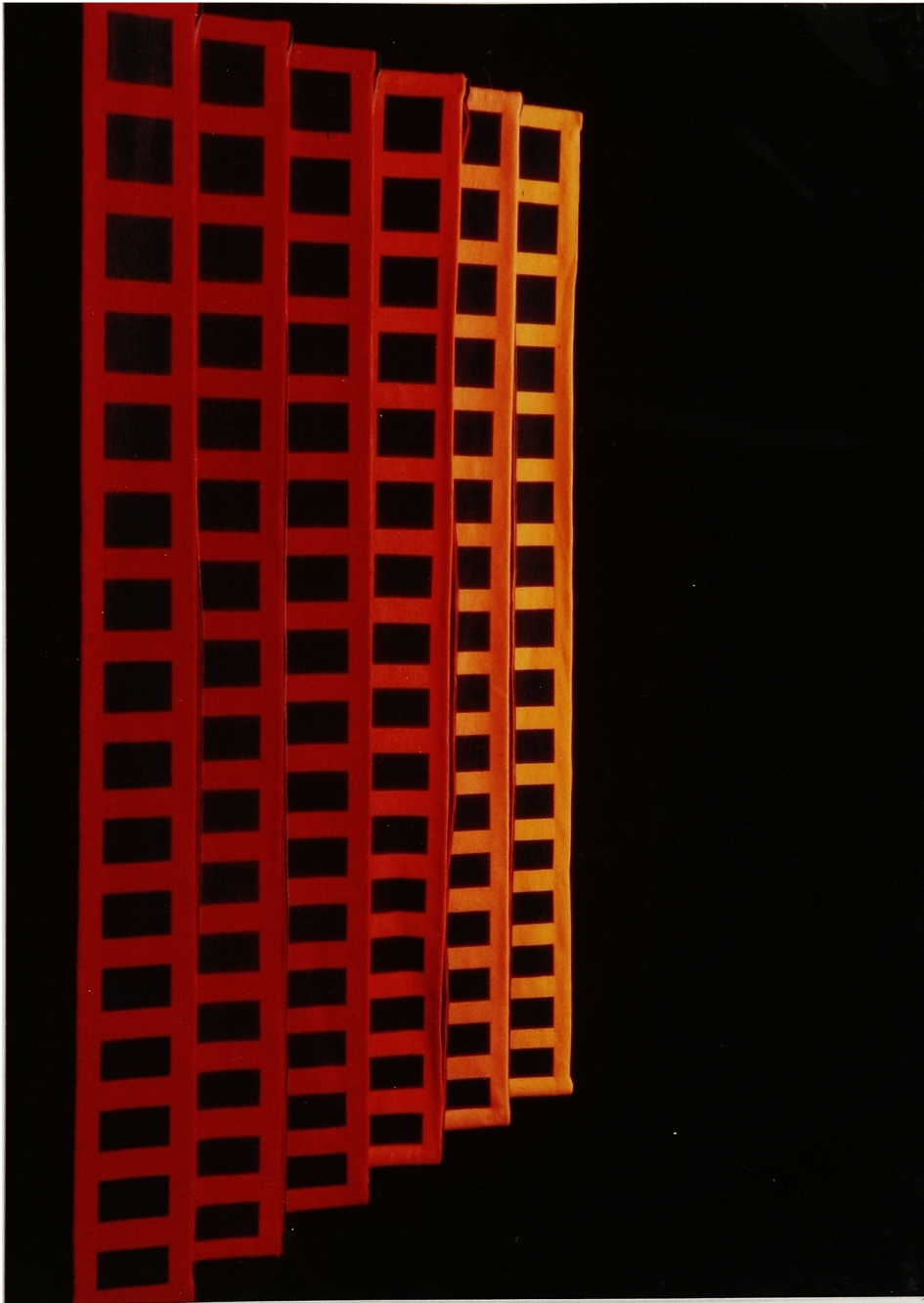


Fig. 3 Is there a square?, left front view.

