

A SYNTHESIS OF COLOR  
INTEGRATED WITHIN THE DESIGN VOCABULARY

by 4589

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## INTRODUCTION

Color studies today, those of most recent publication, have become so enmeshed in the tangle of theory and science that design has become almost estranged. Never before, at any time in our history have so many been involved in a concern for design and color simultaneously. These two are either the most pleasing or the most abhorrent external expressions in our very sophisticated societies and cultures. Individual preferences are part of the projected personality in each of us.

We are inclined to associate various descriptive words and terms with either the past or the present. It is time to devise a "new" vocabulary for DESIGN-COLOR as we are either involved with its creation or as we experience it in our living. The cultural pursuit is a form of education which holds great popularity today. Accompanying this is the mental appetite which must be satisfied, --- contemporary interest requires a contemporary vocabulary.

It is encouraging that designers and educators are seeking new methods of communication with one another. Education committees of professional organizations such as the American Institute of Architects and the American Institute of Interior Designers have established education requirements for students and examinations for membership of high standard. As the various areas of design and design education drift toward a full recognition of a common need existing to provide total design, it seems logical that a contemporary design vocabulary should be initiated.

Color's relationship to design is the principle concern in this study primarily because this relationship has been neglected due to a separation by exterior influences. An example is that of the effects of lighting upon color. Facilities are either not yet devised, or too few exist, to enable accurate studies to be made of this. There are innumerable considerations of natural lighting conditions alone as they will have varying effects upon color from interiors (enclosed space) to exteriors. To those factors we may add those changes that take place when artificial lighting is introduced. It is questioned that the designer can afford the time required to fully calculate the total changes which occur as light meets color under all proposed and existing conditions of color's use.

In this study color has been intentionally set apart from line, form, space and texture. By this means an examination may be made of the interaction of color within the other design elements and as they are organized to represent the various design principles. Whenever we view our environment and its "accessories", we need to be aware of an aesthetic feeling not only of the total design but of the specific and unique role of color within design. Together these elements of design may interact to enforce the expression of a mood, an activity, a reflection of surroundings, a personality, a time and a projected message.

## General Objectives of the Study and Research

In the early stages of concept development, an understanding of the various structural parts and their purposes will provide a means to assembling a stable foundation. These parts which are the principle concern here are: Synthesis, Color, and Design. These require definition at this juncture to enable us to approach the task of assembling the vocabulary.

Synthesis: The combining of the constituent elements of separate material or abstract entities into a single or unified entity.  
--- A complex whole formed by combining. --- A process of reasoning in which the conclusion is reached directly from given propositions and established or assumed principles.

Color: A design element which affects all other design elements. The quality of an object or substance with respect to light reflected by the object, usually determined visually by measurement of hue, value and chroma of the reflected light.

Design: Organization or structure of formal elements in a work of art; composition. --- The combination of details or features of a picture, building, etc.; the pattern or motif of artistic work.

Design-Color: A perceived arrangement of pigmented design elements either 2-dimensional or 3-dimensional which may provide an environmental visual experience, an aesthetic impact and a graphic portrayal of color function in design.



### Specific Objectives

1. Color has been used as the principle element of the study and the design vocabulary established accordingly. Color has been set apart from the remaining design elements. It has been treated here as a unique member to enable us to give it descriptive association with other elements of design one by one.
2. We have moved within the realm and confines of design as it may be applicable to use by the designer and educator.
3. The approach was a direct one with assurance given that relative factors were to be given consideration. These factors include: the physiological (the visual), the psychological (the aesthetic), and the mechanical (the applied).
4. The application of color to all other design elements has been examined, influencing factors established and results justified.
5. Certain problems have been proposed having relationship to the various factors.
6. Color plates have been introduced to illustrate color as it works with and within line, form, space, and as it functions within and affects polarity, tension, proportion, unity and the various design principles.



## CHAPTER I

## COLOR

Hue is the name of a color, --- a specific identification such as red, yellow, blue-green etc. The hue may have degrees of purity, strength or saturation (intensity) and/or lightness or darkness (value). The hue may be classified as either warm or cool. All of these properties in hue may be manipulated in design to aid in expression of the idea or its visual function.

The term harmony has always had close association with the interaction of color. In an attempt to pull color and design into a closer alliance, the word unity, a factor in design organization, should be applied to color. Within a successful design there must be an agreement between the design and color. This is unity. The color must follow the purpose of the design, --- it must reinforce to the concept.

Value and intensity in color are relied upon to achieve variety in design. They are secondary when put into use with a prime factor of pure hue. In the Graphic Arts (e.g., advertising) the pure hue is introduced as a means to attract attention and represent the "message", or we may say, the point of emphasis, --- the dominant factor. The values and intensities of other elements become subordinate and are generally relegated to background elements to give a balance to the design. In the case of Architecture or Interior Design the pure hue most frequently becomes more of an accent, a punctuation of the visual statements. The major body of the total design is then relegated to a "neutralized" hue or

hues. The proportions of the design run from miniscule to gigantic as we view the gamut running between Graphic Design and Environmental Design. Massive structures (arch.) could not possibly be conceived in a pure hue, primarily because the total form would be in danger of being visually destroyed. By reducing the purity of a hue to a value or intensity we are able to maintain the form as the major element and the color as an enhancing agent.

## CHAPTER II

## COLOR IN LINE

Line defined: The representation of form by the use of strokes.

An element of design which gives direction, progression, etc. A continuous unbroken mark; also a series of separated points or other units that lead the eye along a path.

Color will have a variety of influences upon line, due to the variations in color mixtures and many types of line. There are single lines as defining outlines of forms, lines in planear surfaces, occasional or repetitious lines, thin to thick lines, vertical, horizontal, diagonal, curved, intersecting, serpentine, zig-zag, broken lines, and even lines created by a series of small dots.

Color in line may serve the following purposes: To emphasize or increase width, direction, depth, height, length, enclosure. This is generally achieved by repetitious use of line, line width and color variations. See Plate I. To decrease distance, height, width, and depth. Combinations of line directions with variations of line widths and color. (The color variation refers not only to differences in hue but a gradation process, bright to dull, or light to dark, which is an aid in increasing or decreasing the space and rate of movement of either a single line or a series of lines.) See Plates II and III.

Proposed Problem

A room which is 12' x 12'. Use color in line alone to enlarge the room visually in one direction. All four walls may be included in solving this problem.

### Explanation of Plate I

Color in Line. A repetitious use of zig-zag line activates the space. The organization of the warm colors in the line serve to give emphasis to both horizontal and vertical linear activity as directional force.





Plate I



### Explanation of Plates II & III

Comparison study of progression in line width and gradation of color value. In Plate II the value gradation from dark to light at the "corner" gives a visual impression of increased space and in Plate III space is visually decreased as value gradation runs from light to dark. Increased proportions of line width and color are together the factors of visual space change.

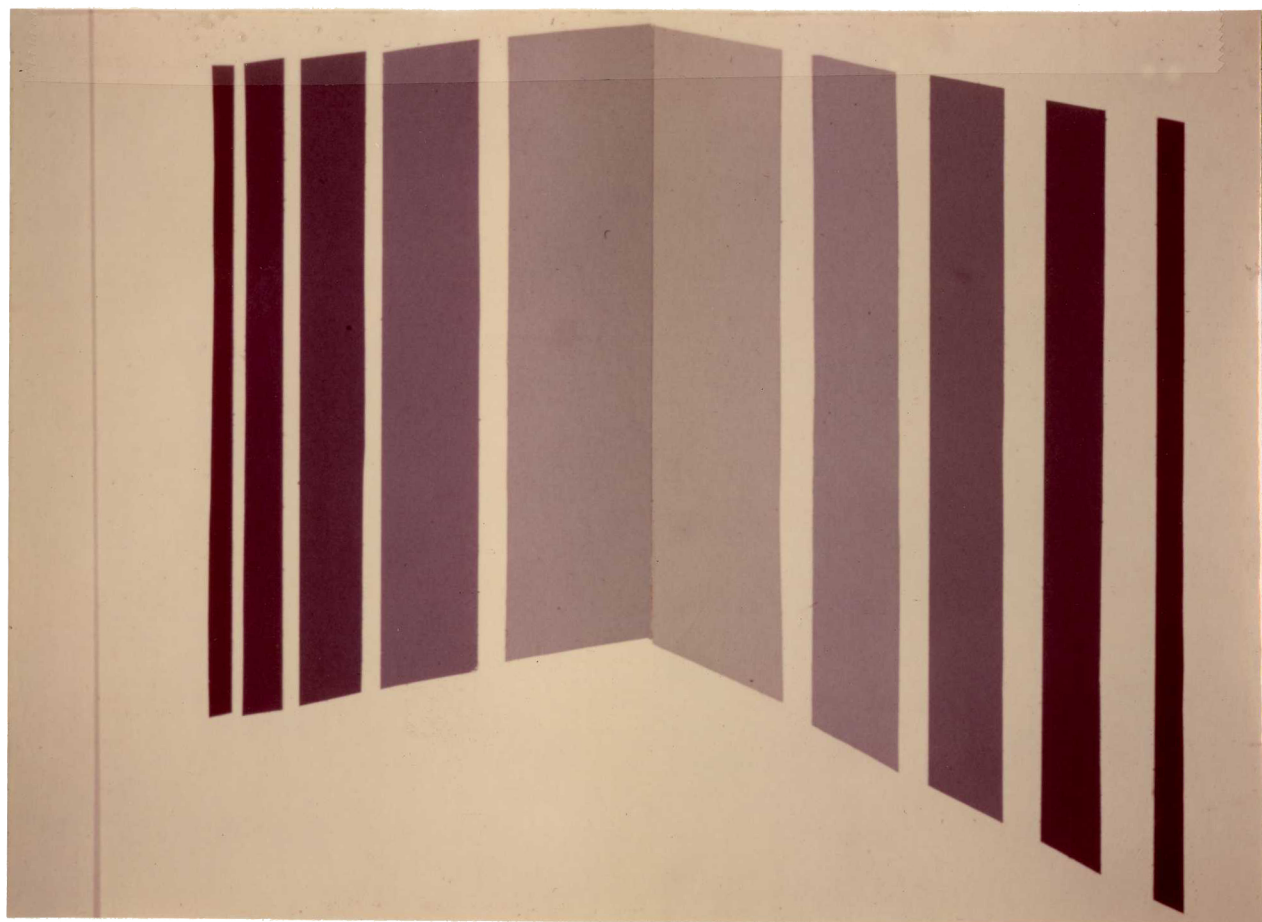


Plate II

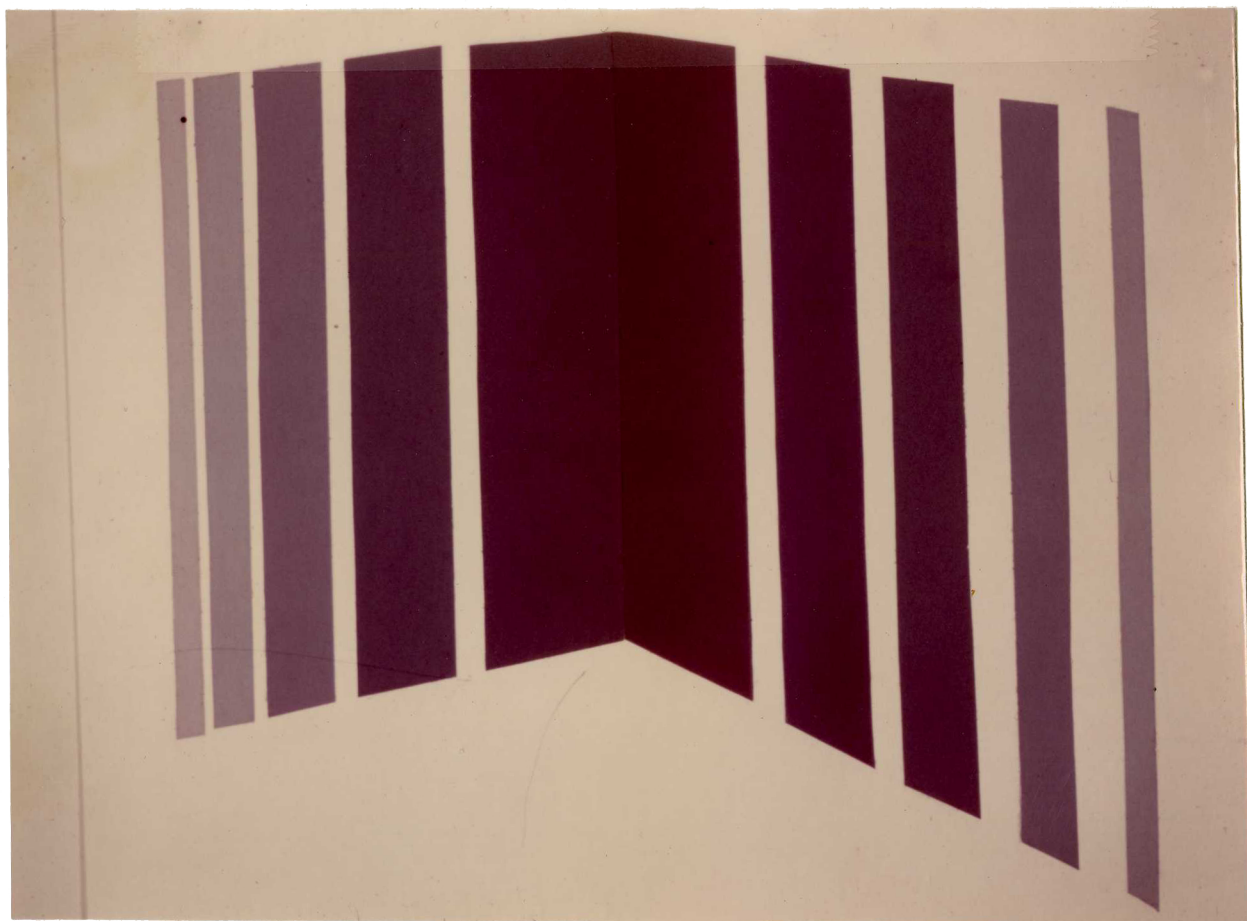


Plate III

## CHAPTER III

## COLOR TENSION

Tension defined: The act of stretching. In giving this application to color: The setting up of a form of visual strain or stress between hues.

