THE STUDY OF VISION IN ARCHITECTURE

by

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PREFACE

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I. INTRODUCTION

Architects can compose colors and draw representations of buildings. Architects can graphically design and build models. They can alter the visual surroundings. All these things depend upon the eye of the individual architect. Should he lose his sight, no longer will he be able to accomplish any of these things. Architecture is a visual art, and the student of architecture must have visual training.

Let us clarify the following: What is vision? What is visual training? What is the purpose of this paper?

Vision is the act of seeing. Visual training is an essential part of education to perceive the beautiful and to approach the creation of beauty and to arrange objects beautifully. Through our vision, we perceive images, dependent upon the relationship between an object and the eye. The purpose of this paper is to study this relationship:

1. From the movement of the visual line (Chapter II)
2. From the viewpoint of investigation (Chapter III)
3. From the potential power of the object (Chapter IV)

Accordingly, the author has developed three theories, one for each phase of the relationship as described above. These theories are limited to the analysis of an independent building within a described area.
We can get different views of the object from different directions.
II. VISUAL LINE MOVEMENT

An image is composed through the movement of visual lines. The visual lines is that line which is projected by the human eye. Figure 1-1 shows how the eye sees from different directions; the image is composed by the visual lines which may be said to project from each eye to particular points on the object.

When people look at a building, we may explain the visual process which they employ as taking place in two steps: First, the eyes glance quickly over all things in view, catching the mass composition and forming a general impression. Secondly, the eyes move to various sections and masses in each section, thus to perceive and appreciate the details. The first step in the visual process always gives us an overall impression of the object which we see. This is the reason why the most important thing in the visual process is a sense of the overall composition. The second step allows us to appreciate the object in detail. This is why details are considered important to the architect.

People control the movement of the visual line according to individual choice. In connection with this, Mr. Earl Kelly once said: "We select what we choose to see; we have a habit of assuming that similar things are alike". This is our effort to classify things. The author believes what Mr. Kelly said to be true—that people always like to examine everything they see, and the easiest way to examine them is to classify and compose them.

In what way can we classify or compose things? The author, thinks that it is done through the movement of the visual line and the potential power of the object.

THE THEORY OF THE VISUAL LINE MOVEMENT IS

1. The movement of the visual line has certain characteristics. If nothing causes it to change, the visual line tends to move in the same way it has previously been moving. If the pattern changes, the movement of the visual line changes accordingly. (Fig. 2-1)

2. The degree of the movement of the visual line is calculated by the distance and the complexity of the movement. The visual lines moving over an object obtain the optical weight of the object.

The optical weight is that which they obtain by measuring the eye's perception on the texture of an object which causes it to have shade and shadow. How much is optical weight, depends upon what kind of texture the object has.

3. The movement of the visual line can be described according to viewer desires, i.e., for completeness, functionality, truth, beauty, etc. (For diagrams of the function of this theory see Figures 7-1 to 7-10).

**Note:** 1. The optical weight refers to Chapt. IX and Figure 9-3a.
2. The optical weight will not be dealt with in this thesis.
2-1. (a) The visual lines move along the pattern and continue to move along the direction shown by the arrow in the diagram.
(b) The arrow shows the force which moves straight forward.
III. VIEW POINT

The view point is defined as the point at which our eyes are located. We have to investigate the view point because we can get different views of the object from different directions, and different reactions from different distances. (see Fig. 1-1)

The Theory of View Point

The view point is a determining factor of the image; therefore, we should know that:

1. At ground level the height of the view point is determined by the height of a man, and is therefore around six feet. (Fig. 3-1)
2. If the altitude around an object changes, the height of the view point changes correspondingly. (Fig. 3-2)
3. When one moves around an object, all the points from which one looks at the object are view points with respect to it. (Fig. 3-3)
4. Man's visual receptors arrange the things he sees from a certain view point into a composition. In front of a building, we can see the composition of all the masses, colors, textures, and patterns, and we react accordingly. When we walk around the building, or inside, we get the compositions in series. (Fig. 3-3)
5. The places around an object where one cannot stand cannot be view points. (Fig. 3-4)
6. Nor can the places where one cannot see be considered view points. (Fig. 3-5)
7. Our eyes have a fixed strength which limits the view within a given distance.
7. (cont'd) When the object is very far away, it diminishes in size, and its effect changes. (Fig. 3-6)

8. When we design a building, we must consider all possible viewpoints. Architects develop their designs on paper. If they are not aware of the variations introduced by changes in viewpoints, errors will occur which may be attributed directly to this lack of awareness, although they have carefully studied the proportion and composition.