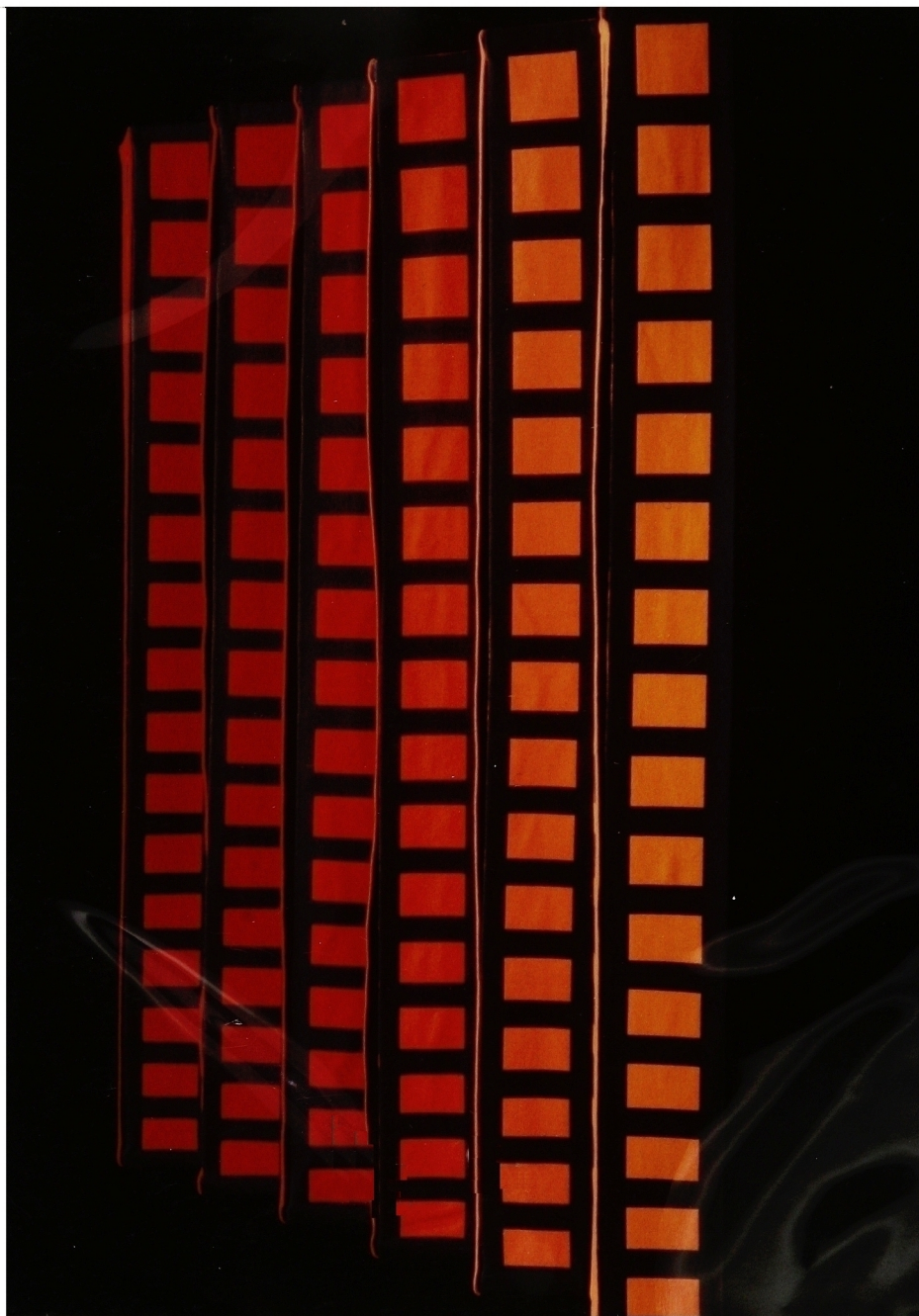


Fig. 4 Is there a square?, right front view.