Color tension may be either negative or positive. It may serve to impose a visual activity upon an area of monotony or it may be introduced carelessly into a visually dynamic area and create confused, disorderly design. Color in line may provide tension or visual movement. Continuous line will vary in degree of tension according to: Line width with strain degree varying according to width variation; the same situation but with the added possible variation of stress according to color choice. See Plate IV. Tension in color line may be reduced by the breaking up of the line at regular intervals to insure against destruction of line principle.

Proposed Problem

Using two hues, illustrate two examples of color tension: one on a white or neutral background, and one on a background of a pure hue (preferable one of the more intense hue).

#### Explanation of Plate IV

Tension in line with color introduced as a major factor. This study was introduced for comparison of color in line on contrasting backgrounds to determine the effect upon the line and the linear mass. The red lines on the white background appear more stable and assured with concentration given to the directional force. When the red is viewed on the green background visual tension and vibration occurs and has effect on the directional force, which appears to be reduced.

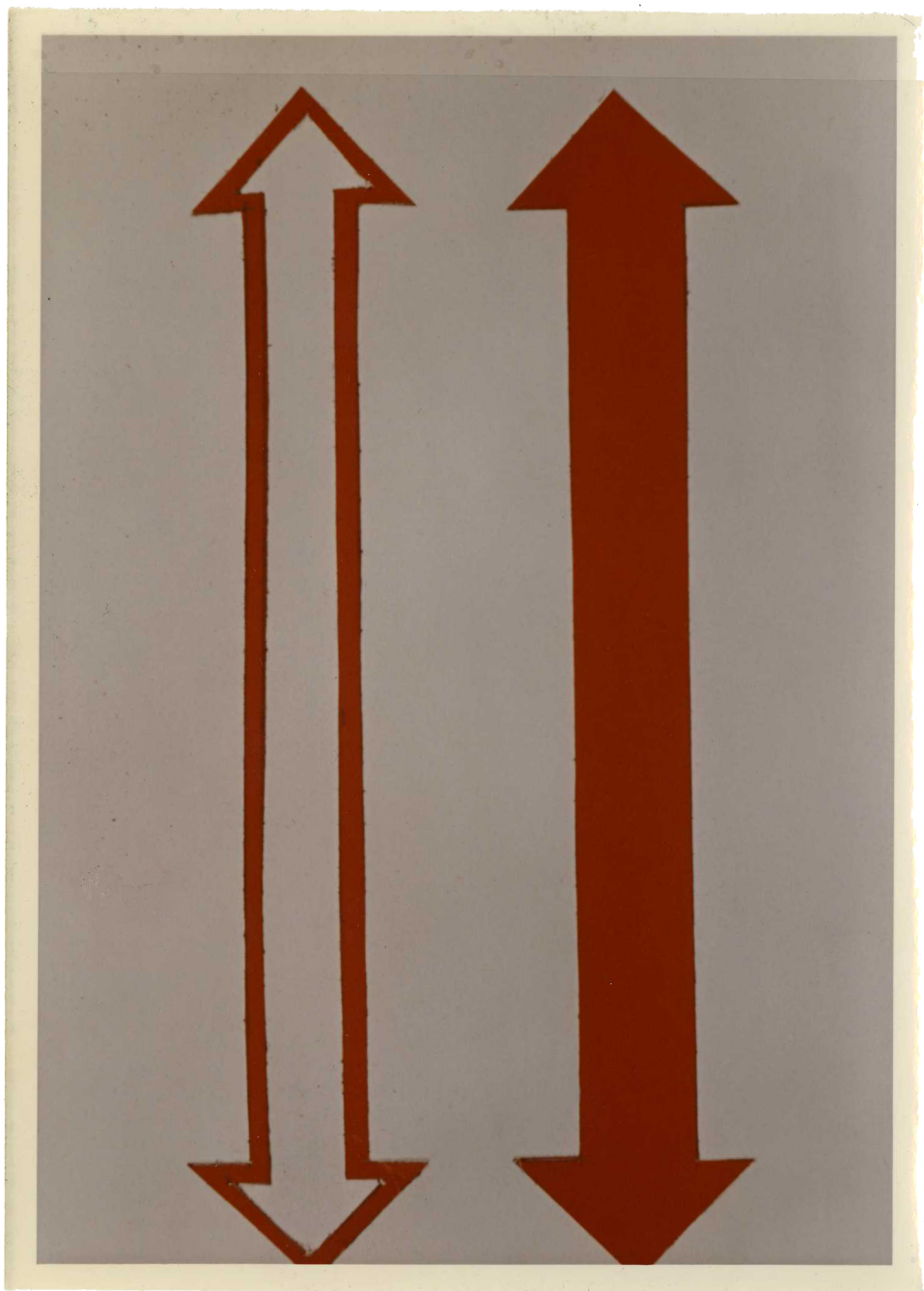


Plate IV

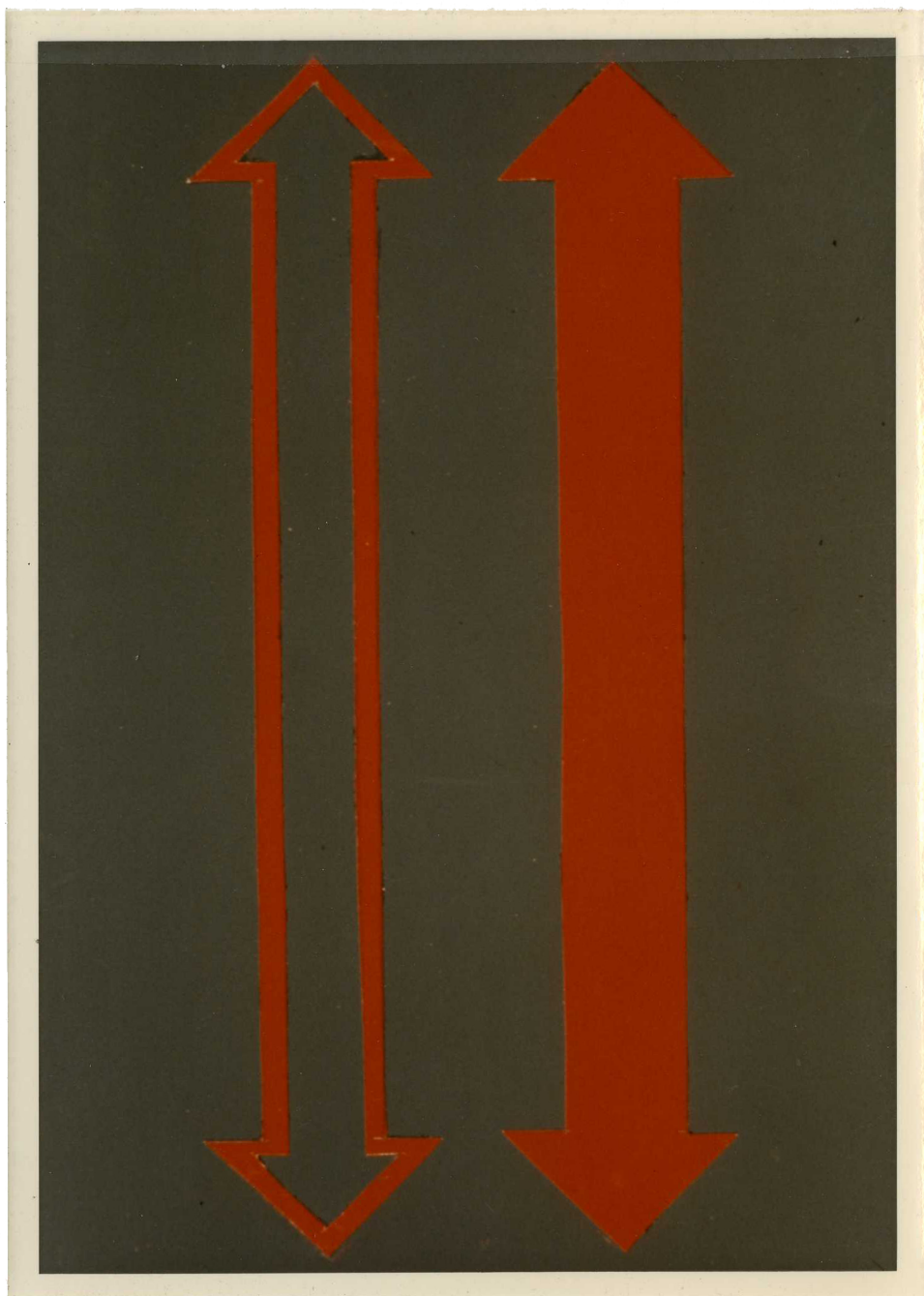


Plate IV

## CHAPTER IV

## COLOR IN FORM

Form defined: The outward or visible shape of a body as distinguished from its substance or color.

The families or forms are: Rectangular; Triangular; Curvilinear; and, Free-Form or Biomorphie.

Rectangular

In this form angles are always 90 degrees. Form direction is up and down, crosswise and lengthwise. This family consists of squares as well as rectangles.

In projecting this type of form into perspective, as we view interior forms in arrangement, or as various of these forms are viewed as parts of a total architectural structure, they are the most important to visual color action. These are generally viewed as either static (inactive) or dynamic (forcefully or directionally activated) planes of flat color or textural color. See Plate V. Their importance to structure lies primarily in enforcing the architectural promise or intent. One of the early examples of this may be found in many of the houses of Williamsburg. The exterior entry doors were painted in contrasting color to the major overall color of the building. This was an individual means of identification and perhaps a welcome and friendship. In today's example we frequently find a panel of bright contrasting color as a background for indicating the name of the company, --- a means to draw



first attention, --- easily detected and read. These may be incorporated in use to either exteriors or interiors. Additional uses of color in rectangular form are:

- a) Color planes juxtaposed to invite and direct a corridor entry.
- b) Colored 3-dimensional forms as members of the total architecture, either in a repetitive use, or varied in orderly positioning and/or size to imply a visual progression in horizontal distancing. See Plate VI.
- c) Planes of color used horizontally to emphasize various levels, as in floors of a building in vertical progression.
- d) Affecting apparent size of forms.
- e) Emphasizing the 3-dimensional qualities.

### Triangular

These are forms which consist of at least one diagonal line. The large ones of this variety and order are strong and dynamic, See Plate VIII, but the very small ones, in groups, may tend to set up internal aggravation and will prove to be disorganized in design. These forms have the distinct characteristic of progressing toward one or more points. Color in triangular form offers several possibilities for use in design though there are many more limitations of use than in the rectangular form.

- a) Triangular form may; vary in size, may have solid sides

or one or more open sides, and may have either smooth or textural surfaces.

- b) A single color applied to the solid triangle will have variation according to effect of high-lighting and low-lighting and will therefore appear as a 3-color arrangement.
- c) Using 2 or 3 contrasting hues (complementary or triad) will tend to alter a relationship or may put the total form in danger of a visual separation of the related parts. The use of 2 or 3 related hues (analogous) may be used and manipulated to bring the 3 related parts into a true visual continuity.
- d) The triangular form in color may be used to view from all 3 sides within a space (a structure), or may be a 2-dimensional form with color giving it the aspect of a third dimension. See Plate IX.
- e) In an open triangle, one defined by line, color "borders" will give emphasis and solidity to the form and may become playful and inviting in aesthetic quality.
- f) Repetitious use of the triangle, e.g., a geodesic dome, offers further possibilities to the use of color. Color may be introduced in a manner of progression from the ground level upward to the top of the dome to give an uplifting quality to the structure.

### Curvilinear

Curved forms consisting of spheres, cylinders, cones, hyperbolas and ellipses. These may be unstable forms but tend toward stability and have an enduring quality. These forms have a well-ordered continuity and give relief to a dominant use of the rectangular forms.

This form, having one dominant directional force should be given either a single hue or a very gradual color gradation which may serve to further the emphasis of the directional force. Care must be exercised in introducing color to these forms to insure preservation of the form. See Plate VII.

Only three forms of this group, the cone, the cylinder, and the parabola may be indicated through the use of more than one color, as having an interior space. A 3-dimensional quality is more evident in these forms and may be given emphasis with the use of contrasting colors.

### Free-form or Biomorphie

These are the forms found in nature and are related to life and growth. We utilize them in architecture and interior design in order that we may relate to nature through human manipulation of structural material. Line or form in nature may dictate the use of the biomorphic lines or forms in architecture and this having been established, the interior design is thus determined. See Plate X.

If indeed nature is the derivative factor in these forms, then color and material should remain honest to the representation of it.

The design of the structure, as it relates to nature, should set up conditions of color use. The dominant use of natural materials must remain true to the form as well as to topographical coloration. This indicates little opportunity for man to carelessly destroy a natural purpose by introducing raw, pure, color in structure with dominant intent.

Within the interior spaces of such structural forms the purpose must continue, but here a bright flash of color is imperative to give relief to that neutralization which not only abounds in nature but also in those places where there is less natural light available.

The interior spaces of the free-form lend themselves to use of light neutral color which relies upon an uneven or undulating architectutral line for color change. High lighting will serve to compliment this line. Within these areas most reduced in color intensity, the accent in arranged objects must be of the most intense pure hue to bring about that contrast necessary to save the area from a dead monotony. Ceilings and walls will run the full gamut from high light to low light and floor areas will generally be more static in color level retention.

By applying color to form: (A summation)

- a) Form may be altered, (e.g.) a square may visually become a rectangle, etc.
- b) Form within form may be achieved visually.
- c) Form may be changed to comply with or become compatible with surrounding forms.
- d) Apparent size may be increased or diminished.

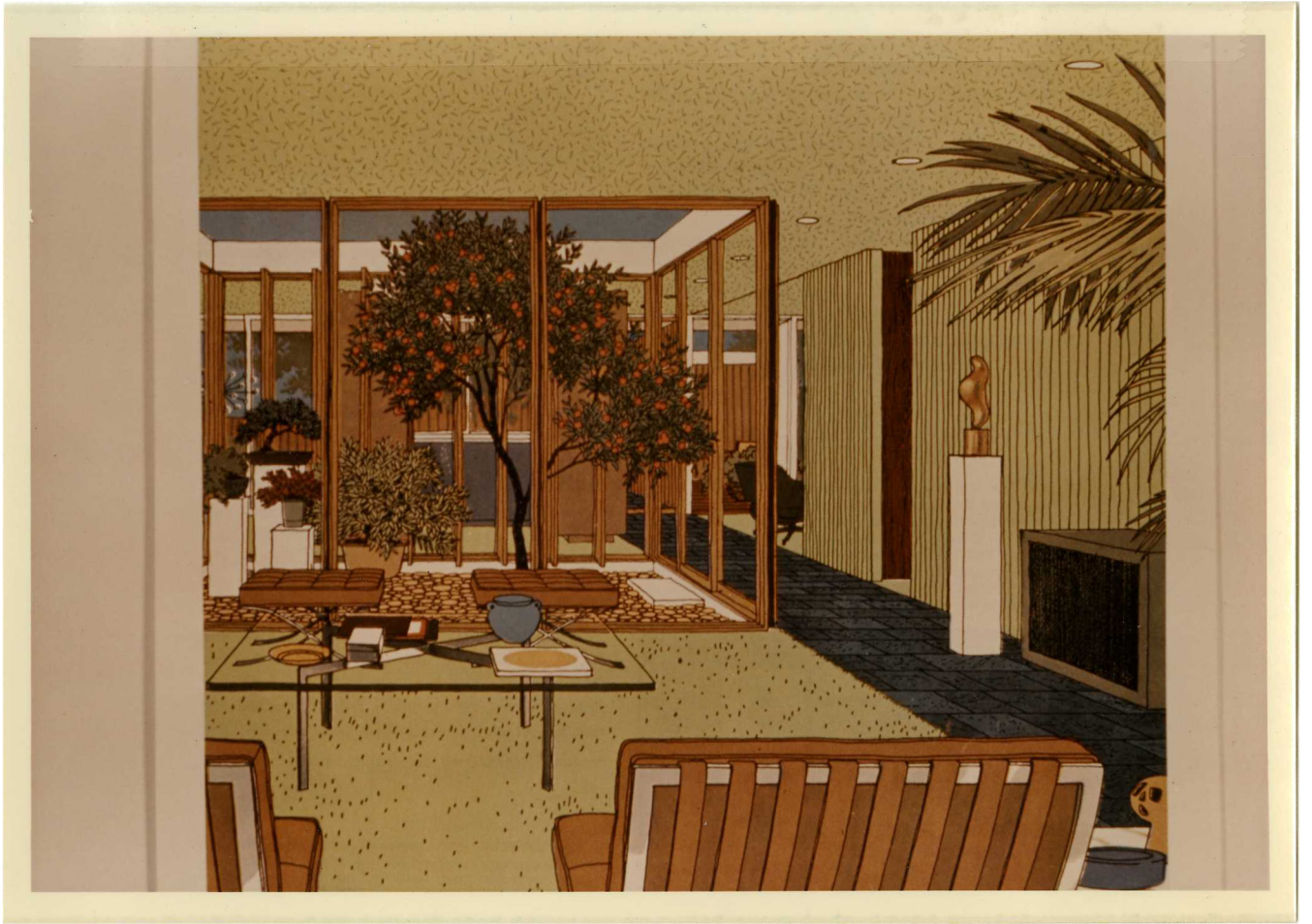
- e) Location of form may be changed visually to advance or recede from its background.

Proposed Problem

An assigned room shape or form with an arrangement of forms (such as furniture) within its borders or walls. This "room" should afford only one possible form arrangement which could only be changed by the manner in which color is applied and used.

### Explanation of Plate V

Illustration of color in rectangular and square planes which define areas of function, passage and divisions of space in structural materials. The use of a single hue, the green, in the major rectangular and square planes interrelates the total space to the specific areas by directional positioning (vertically and horizontally). The blue separates the vertical and horizontal planes of green as it is introduced as a corridorred passageway to unite the forward and distant spaces.



#### Explanation of Plate IV

Strong repeated use of geometric forms in pattern emphasize a symmetrical architectural setting. Repetitious use of a single intense hue in the central seating grouping draws first attention to and maintains an orderly arrangement dictated by the geometric floor patterns. Hue strength in the indicated proportions provide a balance to the dark neutrals in the geometric patterns. The strong intense hue also holds the attention to that space it occupies.





Plate VI

### Explanation of Plate VII

This plate illustrates an ill-use and unlikely positioning of cones in a meandering space. The color, as it has been applied to these forms, serves to follow the curvilinear character of the cones as well as to imitate the directional thrust of these forms. In such color application, the true forms are altered, their visual weight is increased and they become insecure in their positioning.



Plate VII

### Explanation of Plate VIII

Related color in triangular forms in architectural planes are positioned to establish a relationship between the dynamic human space and the structural forms of the roof. In the foreground diagonal force lines, provided by the converging pair of hues, are further defined by 3-dimensional structural line. In the background the diagonal lines and one hue are repeated as a triangular form terminates the space flow on a 2-dimensional surface. The positioning of these major colored triangular planes is such that they penetrate the space in a manner of progression.





Plate VIII

### Explanation of Plate IX

A color study of two identical, double triangular forms represented as 3-dimensional forms. Complementary hues and deliberate value variations have been used to determine the affect upon size and depth between each pair. Where contrast in value is the greatest there is a reduction in both the size of the forms and the depth between them.

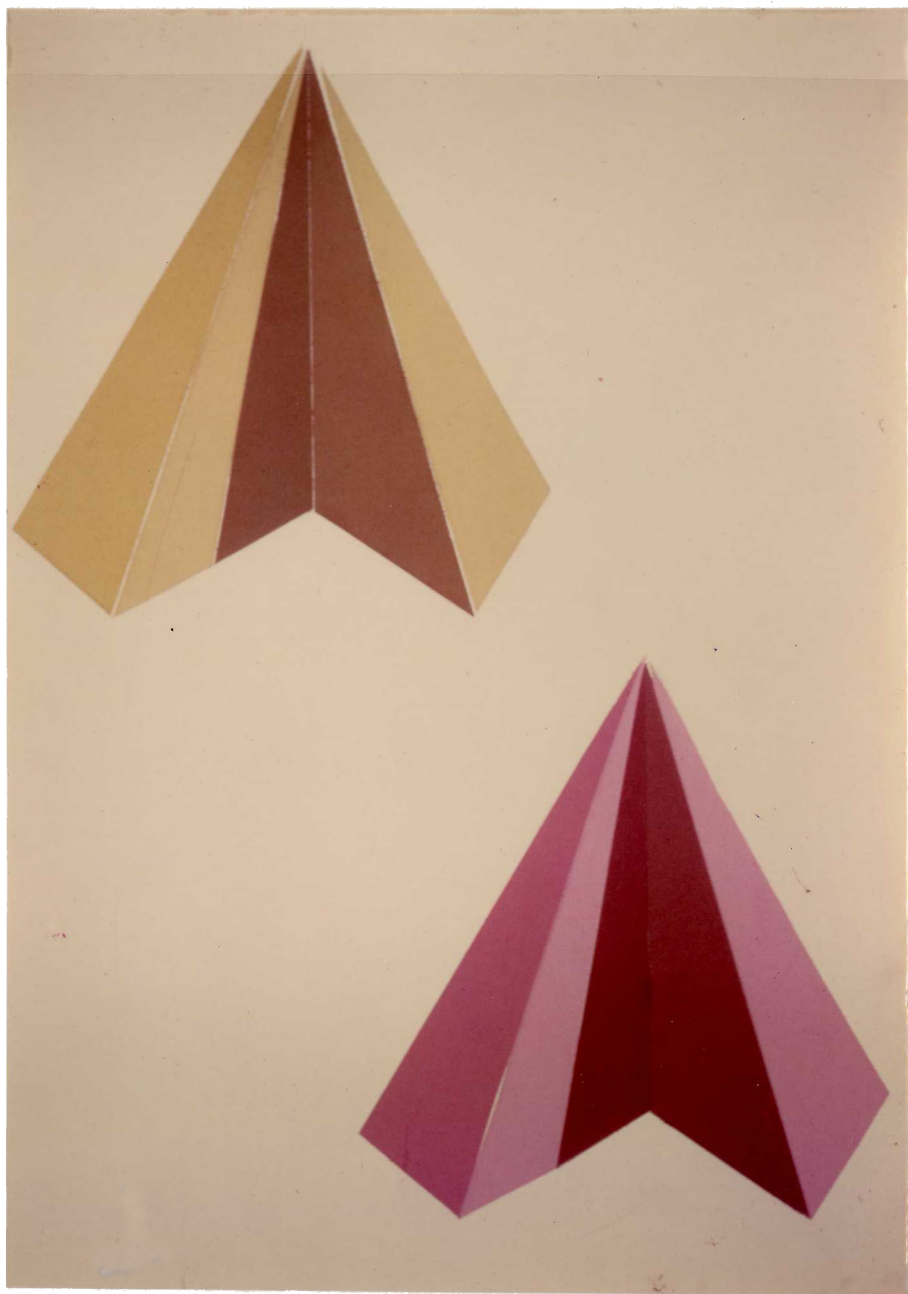


Plate IX

### Explanation of Plate X

Interior and exterior studies of biomorphic form in architecture are complementary in form and contrasting in color. Bright color has been introduced to interior architectural forms in mosaic floor patterning, the stained glass window and the door identifying with the biomorphic flow and shape of the interior space and as contrast to the neutral architectural colors.





Plate X

## CHAPTER V

## COLOR IN SPACE

Space defined: An interval between points or objects; a limited portion of extension; distance; area. The abstract possibility of extension; that which is characterized by ill-imitable dimension; continuous, boundless extension in all directions. The designer's concern is for the 3-dimensional qualifications of space.

Color in space is that element which can give a final definition to line, form or plane and may give movement, flow or a meandering to space. See Plate XIV. Color can establish the positioning or location in space of line or form. See Plate XI. This is accomplished only if there is a familiarity with color as a force of movement. Cool colors recede as do those colors that have been neutralized until they have a tendency to fade into a background related in color. The warm colors will advance but it remains that the warm neutrals will be less apt to recede than the cool neutrals. It would be incorrect to state simply that cool colors recede and warm colors advance. There are a great many degrees of advancement and recession when the factor of background color is introduced for added consideration. See Plates XII and XIII for examples of certain possibilities.

In design, color may create as a final statement:

- a) An illusion of space flow.
- b) A juxtapositioning of objects within the space.

- c) An arrangement of a single space into several spaces according to a function or need.
- d) A re-arrangement of spaces from formal to informal or vice-versa. This may also be termed as either static or dynamic.
- e) A definition of the quality of the space or as a means to draw attention to that space which defines the object.

In Interior Design, space is a word more likely to be only as important as the measuring of it or the determination of the pieces of furniture to be arranged within it to serve a function. Too often the final appraisal is heavy with concern for style, color, pattern, and texture and the spatial element is sacrificed. Designers must all be continuously aware that space may affect color: As a 3-dimensional force of length or width to separate colored mass or form and to give definition to forms in specific arrangements.

#### Proposed Problems

1. Illustrate on a board 12" x 12", an organization of STATIC space. Use colored forms.
2. See Number 1. Organize DYNAMIC space.

### Explanation of Plate XI

Enclosed space is given direction and progression with the use of overlapping and offset planes of color. Both hue and value location aid in this definition.



Plate XI

### Explanation of Plates XII & XIII

A comparison study of hues, values and intensities arranged in a 3-dimensional representations of space on contrasting hue backgrounds. As these are compared it seems evident that the study with the blue background has greater depth. There is less contrast between the darker colors and the blue background and as progress is made toward the lighter colors these are, when compared to the same group on the yellow background, greatly intensified. Identical colors have been used on these two studies, yet, as they are compared it appears that two different sets of colors were used. It is concluded that background color will tend to have effect on hue, size and the positioning of hue in space.





Plate XII

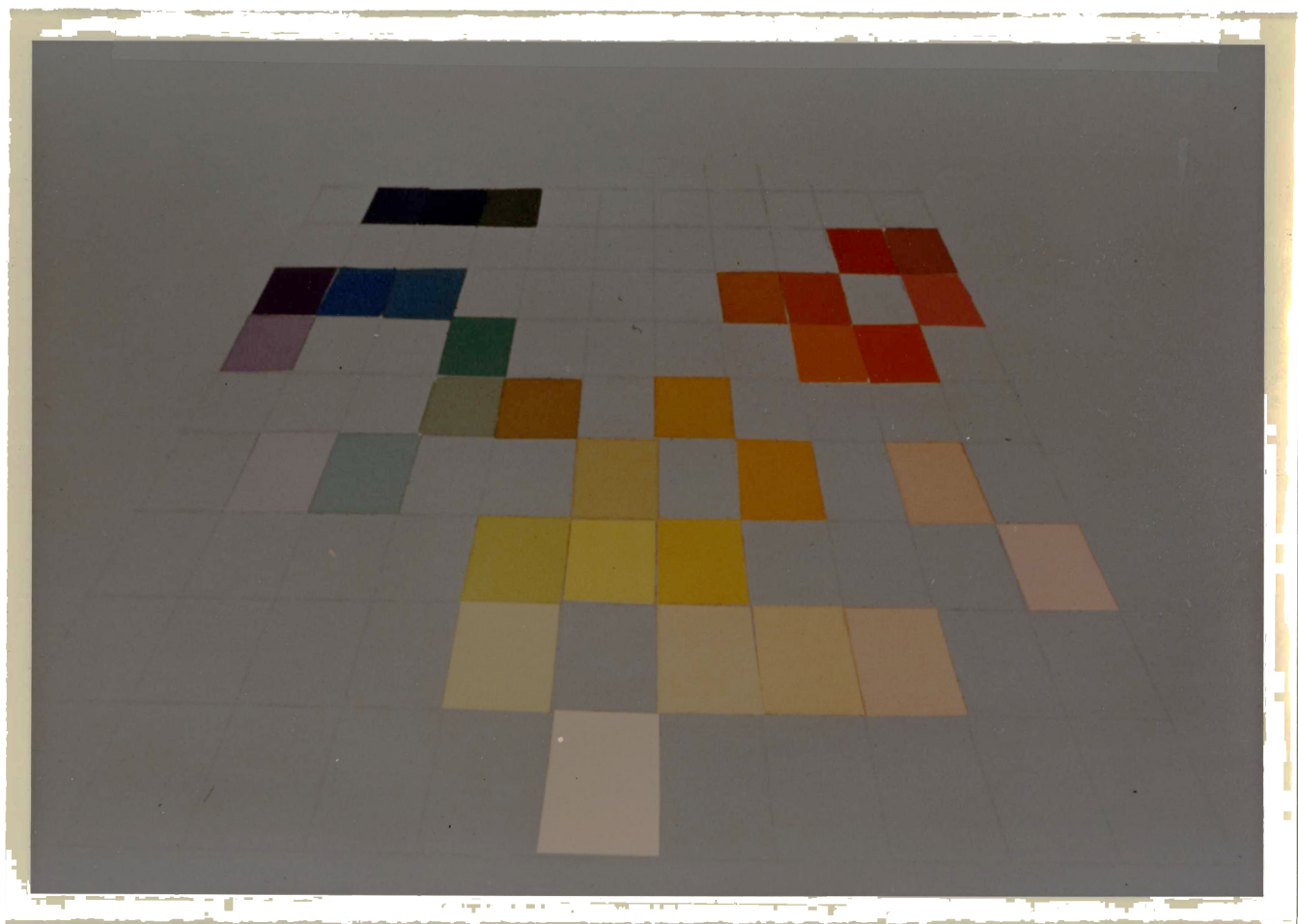


Plate XIII



#### Explanation of Plate XIV

Dynamic planes of color in organization of advancement and recession. These hues define and enclose the upper half of the total space and have both contrast and relationship. Contrast exists between the two hues, the blue and the orange and is also a factor in positioning of these two hues. The orange and yellow in their analogous relationship, have been assigned to the same surface area. The yellow, having the greatest properties of advancement, has, in its least proportionate use, the importance of penetration of the space as well as to bring into visual relationship the upper and lower areas of the total space.