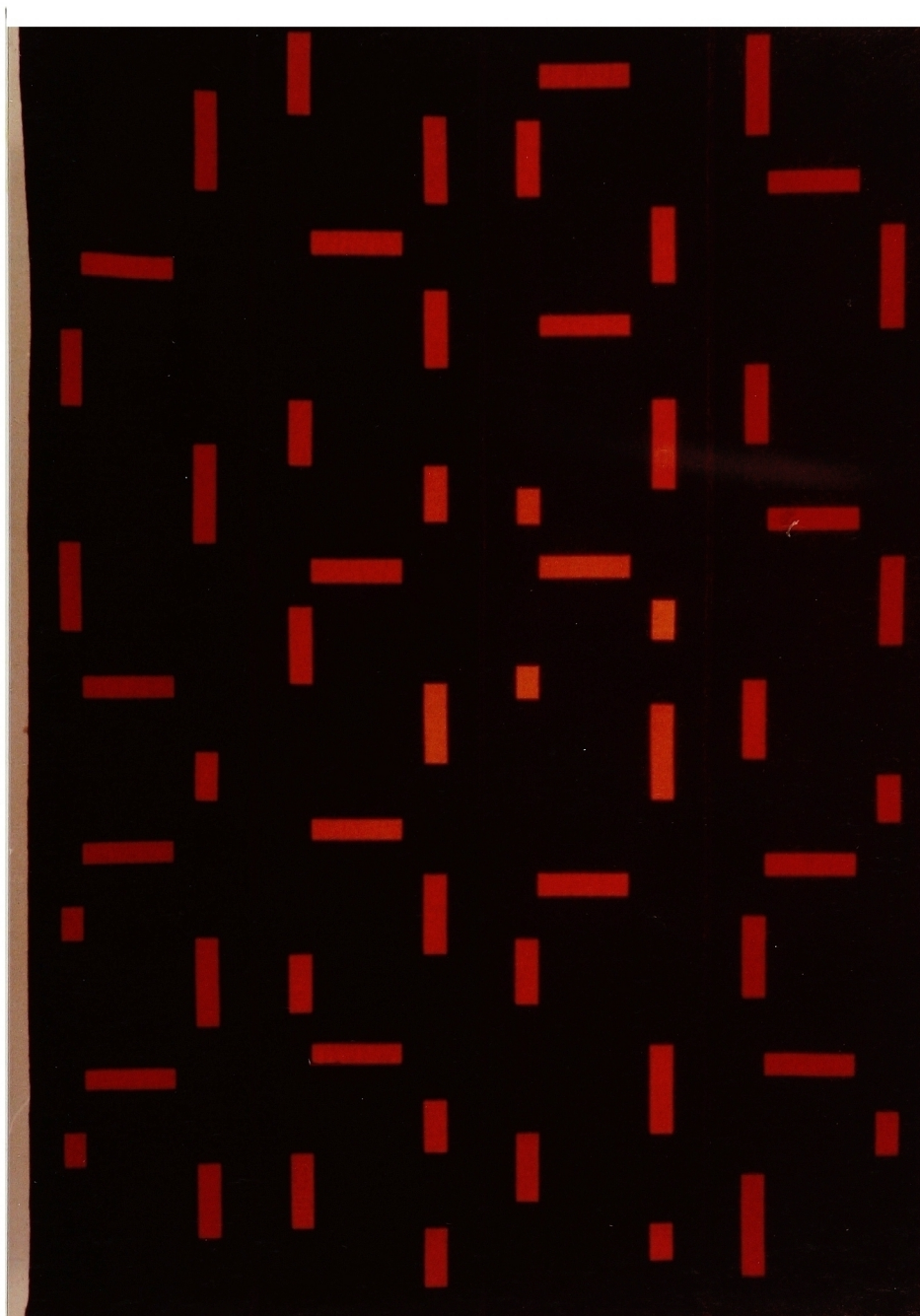


Fig. 5 While morning is broken.