Plate XIV

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## CHAPTER VI

## COLOR IN TEXTURE

Texture defined: The characteristic visual and tactile quality of the surface of a work of art resulting from the way in which materials are used.

With this in mind, color is combined with texture for discussion and examination of the relationship of hue to surface quality. See Plate XV. In nature where order is considered most perfect, we know the range of texture from the rough bark of a tree to the smoothness of its spring and summer leaves, the soft and pliable petals of flowers, the dry brittleness of a head of wheat or the spiny quality of the needles of the evergreens. Color adapts to these qualities. Imagine a delicate pink in tree bark, or in reverse thought, a dull, lifeless brown given to the bloom of a flower. A point of attention such as this is equally significant in interior designing. As an example, how could one justify the use of brilliant rough red texture in a Louis XV setting?

Observation of atmospheric conditions and their effects upon nature's colors may provide us with an invaluable source of information on reflection of a mood within a room. Preservation of the mood is dependent upon light control. Surface texture is highly dependent upon color to enhance it or to temper it. See Plate XVII. Inner texture, the visual variety, have varying effects upon color and, in the case of glass, will change and alter the color according to the variations or light available.

Light is a prime factor in discussion of color in texture.

Dominant texture is dependent upon light to justify its use; therefore, it would be fallacy to use it in a room having a subdued light source.

It also would be fallacy to use a dominant, and interesting texture in a dark color where little light is available. It is improbable that we would adjust our colors to suit the light changes of a single day.

Therefore it would be wise to make careful color selection with consideration given to the average lighting level.

Color's effect on texture:

- a) Color may change the character of texture: Emphasize it.  
De-emphasize it.
- b) Color in texture may create boundaries or may give form  
freedom or release from itself.
- c) Color in texture may give relief from boredom--variety  
in a living situation.

The effect of texture on color:

- a) Heavy textures: High to low texture levels will cause shadow and high light effects, --- therefore a visual bi-color will result. Planes of textured color as in carpeting will change from that viewed in the foreground to that in the distance.
- b) Fine to smooth textures: Smooth materials (glass, vinyls, etc.) will be of importance in that extreme high lighting will result and a pure even coloration will be broken and most of it lost.

A fine textured (silk) fabric may have degrees of color change. This generally is more in evidence in a silk woven in two hues--warp in one color and weft in another color. Three colors will result here according to the direction in which the fabric is viewed and the lighting conditions. These colors will be, that of the warp, the weft yarns and the mixture of the two. Both high and low lights will result from the nature of the fibre alone when both warp and weft yarns are the same color.

- c) Smooth surface: (Not high-lighted). Will appear darker than the same color in a surface with a fine texture.

See Plate XVI.

### Proposed Problems

1. Create four types of textures in 3" x 3" squares. On each of three use a different hue and vary it by introducing a value or intensity (chroma).
2. Create three textural surfaces in different shapes. By your color choice emphasize one.
3. Using three forms (textural) of unlike size, arrange them in a manner that will create a visual 3-dimensionality, (movement in space). You might experiment with one hue in three different materials.

### Explanation of Plate XV

Rough, natural textures are accompanied by, complemented and balanced by the use of equally Strong warm hue in highly textured fabric and in smooth, architectural block forms. The texture in in the fabric also provides a surface and color transition from the natural material to the smooth blocks in the pure hue.





Plate XV



#### Explanation of Plate XVI

Smooth textures in various materials are complemented by the use of light values of neutral, related colors and act to emphasize and encourage space flow.



Plate XVI

## CHAPTER VII

## COLOR AS EMPHASIS

Emphasis defined: Insistence upon a particular object or color as of pre-eminent value or importance. A principle productive of unity and variety. It can serve either or both.

The two parts of emphasis are dominance and subordination. One cannot be present in a successful design without the other also being present.

Dominance in Color

The warm colors, as a group, may be considered dominant within any total color group. At full intensity or saturation, they have a more dominant, intense brightness than the cools, at full intensity, do not possess. This quality will enable the color to emphasize form and line and will be most noticeably outstanding in a spatial arrangement. See Plate XVIII. The degree of intensity and dominance will increase on cool colored backgrounds.

In examining the dominance within the range of cool hues, a pure green may be the most dominant when compared to the other remaining cools also in a pure state of saturation. Once again it is always of importance to consider any background color that is in use: Bright green against a light green or bright green against a pink. Will the green become more dominant as a color against the light green or against the pink?

In design, either 2-dimensional or 3-dimensional, one major element should be strong enough to command the viewer's attention, --- a dominant form, perhaps which alone, is able to project the "message". In a building it may be a repetitious use of arches projecting an emotion, --- serenity. Therefore an aesthetic feeling becomes the dominant factor and the materials, methods of construction and even the surrounding elements become various degrees of subordinants. Color should be made use of, in such a case, as a factor of emphasis of the emotion though the color may not be a part of the dominance.

One additional factor of importance here lies in the ever existing possibility of the danger of color over-powering (dominating) form. Would we dare paint the facade arches of a mortuary in a bright red?

#### Subordinance in Color

This factor is relegated to secondary position when dominance is present; therefore, we may assume that subdominant color is that which is either in small amounts or, for the most part, altered when it is accompanying a pure hue in dominant proportions. As these terms are examined in their relationship to color, the design principle of balance continues to emerge for consideration. This has to do with color as it is in use on several forms in a design arrangement. One form may be dominant, --- the remainder, subdominant, yet balanced as a group against the single form. See Plate XVII.

#### Proposed Problems

1. Using four forms: Make one dominant, the remainder subdominant yet balanced to the one.

2. Using four forms: Use three as the dominant factor and the remaining one as the subordinant.

### Explanation of Plate XVII

Dominance in color proportion, form size and form positioning. As the principle of emphasis requires, there are a limited number of objects and colors. Variety is served by the two different forms and their sizes and unity provided by the use of related color.

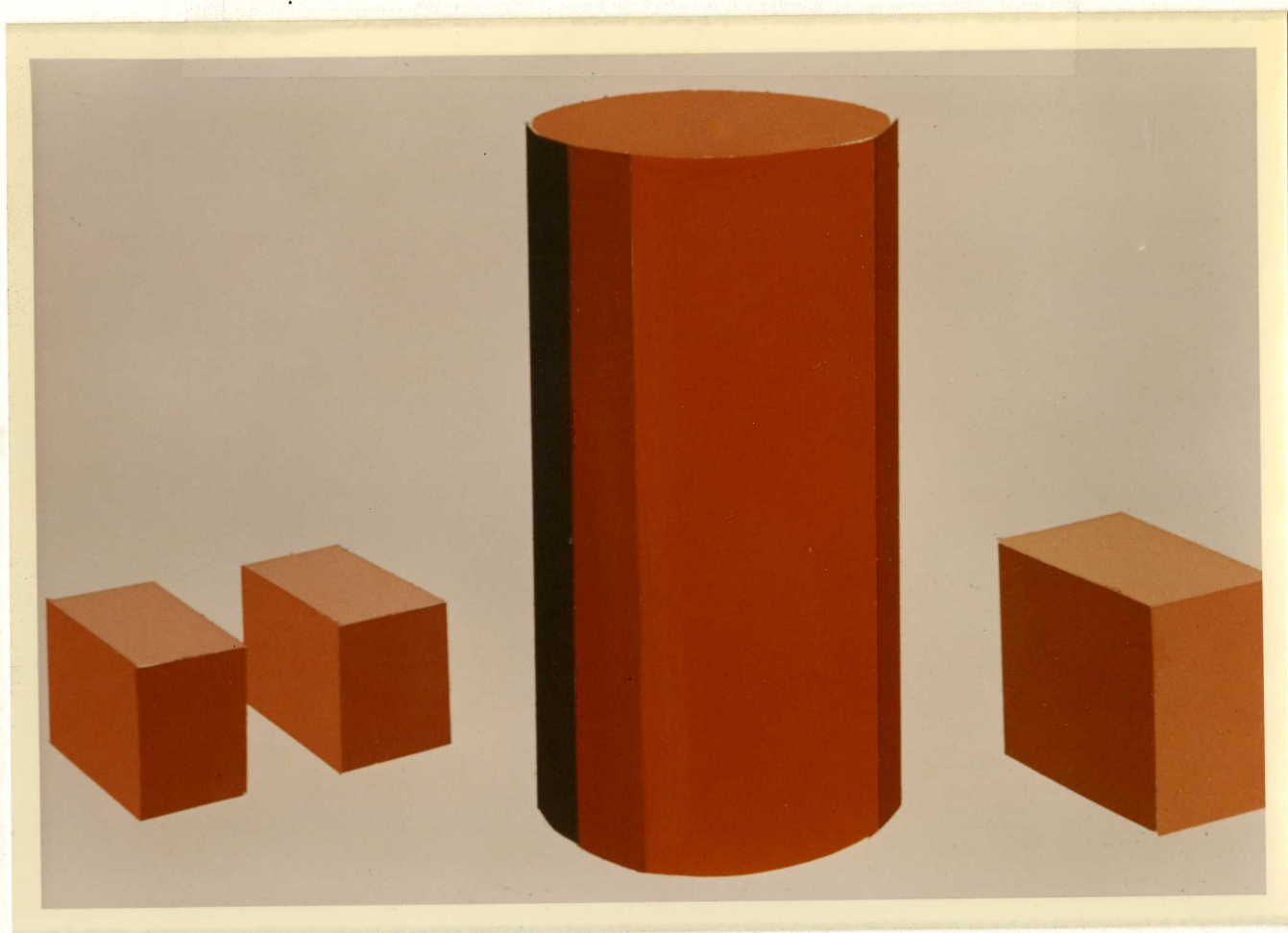


Plate XVII

### Explanation of Plate XVIII

This room is predominantly in neutral color and therefore provides an ideal situation for repeated use of intense, related hues in various proportions to play a dominant role. The forms in these hues are simple and are also related to insure preservation of the importance of the dominance factor.





Plate XVIII

## CHAPTER VIII

## COLOR BALANCE

Balance defined: Equilibrium of all contributing parts in a work of art to create unity. In color: The role of color in this definition is dependent upon like proportionate amounts of hue, value and/or chroma as they are applied to like or equal forms, lines, etc.

Measurement of hue, intensity or brilliance in proportioned use: A red square (the red in a pure state), 2" x 2", accompanied by two pure yellow and two orange squares each 1" x 1". Proportions of hue are identical but the red, being of stronger intensity than either of the yellow or the orange, will create an imbalance unless accompanied by an identical set of the aforementioned forms. A shifting of the hue arrangement will provide an asymmetrical balance. Analogous colors, through their relationships, create spatial movement, and contrasting colors provide varied accents and focal points of interest. See Plate XX. Both are used to exploit the limitless dimensions of space.

According to proportion: Whenever more than one hue or a single hue and its variations are introduced into design, these cannot all be proportionately the same even though a variety of forms are introduced. The proportionate variation of color in design reduces the possibility of boredom and a loss of unity and variety.

A single pure hue in any proportion may dominate the design while accompanying colors may serve as the subdominant elements to balance

the total design. See Plate XIX. Where there is no pure present, larger proportions of a value or intensity must be present to draw the required attention. There must be a dependency upon greater variation of both the accompanying color and its proportionate use.

The principle of balance includes three basic types: Symmetrical, asymmetrical and radial.

### Symmetrical

(Formal) This occurs when two identical colors are in use on two identical lines or forms, e.g., a mirror image. This type of balance may be either passive or active according to the hue used. If the action of the line or form suggests a passive nature, the hue or hues given it should serve to complement the mood, e.g., the Taj Mahal. In the matter of active line or form, the hue or hues may serve to further emphasize the activity. Examples may be monochromatic arrangements, neutral or low tones.

### Asymmetrical

(Informal) This type of balance will be more vigorously active, more dynamic than the symmetrical. There is less danger of boredom or monotony occurring in the asymmetric arrangements in design. Movement, spontaneity and sometimes a casualness will be present. Pure hue may dominate to assure the nature of the activity, whereas degraded color or low tone is likely to destroy the activity. Contrasting color schemes are the most probable choices. See Plate XXI.

### Radial

This generally is a symmetrical or asymmetrical arrangement of the major design parts from a center or focal point creating a sense of circular movement. (1) Analogous or gradated colors will insure a progressive type movement in a 2-dimensional study. (2) A combination of advancing and retreating colors will serve as agents to produce a 3-dimensional, radial design. See Plate XXII.

### Three Problems in Color Balance and Proportion

Purpose: To create visual mobility considering the three principles of balance and proportions of both color and form.

Limitations: Three colors only; two forms only, and a 2" x 5" rectangle and one a 4" x 4" square placed against a single colored ground.

1. Using complementaries
2. Using an analogous grouping
3. Using a monochromatic grouping

#### Explanation of Plate XIX

This plate illustrates asymmetrical proportions of related hues in identical form size groupings. The balance represented is, according to form, symmetrical, but according to color, is asymmetrical. The color dominates the form when proportion is the major consideration.

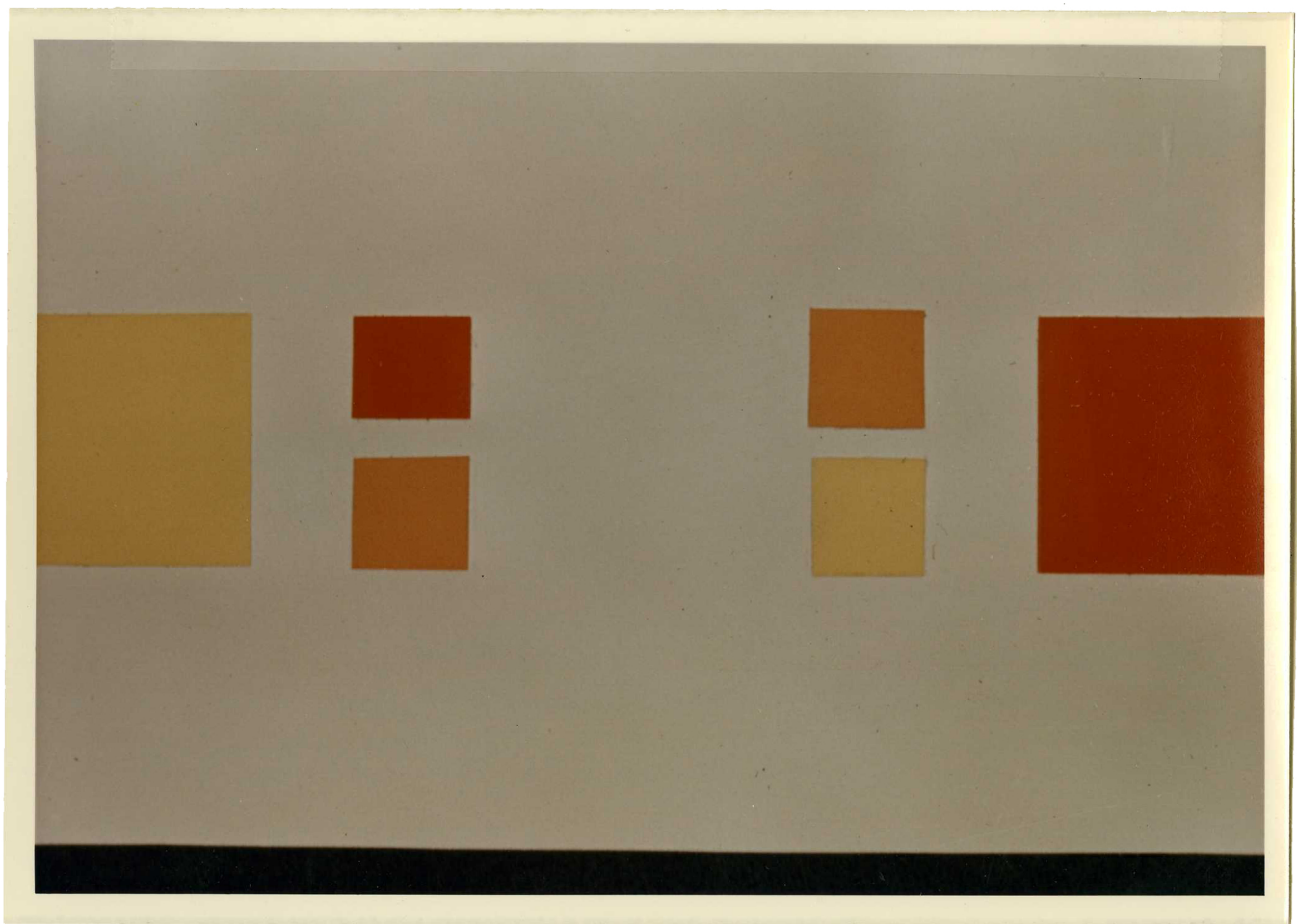


Plate XIX

### Explanation of Plate XX

As a symmetrically balanced design is viewed laterally in a 3-dimensional space the organization of the elements may not appear to be symmetrical but rather asymmetrical. Color may also change according to the angle of viewing and according to the effect of a neighboring color. Forms in the foreground may retain certain slight intensity variation, but as form is projected into space the degree of color change is increased.

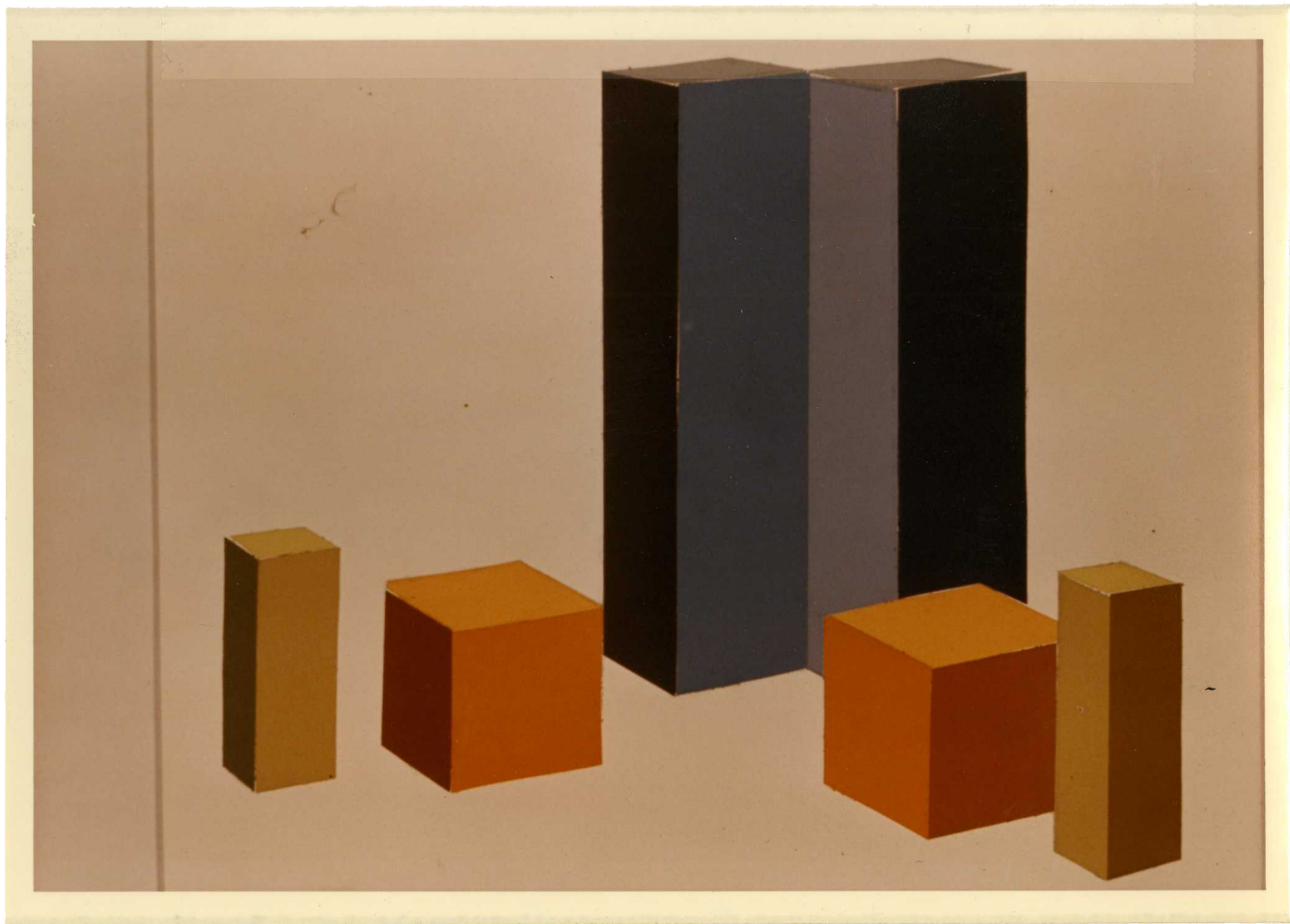


Plate XX



### Explanation of Plate XXI

The forms to the right and left are identical in size but as they are viewed in a space represented 3-dimensionally and in differing positions the left one appears smaller. This visual effect is assisted by the use of the intersecting lines in both a low intensity color and a contrasting hue. Asymmetrical balance exists between the two forms to the right and left by color application and also between the three forms appearing here.

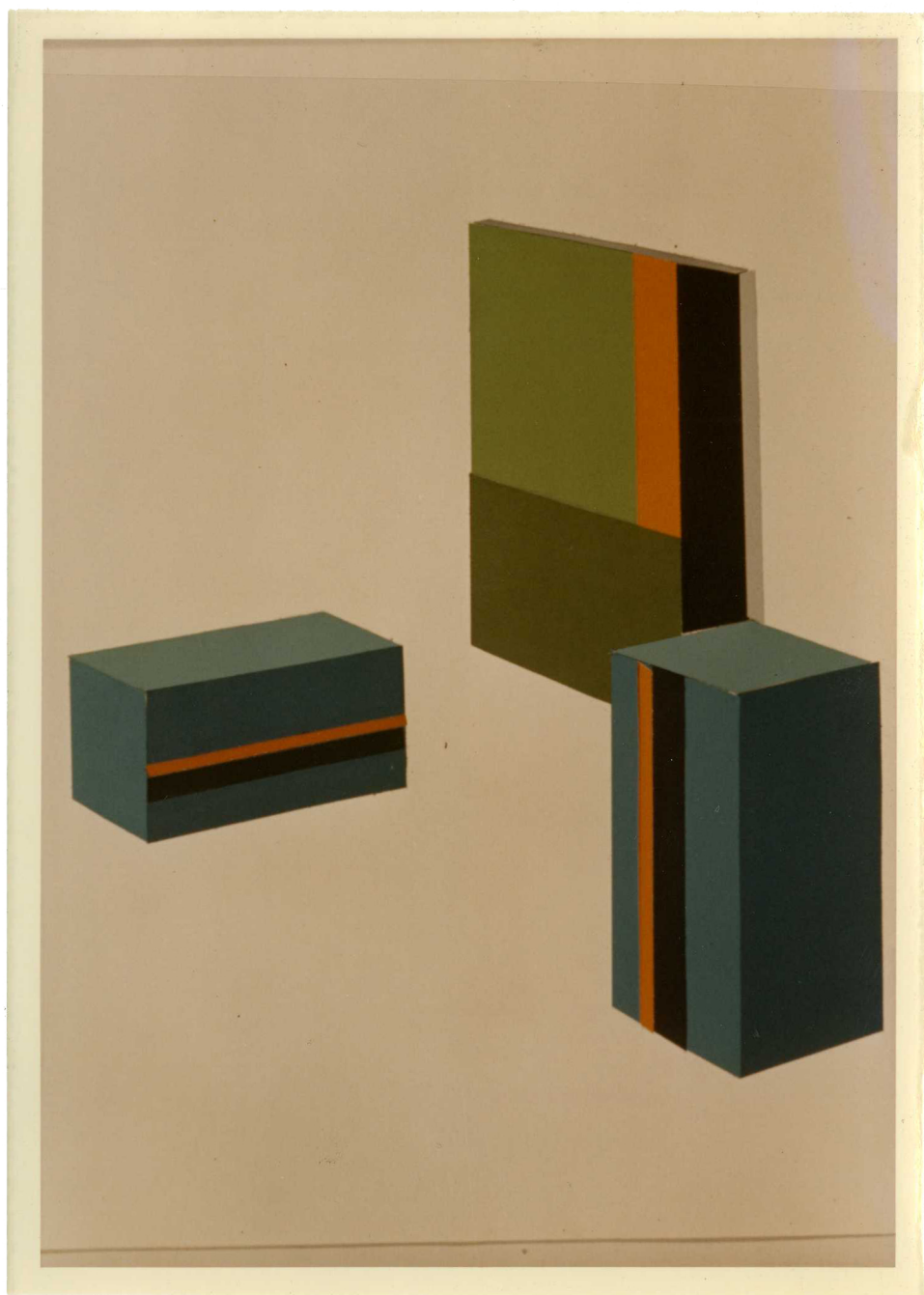


Plate XXI

Explanation of Plate XXII

A representation of principle of construction found in a curving stairway using color to enforce the factors of advancement and recession of the steps in their radial positioning.



Plate XXII

## CHAPTER IX

## COLOR CONTINUITY

Continuity defined: (Webster) The state or quality of being continuous. That which gives an orderly sequence.

Color Continuity. Color sequence...a progression. Ex., a monochromatic plan in the case of a single hue, red (value progression); an analogous plan in the case of related hues, e.g. warm or cool; hues in sequence from warm to cool.

Continuity may be maintained to some degree where hues having red are used, e.g. orange, red-violet, blue-violet. The strength of this classification is weak and should be given little consideration due to missing color steps.

Within the living-working environment we find more and more the need to use color with discrimination and knowledge. Color use reflects the mood or trend or social conditions and demands. During World War II darks and neutral walls were a reflection of the somber attitudes of the times. At this writing we are on the other side of the coin with color being used in an almost fanatic and artificial manner; pure bright hues crashing in argument for dominant position. Continuity has been temporarily side-tracked in favor of fad. That part which remains has been the leveling factor, that factor of contrast that restrains us from a total mental submission to instability.

Color continuity may be implied with a series of like color forms or lines in orderly arrangement. These forms may be identical or may vary in size as they are reduced by a step process to insure a

retention of continuity. This may be that type of continuity known as progression. See Plate XXV. The identical arrangement; like forms and that distance between their location may be extended as the repetition factor by the repeated use of a single hue. See Plates XXIII and XXIV. A third type of continuity is known as alternation. See Plates XXVI and XXVII. This is described in the simplest form as two identical forms in alternate arrangement. Once again as color is introduced it may serve to emphasize the factor in its role.

Color continuity may serve the purpose, in a room, to accentuate visual depth or distance. There must be present a continuity of space flowing in a sequential manner around or in and out between the lines or forms. There must be an implication of an existence of space separating the lines or forms. Without this we would have only disorganized massed of color in line or form and continuity would lose the major part of its meaning.

#### Proposed Problems

On three plates 15" x 24" illustrate examples of the types of continuity as may be found in today's architecture.

Explanation of Plate XXIII

A simple and direct example of color used  
repetitively in like form arrangement.



Plate XXIII



#### Explanation of Plate XXIV

Color and form repetition in a 3-dimensional representation. This illustrates that color may be enhanced as form is projected into space in organized repetitive use of identical form, form size and hue. This type of arrangement brings regularity and order to both architectural design and interior space.