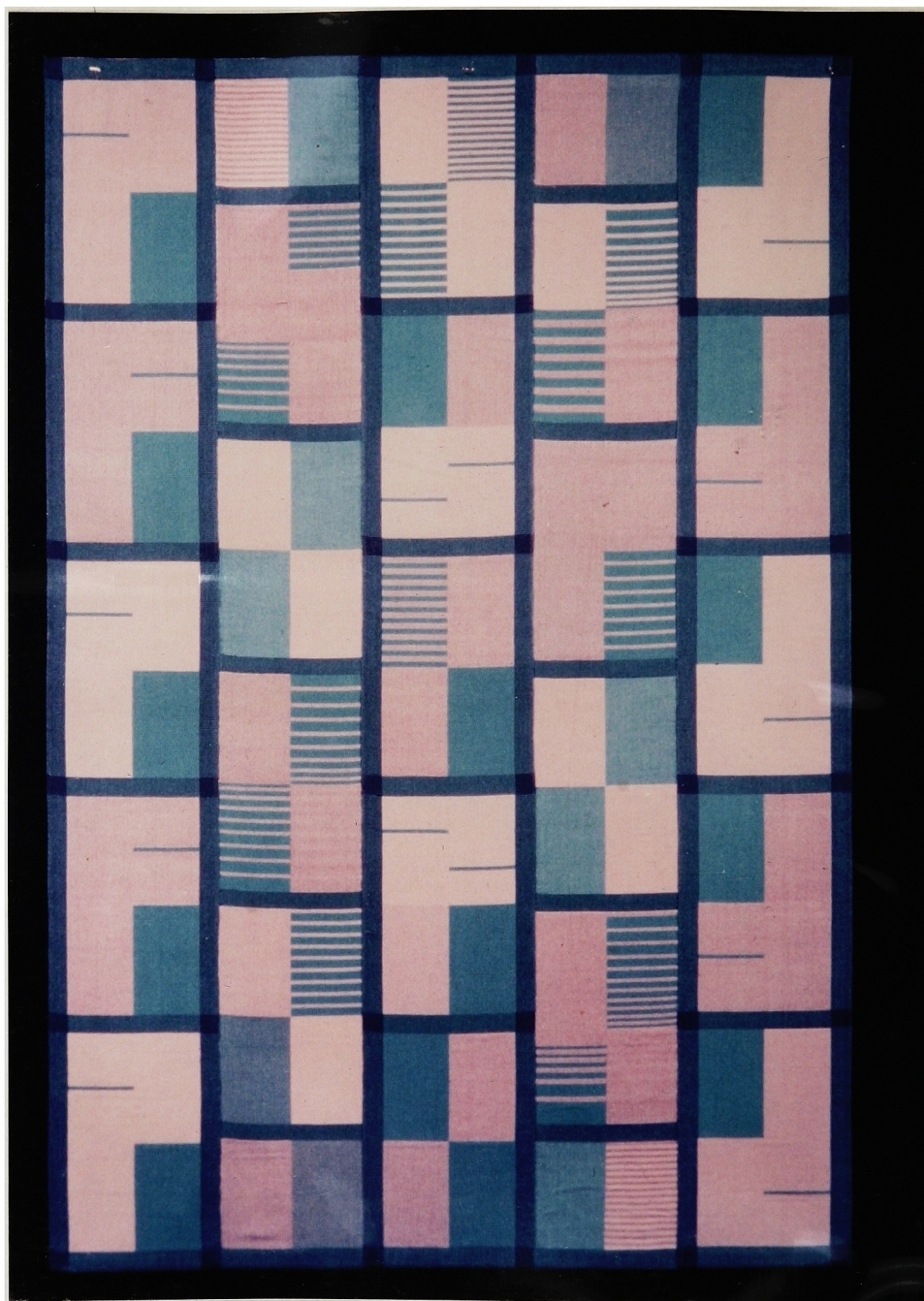


Fig. 6 City landscape, front.