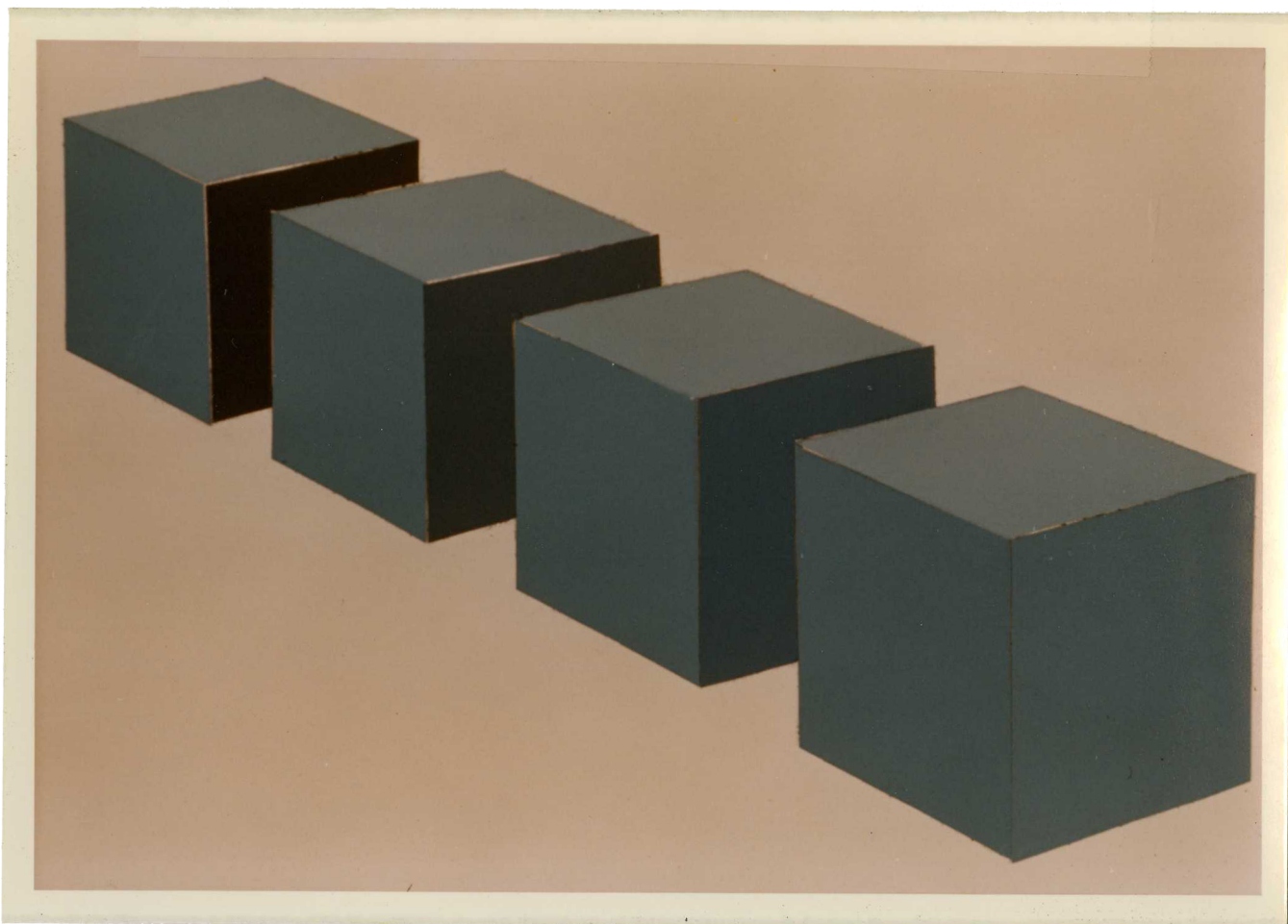


Plate XXIV

#### Explanation of Plate XXV

A 3-dimensional representation of sequential change of form, color and space. Analogous colors are used here in combination with form progressively reduced in size on the face and increased in depth with the space between the forms increasing progressively.

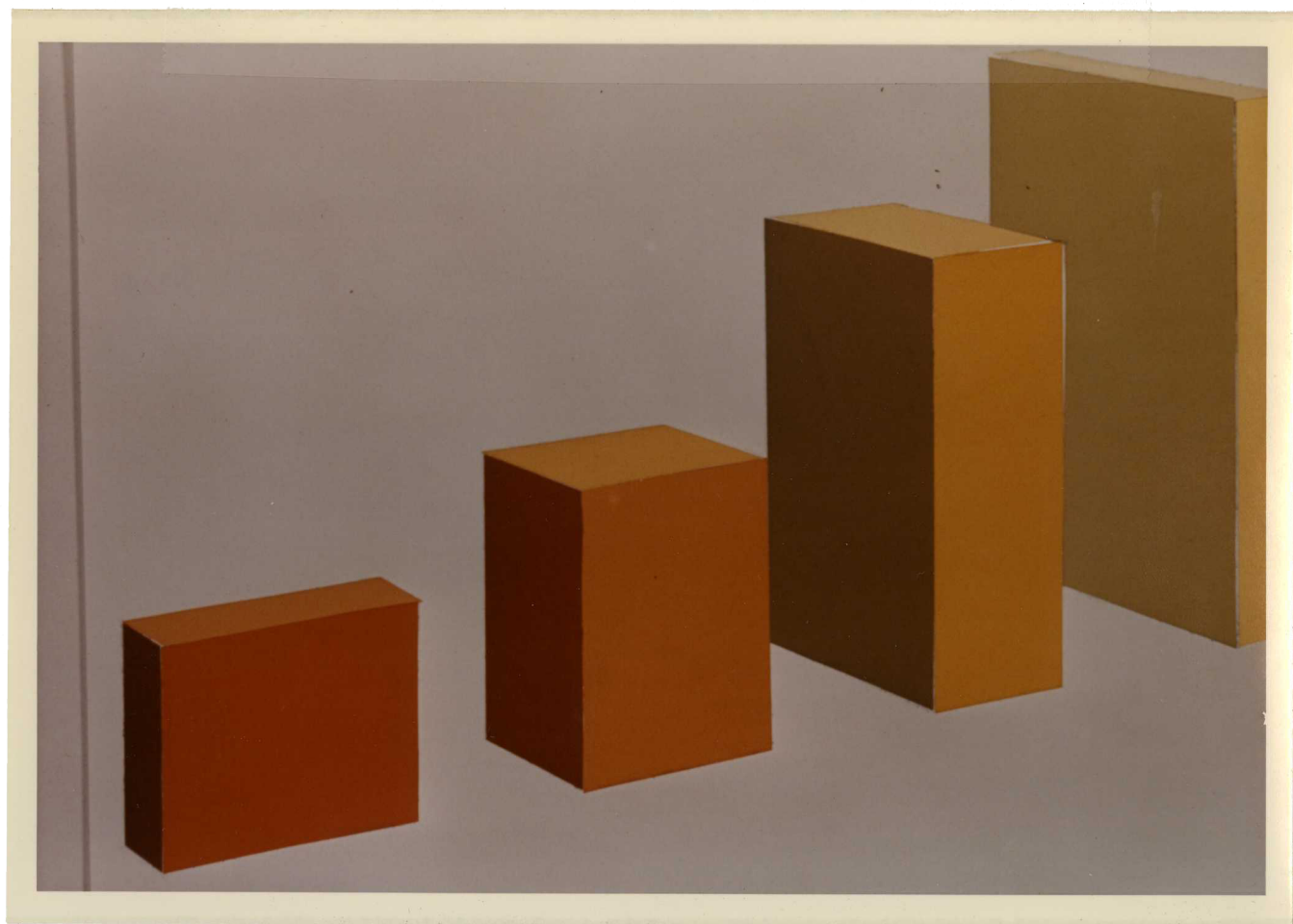


Plate XXV

### Explanation of Plate XXVI

Complementary colors in alternation form and positioning. In the form, color and spatial depth provide a more active arrangement of the elements. The use of contrasting color will further accentuate activation of space.

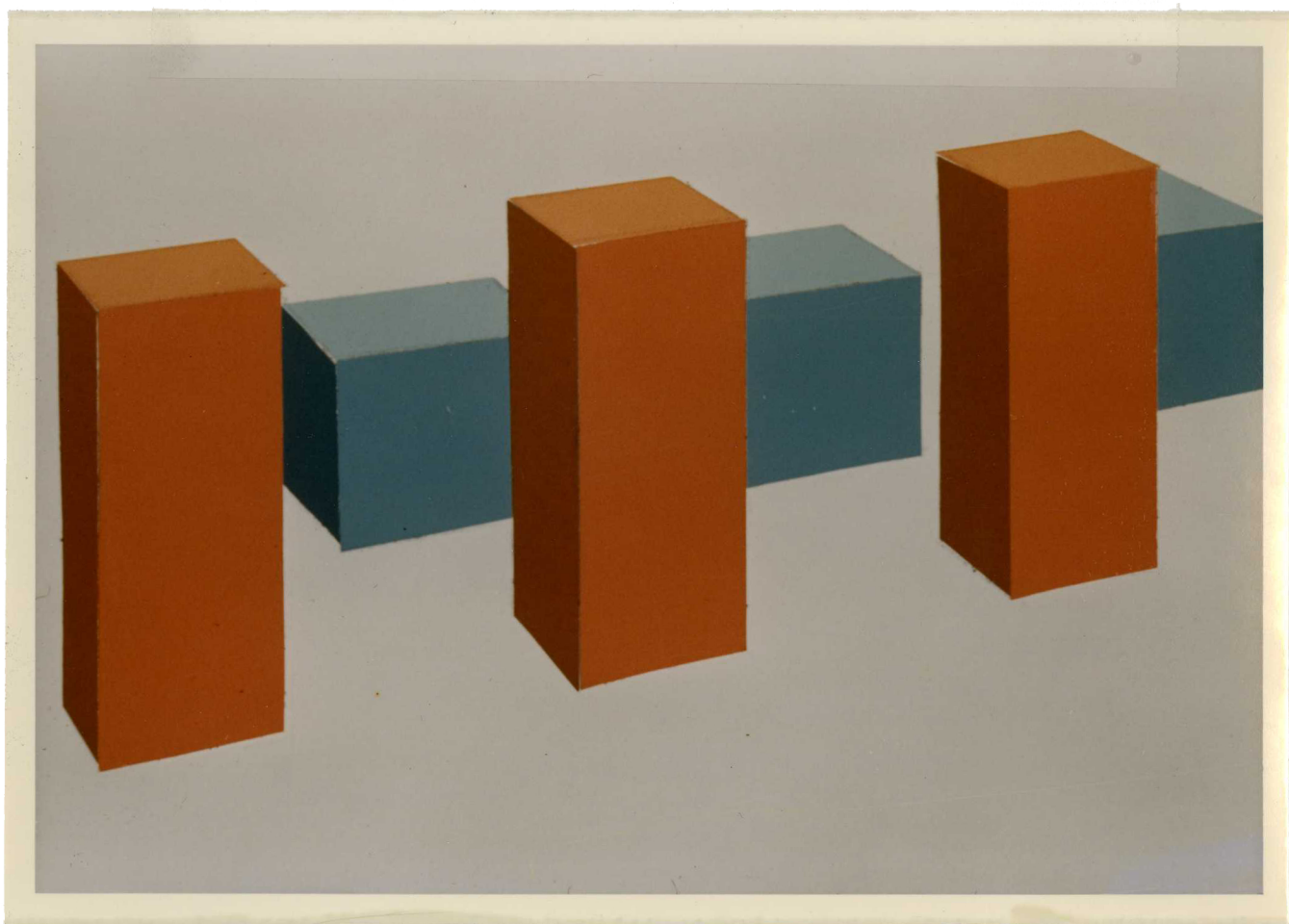


Plate XXVI

#### Explanation of Plate XXVII

The principle of alternation is represented here very simply in the use of related color and value level in the pillow forms on the curvilinear sofa. The close relationship of the color provides an even transitional flow as it accents the directional line of the sofa.



Plate XXVII



## CHAPTER X

## COLOR POLARITY

Polarity defined: Duality, dualism, duplicity. Opposite, reverse, counterpart, opposition.

The word polarity is introduced here as something of a composite type of principle, unique in that it has a distinctive opposition within itself (perhaps as grey is both black and white). As designers we must search out those terms which best give description to design under given conditions of environmental experience. Polarity seems apt as we examine the many means to improvement of life. Simply stated, in all design we must make use of and integrate both the agreeable and opposing factors.

Color may have polarity in that it has that ability to attract and oppose within itself. The various forms of attraction may be assumed to be between related colors, (monochromatic and/or analogous schemes) and opposition may be placed between those contrasting colors of the triad, complementary, split-complementary, double-complementary and the tetrad schemes. Additional degrees of attraction and opposition may be found as color is applied to form, line and arranged in space. See Plates XXVIII and XXIX. Color in form continues to have importance and as form also has relevancy to the state of polarity, it becomes increasingly important in design. As form's place is established in the design it must have, as does color, that contrast and agreement which bring variety to the work.

Example:

1. If one large dominant form is presented in a pure hue, the opposition may be represented as two smaller forms in colors contrasting to that of the larger form. See Plates XXX and XXI.

2. If a monochromatic scheme is incorporated into use on several forms, which are square but of differing sizes, the color may be the singular factor of attraction.

Locality of Color. Polarity may have solidity or assurance when the correct colors are positioned to maintain an attraction for one another, yet the forms may be in shape of size opposition. If color is changed to become contrasting, visual separation of the design elements may become so extreme that polarity may also become extinct.

Problems in Polarity

In a room, 10' x 12' develop a furniture arrangement which includes the polarity factors of both attraction and opposition with the emphasis placed on attraction.

In a room such as a hotel lobby, design an arrangement of furniture using the two colors, orange and yellow only. Place the emphasis on the opposition factor.

### Explanation of Plates XXVIII & XXIX

Polarity: Two studies of both duality and opposition factors. In Plate XXVII duality is found in the pair of large yellow forms, their sizes, and form relationship to the blue form. Opposition is present with the introduction of the small blue form, its size and hue contrast to the yellow forms and the positioning of these three. Attraction is gained through the duality factors, variation through the opposition factors. In conclusion, as these two plates are compared the pair of large yellow forms seem to possess less attraction to the small blue form than do the pair of large blue forms to the small yellow form.

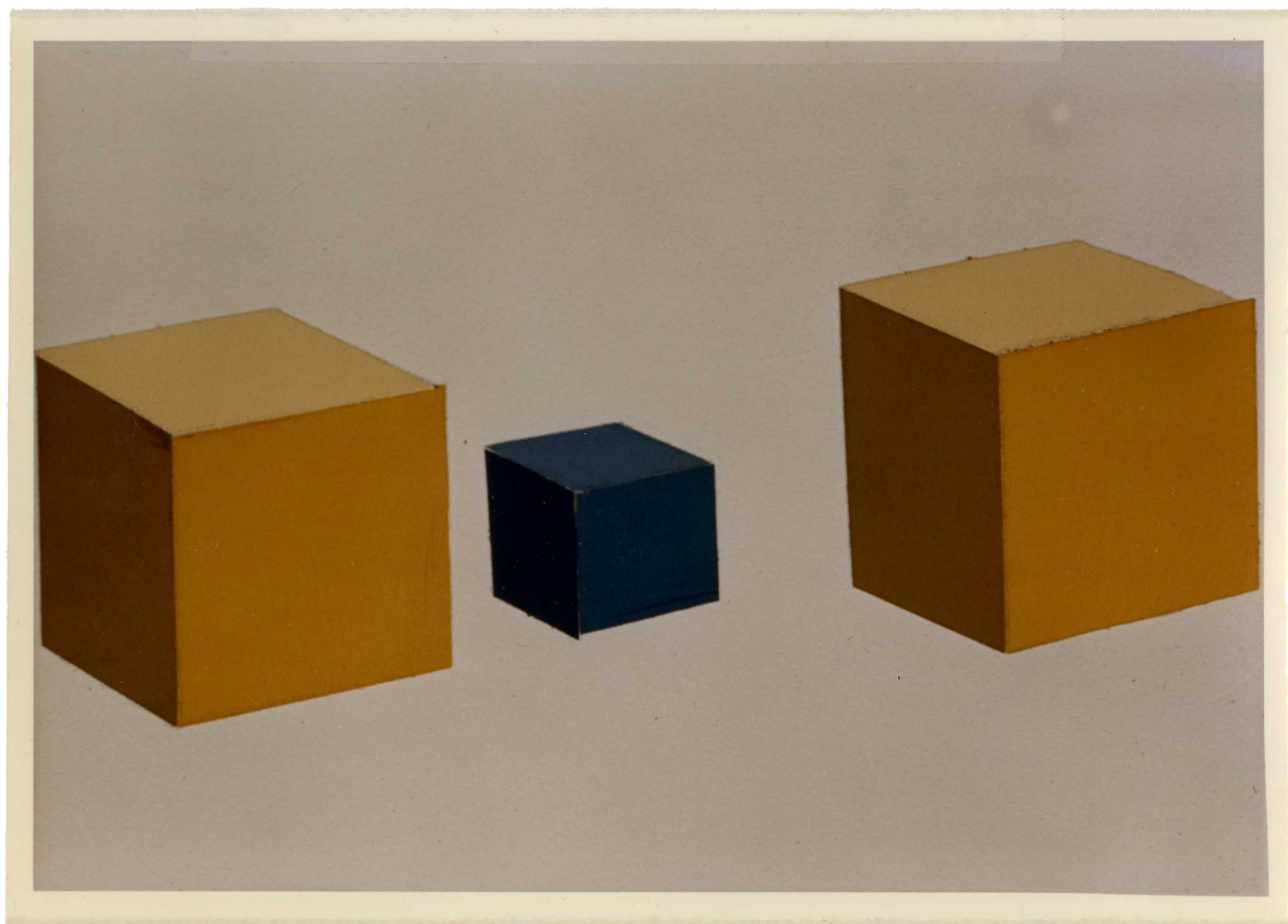


Plate XXVIII

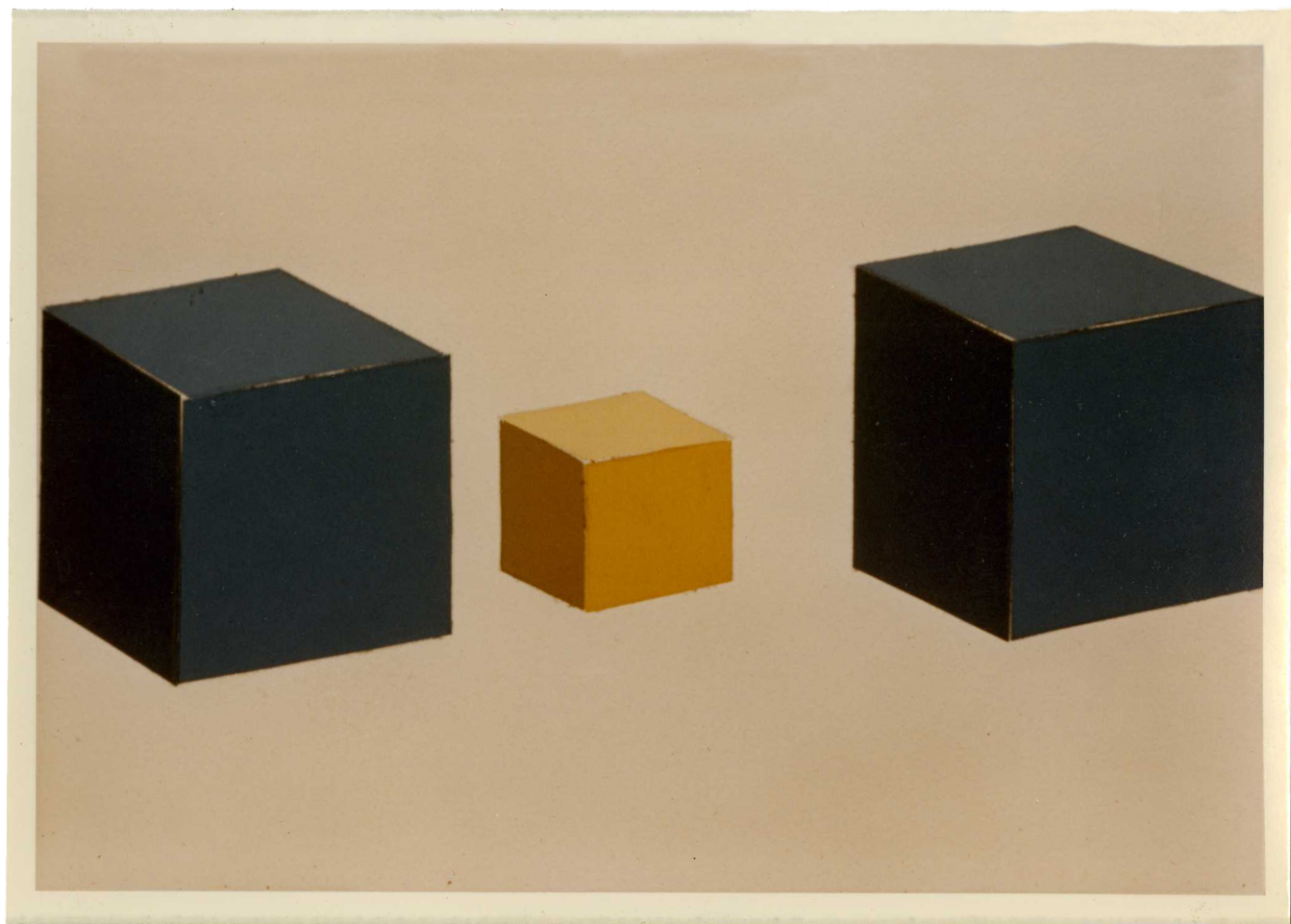


Plate XXIX

#### Explanation of Plates XXX & XXXI

Polarity: The hues and number of forms are the only identical factors here to Plates XXVIII and XXIX. Reversal is found in form, size and proportion of hue. Change is found in positioning of the three forms. These differences do appear to change the attitude of attraction concluded in Plates XXVIII and XXIX.

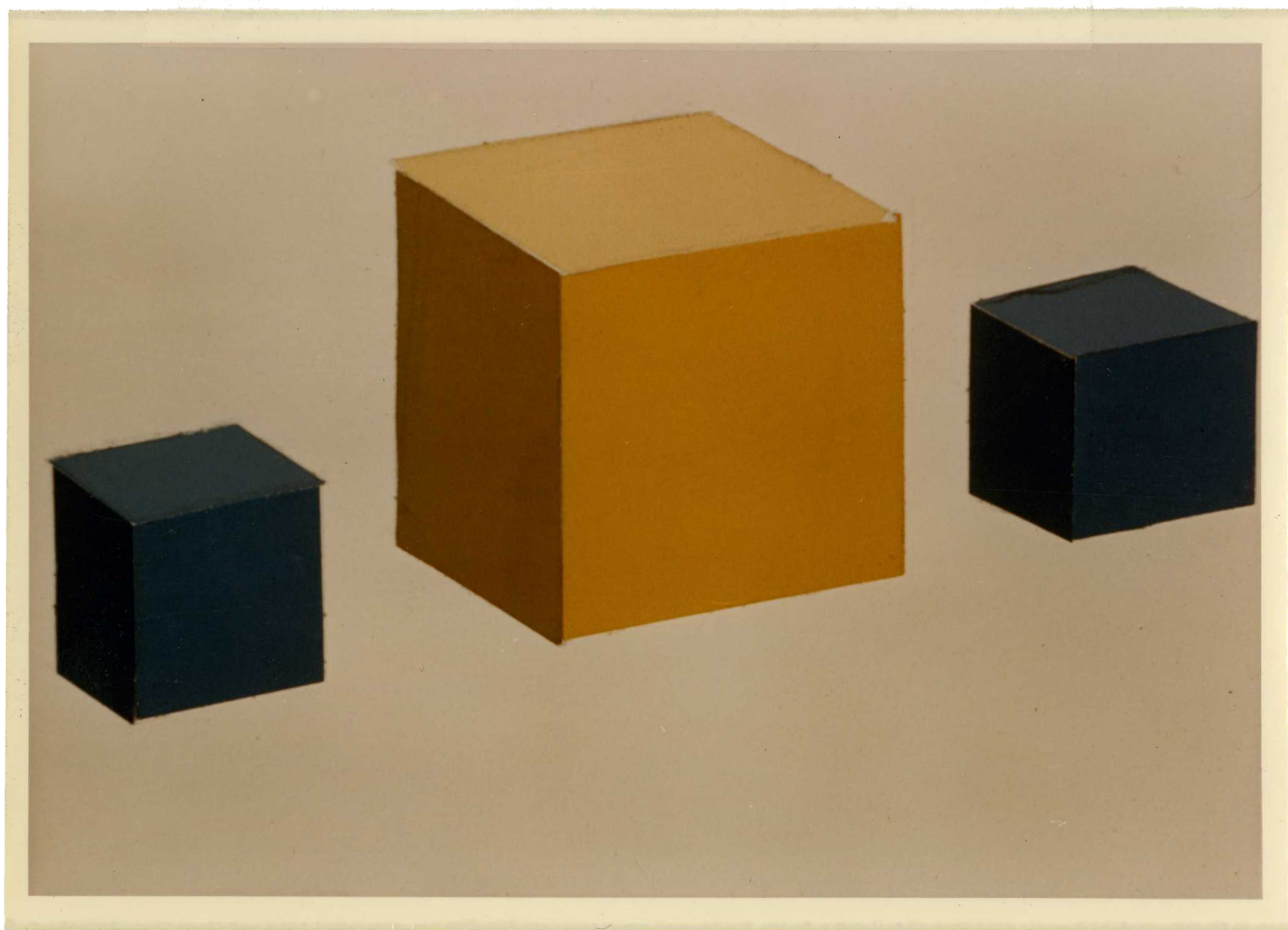


Plate XXX



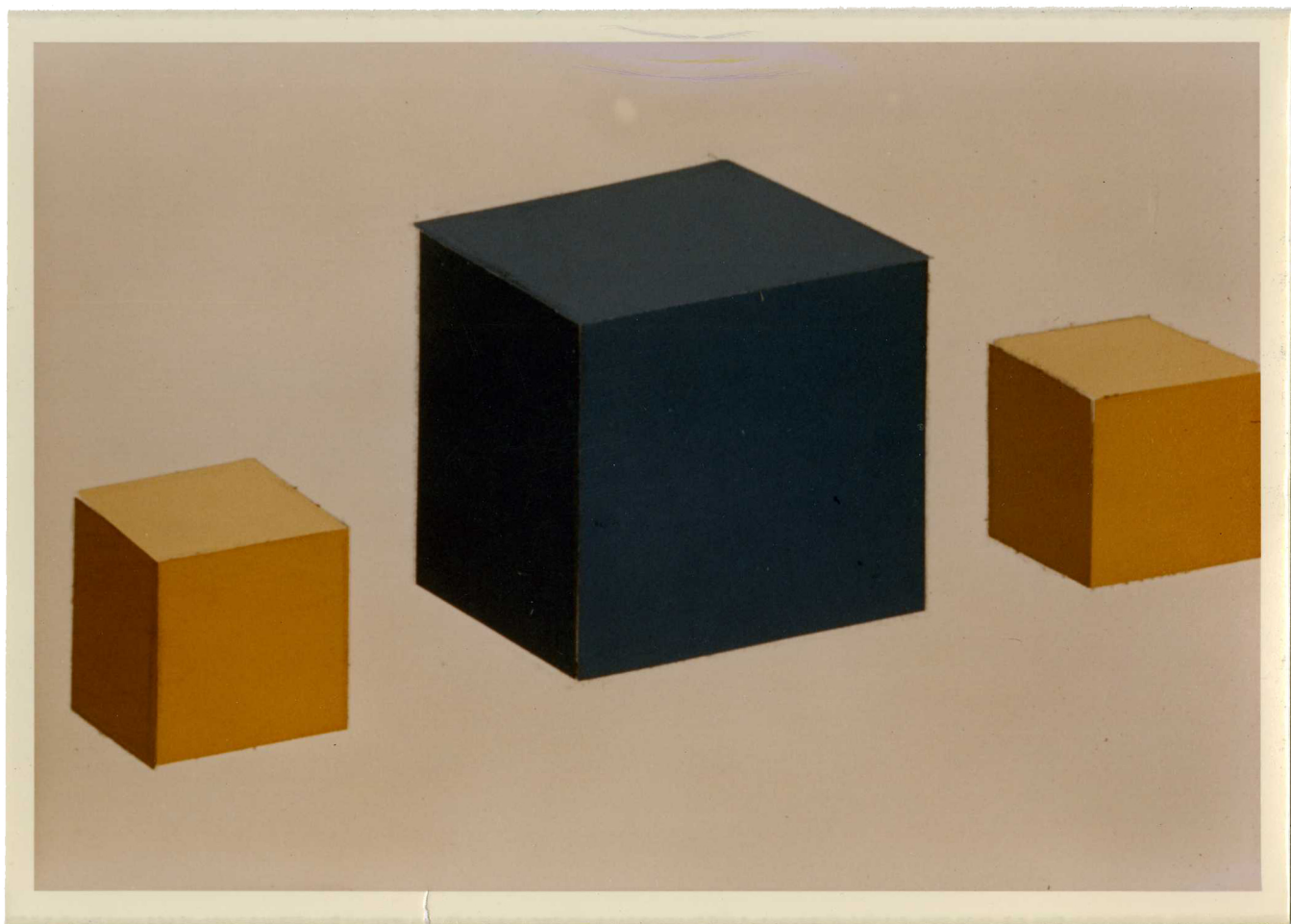


Plate XXXI



## SUMMARY

Fundamental color studies, those based only on pigmented mixtures, color wheels and value and intensity charts in 2-dimensional exercises, are extremely inadequate preparation for 3-dimensional space designers. Educators, in many cases, are equally unprepared to present design students with advanced color experimentation problems relative to 3-dimensional studies. The work done herein has been done with such discrepancies in mind and provides a basis for additional, in-depth studies.