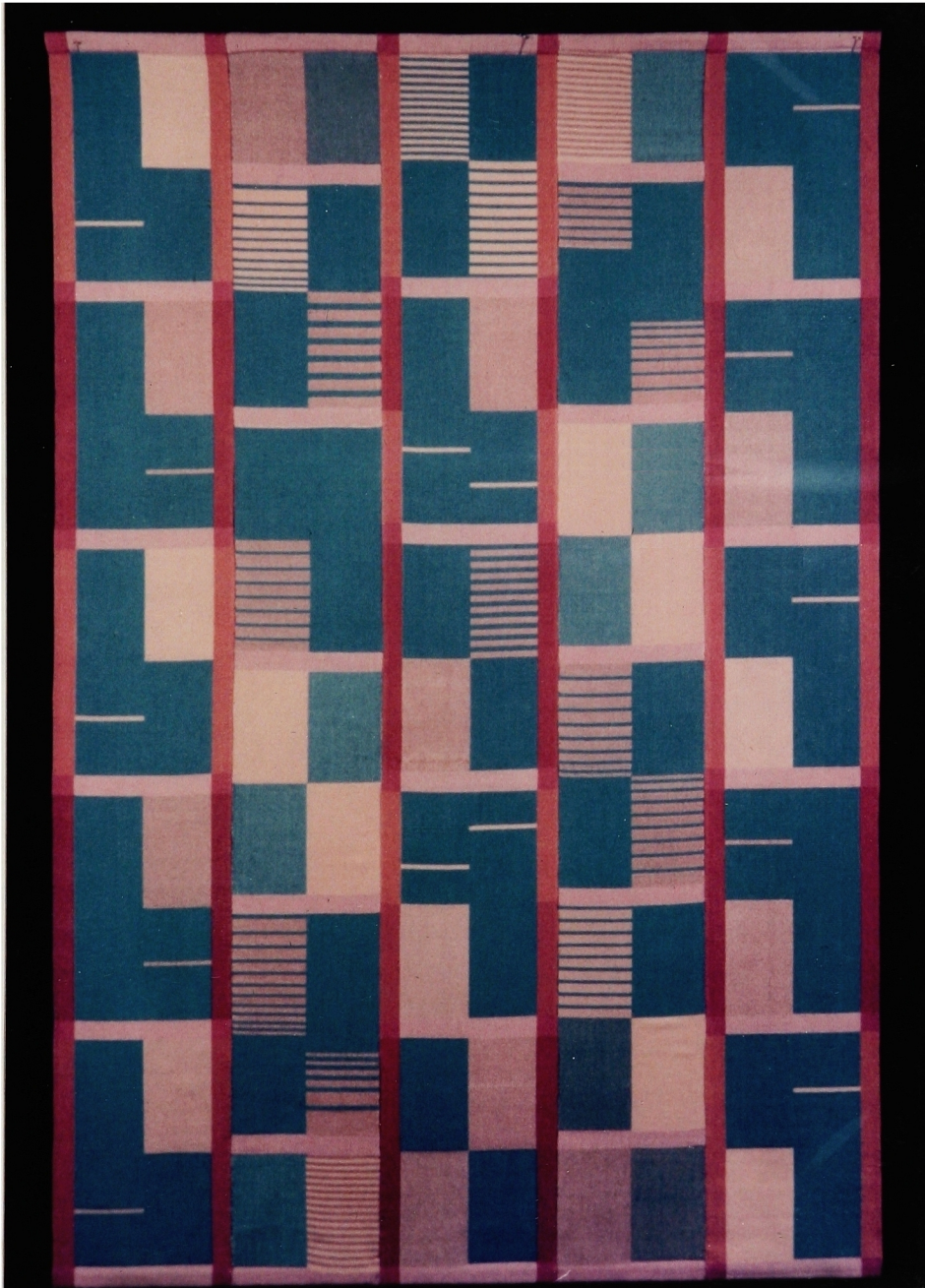


Fig. 7 City landscape, back.

V. CONCLUSION

To design is to plan and to organize, to order, to relate and to control. In short, it embraces all means opposing disorder and accident. Therefore, it signifies a human need¹⁰ and qualifies man's thinking and doing.

My final statement is not a conclusion, but rather a point where I stand; both in the process of these works and in the direction of my thesis.

I have been greatly interested in technique and discipline in my work. While developing the pieces, first on paper and then on the loom, I have enjoyed experimenting with a variety of techniques and materials. Exact and finite forms served to combine my attraction to geometric abstract art, on the one hand, and precision and clarity, on the other. Abstract art, one of man's greatest achievements, allows a totality and wholeness that can only be grasped partly in nature. In this sense, I hope to reflect balance and harmony of form with totality and wholeness in each of my pieces. I feel that my visual

language, while not so rich and free as to express and communicate my personal feelings, nonetheless, allows me countless variants in which to express the unchanging structure of consciousness, rhythmic movement and color interaction.

In the future, I would like to continue to work with grid designs and to utilize the relationship of proportion, color and geometric systems, as first experimented with here.

ENDNOTES

¹ John Gordon, Geometric Abstraction in America (New York: Whitney Museum of American Art, 1962), p.9.

² Rene Smeets, Signs, Symbols & Ornaments (New York: Van Nostrand Reinhold Co., 1982), p. 85.

³ Gordon, Geometric Abstraction in America, p.9.

⁴ Naum Gabo, "Constructive Art (an exchange of letters between Gabo and Hebert Read)," Horizon, July, 1944, p. 59.

⁵ Statement by George Heard Hamilton in Josef Albers (New Jersey: Yale University Press, 1956), p.43.

⁶ Arsen Pohibny, Abstract Painting (Phaidon-Oxford, 1979), p.25-26.

⁷ L. Moholy-Nagy, The New Vision and Abstract of an Artist (New York, 1947), p.67-86.

⁸ Gillian Naylor, The Bauhaus (London: Studio Vista, 1968), p. 156.

⁹ Donald M. Anderson, Elements of Design (New York: Holt, Rinehard and Winston, 1961), p.68.

¹⁰ Joseph Albers, Despite Straight Lines (Cambridge, Massachusetts: MIT Press, 1977), p. 75.

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