A color study such as this is highly dependent upon the inclusion of photographs and 3-dimensional color plates using simple forms which can be construed as either forms in architectural structure or forms in furnishings. The quality of the color used for the plates had to be of such clarity and strength that the photographic reproductions, both in slides and prints, would be assured.

It has been determined, by experimentation with assorted color groupings used in the plates, that color may be manipulated and organized according to the requirements of form, line and texture within any given space. Since there are innumerable color combinations, and with the added consideration of 3-dimensional space, it is possible to change visually, the shape and size of forms, interrelationship of forms in design organization, and color itself.

As the principles of emphasis, balance, continuity and polarity are examined, color proves itself a major factor of enforcement and identification of the principle. It is relatively simple to devise a single

problem representing and given principle or a combination of principles and to these apply different color combinations to form, line, etc. It is not so simple to predict the effects of the aforementioned principles and their requirements of organization upon color and vice versa.

The proposed problems will hopefully provide various means to advance to specific studies of color as it is applicable to use in 3-dimensional space. These problems have been suggested to be solved on 2-dimensional surfaces, but from these it would be recommended that they be translated to 3-dimensional studies for additional forms of experimentation.

## A GLOSSARY OF COLOR AND DESIGN TERMS

Accent: Any stress or emphasis given to elements of a composition which makes them attract more attention than other features which surround or are close to them. Accent may be created by brighter color, darker tone, greater size, or any other means by which difference may be expressed.

Achromatic: Relating to differences of lightness and darkness; the absence of color.

Advancing Color: A strong, usually unadulterated color which appears to advance to the front. Warm colors (e.g., red).

Aerial or Atmospheric Perspective: Use of value and color modification to suggest or enhance the effect of space.

Alternation: Reciprocal repetition. Regular and repeated interchange in succession.

Analogous Colors: Closely related colors, especially those in which we can see one common hue; neighboring colors on the color wheel.

Asymmetrical Balance: (a) Visual control of contrasts through a "felt" equilibrium between parts; (b) Judgment or estimation of the forces and their tensions in a work of art so that they balance each other in a total concept.

Balance: Equilibrium of all contributing parts in a design.

Bio-morphic Shapes: Shapes which are irregular in form and resemble the freely developed curves found in organic life.

Body Colors: Pigments, whether oils or watercolors, which possess 'body' or opacity, as opposed to those pigments which are transparent.

Broken Color: Color which is varied by the introduction of other colors.

Strictly speaking, an inevitable condition of painting, since each color is both affected by, and in turn, affects the colors in proximity.

Chromatic: Relating to color.

Color: The character of surface created by the response of vision to the wave-length of light reflections.

Color Interval: The degree of visual differences between two colors measured in steps of hue, value and chroma.

Color Scale: A series of colors that exhibit a regular change or gradation in one or more dimensions.

Color Unity: Color harmony, because the main colors employed in a picture or environment are to be found on the same side, or in the same segment, of the color circle.

Complementary Color: Two colors which appear directly opposite each other on the color wheel. Any pair taken together, includes all the primary colors.

Composition: The act of organizing all of the elements of design into a harmoniously unified whole. Each element used may have intrinsic characteristics which create interest, but it must function in such a way that the whole is more important than its parts.

Contour: The outline or external boundary of a form. The illusion of a line enclosing form.

Contrast Effect: When placed side by side, complementary colors, (e.g., red and green, orange and blue, yellow and violet) appear intensified.

Cool Hues: Green, blue-green, blue, blue-violet and violet.

Curvilinear: Stressing the use of curved lines as opposed to rectilinear which stresses straight lines.

Degraded Color: A pure color which has lost its brilliance through the addition of a neutral color.

Design: The art of relating or unifying contrasting elements. Man-made order, structure, composition, organization, form. The art of creating pleasing units.

Distortion: In art, any deviation from the normal, objective shape, form, and general appearance of things.

Dominance: (a) The featured or controlling part or parts of a design;  
(b) A strongly contrasting part, idea or theme in a design.

Drowned Color: See "tormented color".

Earth Color: Those pigments, such as yellow ochre, terre verte, and umber, which are obtained by mining. They exist in veins and pockets and owe their color to the presence of compounds of iron and closely associated metals like manganese.

Emphasis: Instance on a line, shape color or other form which makes it more prominent.

Foreshortening: The apparent shortening of forms in relation to the angle from which they are observed. The appearance of shortening becomes more acute as the angle between the eye-line and the nearest point of the form, e.g., an outstretched arm, is reduced.

Form: (1) In general, the final and total appearance of the art object.

(2) The organization and use of the elements of art; includes the principles

of organization, the technique and the media. (3) The unification and expressive handling of primary devices into artistic combinations. (4) Often loosely used to mean shape.

Formalism: In art or design, the representation of the ordered aspects of a subject, irrespective of its subject content.

Gradated Color: A passage of color which gradually changes its hue, chroma, and/or value.

Harmonious Hues: Adjacent or similar hues, such as blue-green, green and yellow-green. (Synonym: Analogous)

Harmony: Combination or adaptation of parts, elements, or related things, so as to form a consistent and orderly whole.

Hot Color: Color which is too red, or fiery.

Hue: The name of the color (e.g., blue, green, violet, red-orange, etc.).

Intensity: The characteristic of color in terms of its brightness or dullness; the saturation or strength of a color determined by the quality of light which is reflected from it.

Intermediate Hues: The two hues red-violet and yellow-green on the 12-step color wheel.

Line: The track made by a moving point; a long narrow stroke or mark; a threadlike or ribbonlike mark; the character of line is formal and suggests continuation.

Linear Perspective: The art of delineating solid objects on a plane surface by the exercise of the science of Perspective.

Local Color: Theoretically, the positive color of an object, etc.,

unmodified by the color of other things or the prevailing circumstances of atmosphere, lighting, viewpoint, the proximity of other colors, and so on. In fact, it has no exact existence, since all color is subject to the conditions in which it is seen.

Low Tones: Subdued color or tone.

Mass: A large quantity or bulk; the form of matter, cohering together in one body; a compact body; a combination of lines, shapes, values, textures and colors.

Matt Surface: a dull, flat surface, without gloss or sheen.

Middle Distance: In perspective, the plan which exists between the foreground and the background.

Monochrome: A setting or painting in one color.

Neutral Grey: A grey mixed from black and white or can be mixed using two complements.

Objective Color: A tone which takes its color from the nature of the actual object, (green grass, wood, etc.).

Opacity: Non-transparency in certain pigments. The characteristics of pigments which reflect the light from their surface, but do not transmit it to the surface below.

Optical Mixing: Theoretically, the mixing of juxtaposed colors by the eye. Thus, when seen at the correct distance red and yellow, for instance in a small check pattern, produce on the retina, the sensation of orange.

Optical Perception: A way of seeing in which the mind seems to have no other function than the natural one of providing the physical sensation

of recognition by sight. The designer is dependent upon this for guidance in choice and decision.

Perspective: A mechanical system of creating the illusion of a 3-dimensional space on a 2-dimensional surface.

Planes: Two-dimensional area or areas which indicate the character of volume or a change in the direction of a surface.

Polarity: The quality of being attracted by one pole and being repelled from the other. In design: A matter of relatedness and non-relatedness between design elements in arrangement, e.g., like forms in related colors will attract one another, while unlike forms in non-related colors will repel one another.

Primary Colors: The master colors; red, yellow and blue, (a) from which, with the addition of white, it is possible to mix the full spectrum range, (b) In the mixing of pigmented agents of red, yellow and blue and/or white or black we are able to produce any colors used by artists and designers.

Proportion: The comparison of elements one to another in terms of their properties of size, quantity or degree of emphasis. Proportion may be expressed in terms of a definite ratio such as "darker than", "more neutralized" or "more important than".

Pure Color: A hue which is unadulterated by a mixture with another.

Radial Balance: (a) Two or more identical forces distributed around a center point to create a repetitive equilibrium; (b) Rotating forces which create a visual circular movement.

Rectilinear Shape: A shape which may be regular or irregular in character but is basically composed of straight lines.



Repetition: (a) A method used to re-emphasize visual units again and again, in a marked pattern; (b) The binding of a design by reiteration.

Retreating Color: A color such as blue, which in a setting or painting appears to retreat into the distance. The assumption is based on the theory that objects tend to become colder in hue as they become more distant.

Rhythm: Continuance, a flow, which is affected by reiterating and measuring, similar or equal parts.

Scale: A series of steps in the progression of values light to dark, as "value scale". The proportion between the drawn dimension of an object and the actual dimension.

Shade: The degree of darkness of a hue. The dark values of a hue between the pure hue and black. The opposite of tint.

Shape: An area having a specific character of form defined by a contour, or by a contrast of color, value or texture with the surrounding area.

Space: The interval between pre-established points; measurable distances.

Two-dimensional: An extent (surface) possessing measurement as to length and breadth but lacking in thickness or depth.

Three-dimensional: Possessing thickness or depth as well as length and breadth; this may also be classified as plastic space.

Subjective Color: Tones which are chosen by the artists or designers without regard to the "real" color of the object.

Subordination: Subduing or making less emphatic and less important. Conformity to an imposed order. Subordination implies the presence of dominance that is its positive opposite.

Symmetrical Balance: Identical optical units (or forces) distributed in equilibrium on either side of an axis or axes in mirror-like repetition; sometimes referred to as bi-symmetrical or formal balance.

Tactile: Referring to the sense of touch.

Tension: (In Design.) Certain dynamic interrelationships of force as manifested by the movements of force inherent in art elements; semi-architectural stresses affecting balance.

Texture: The surface feel of an object or the representation of surface character. Texture is the actual and "visual feel" of surface areas as are arranged and altered by man or nature; fine-scaled physical character of a surface such as smooth, rough etc.

Tint: The degree of lightness of a hue. The light values of a hue between the pure hue and white. The opposite of shade.

Tonality: A color combination or color scheme chosen by the designer as an expression of his intention.

Tormented Color: Color which has been mixed, or manipulated to excess. Such colors are prone to blackening.

Triad: A group of three colors harmoniously related to each other. On the color wheel, those three colors equidistant to one another.

Unity: All component parts in design combined in such a way that the final result is complete harmony; totality of related parts.

Value: The relative lightness or darkness given to a surface or an area by the amount of light reflected from it.

Value Pattern: The relationships established between shapes and areas by means of varying degrees of value difference.

Three-dimensional design: A type of value organization where the changes of light and dark seem to create an illusion of depth back of the picture plane, or of projection in front of the picture plane.

Volume: A shape having three-dimensions or one which gives the illusion of solidity or mass.

Warm Colors: Colors of a warm hue, such as yellow, yellow-orange, orange, red-orange and red which appear opposite cool colors.

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A SYNTHESIS OF COLOR  
INTEGRATED WITHIN THE DESIGN VOCABULARY

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B.F.A., The Kansas City Art Institute, 1961

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AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF ARCHITECTURE

College of Architecture and Design

KANSAS STATE UNIVERSITY  
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1970

The role of the designer has been changing with increased rapidity over the past decade. We must recognize the need to involve ourselves not only in those areas having relationship to our profession, but to seek information and learning of those specifics within the profession. As Architects, Interior Designers, Landscape Designers, and Industrial Designers are attempting to expand the lines of communication with one another they are recognizing that a vital need exists for total design within the environment. As these groups exchange and intermingle thoughts and ideas it becomes evident that a new vocabulary must be established for design with color as a parallel.

Color in design is essential. It activates emotion and response more than any other of the plastic elements of design. It is the most versatile and manipular and is alone in being that one element which is purely visual, the others being both visual and tactile. Color is automatically a line, a form, a space or a texture. Color gives reality and credibility to these. They may all be created with color alone. In reversing this thought, neither line, form, space, or texture can create color, though they may affect it. It is from these points of view that we have a reasonable means to establish the difference between color and the other plastic elements in the thesis. Color will be given a new position in order to set it apart in degree of importance.

The scientific study of color has been adequately pursued by others, yet this alone cannot satisfy the need of the designer. This examination takes up where the scientific has come to a logical end. It

will be developed from that point of once having perceived the color we are prepared to use it. Color and its parts are given definition to provide a more complete understanding of terms as they are used.

As the designer conceives and develops his plans, he works within an area of lighting not relative to the conditions in which his design will exist. The range of color change possibilities is infinite from the variations occurring in natural lighting through those to be gained from mechanical manipulation. For these reasons it would be impractical to attempt any examination of the effects of lighting upon color.

Both designers and educators are intended to be the prime beneficiaries in this study. Opinions in these areas have been sought and serve to clarify the need that presently exists. Explicit statements of purpose in design are imperative at the level of education. The well educated designer is equipped to recognize the areas of lack in those seeking positions in the profession. It is intended that the thesis will serve to establish a means of communication in the area of design-color.

Whenever the term color is used it will be as a blanketing reference to either hue, value, or intensity. Color will be given description as it is relative to and interacts with the other design elements and the design principles.

Illustrations in color will accompany the individual examinations of color in line, color in space, color form, etc. To

further assist the area of education, there will be problems proposed to follow the aforementioned examinations.

Since this study is not known to have been previously attempted, there will be a minimum number of texts and sources appearing in the bibliography. It is felt that this research and development can become a means toward helping to unite the various areas of design into one, that of Environmental Design.