**HOW TO TREAT VIEW POINTS**

Different viewpoints give different views. The point from which we get a beautiful view is a good viewpoint, that from which the view is ugly is a bad viewpoint. (Fig. 3-7) In architectural design, we should consider whether a viewpoint is good or bad. When we plan the roads and landscapes in our design, we should keep in mind all the viewpoints which are possible from the road, and, equally, viewpoints from positions all around the building. Should we find some bad points in our design afterwards, they may be diminished in the following ways:

1. The best method is to put something else at this point (if it does not harm the design) in such a manner that no one can stand at this point, thereby eliminating it as a possible viewpoint for the object.

2. Another method is to increase other beautiful parts of the design which may attract the visual line of the observer at that viewpoint.
3. If the viewpoint is very far from the building, we may add such things as sculptures, fountains, monuments, portals, in order to interrupt the visual line until the viewer arrives at a suitable distance to appreciate the building.

4. A person should stand at a suitable distance to appreciate the building.

The optimum distance at which to appreciate the facade of a building is generally determined by the visual angle of the viewer, which will depend upon the size of the building. According to the experience of the author, the appropriate angle in the vertical dimension would seem to lie within a range of fifteen to forty-five degrees. The maximum visual angle in the horizontal plane appears to be sixty degrees. (Figs. 3-8, 3-9)
3-1. At the ground level, the height of the view point is determined by the height of man, about six feet.
3-2. The altitude of the land around the object varies; the height of the point of view varies correspondingly.
3-3. As the person moves around an object all the points from which he looks at the object are view points, and he can get a continuous view.
3-4. The space around an object where a person cannot stand cannot be a viewpoint.
3-5. The space around an object from which one cannot see cannot be a viewpoint.
3-6. Even a monument will lose its solemn appearance from a far distance.
The point "A" is a bad viewpoint, because from here the monument looks too small. The point "B" is a good viewpoint, as the height of the monument is enhanced.
3-8. \( a = \text{minimum distance} \)
\( b = \text{the range of the allowable optical distance} \)
\( c = \text{maximum distance} \)
\( d = \text{the minimum distance is determined by the 60 degree angle in the plan.} \)
3-9.  

a = distance greater than normal optical limitation.
b = c = normal optical distance for the big building.
d = the normal optical distance for the portal, a limiting visual frame.
When two objects are placed one close beside and parallel to the other and we look at those objects, we might find that the space between them gives us a sense of confinement. When two objects are placed very far apart, they seem unrelated. Through an understanding of this phenomenon, we find that objects have certain potential powers.

In order to show the potential power of an object, the author believes that it is necessary to use some lines which are called potential lines of the object. The potential lines are related to the object in a manner similar to the way that magnetic lines are related to an iron bar. However, they differ from the former, both in character and scope.

**DEFINITION OF POTENTIAL LINES**

Potential lines are those lines which when projected from an object, show the potential power of the object.

**CHARACTERISTICS OF POTENTIAL LINES**

1. Potential lines have the character of forces.

2. Potential lines start at the surface of the object. (Fig. 4-1, 4-2)

3. The length of the potential lines is equal to the distance from the starting point to the center of gravity of the object. The length of potential lines that project to the surroundings changes according to the light, color, textures and pattern of the materials.

4. The number of potential lines of a body depends upon the number of parts into which the body is divided.
5. A hole projects its potential lines to the center of gravity of the vacant space uniformly. (Fig. 4-3)

6. A solid body projects its potential lines uniformly to the surroundings. (Fig. 4-4)

7. The direction of the potential lines is determined by the vision of the viewer, which is always influenced by the configural tendencies.

8. The strength or weakness of the potential lines is influenced by the color and texture of the object.

9. The potential lines of an object can be considered as hands which can join together with the potential lines of other object, when they just meet. Alternatively, the potential lines can be considered as forces which, when too close together, act as two opposing forces.

THEORY OF POTENTIAL POWER

The potential lines represent the direction in which the potential power of the object is manifest. The potential lines show the relation between or among objects.

THE SPREADING OF POTENTIAL LINES

1. Point. A point without size has no potential lines.

2. Line. A line has a certain length; the potential lines are spread as in Figure 4-1.

3. Surface. The potential lines of the surface spread out its surroundings. (Fig. 4-2)

4. Hole. The potential lines of a hole spread towards the center. (Fig. 4-3)
5. **Solid Body.** A solid body spreads its potential line to all directions. (Fig. 4-5)

Since the potential lines spread out, we can draw the following conclusions:

a) A line tends to spread out from two ends.

b) A solid body has the tendency to expand.

c) A hole has the tendency to appear smaller.

**Note:**

1) The center of gravity of the object is not always decided geometrically. The influence of another object, or an optical illusion, will change the center of gravity visually.

2) The diagrams on the following pages will be designated as follows: (a) is the object, (b) shows potential power of the object.
4-1  (1)  (a) The vertical line is a wall from which the horizontal and diagonal lines project.  
(b) This diagram shows the potential lines having full length of the original line and projecting horizontally and diagonally.

(2)  (3)  (4)  
(a) Shows different kind of lines.  
(b) Shows the potential power of different kind of lines.
(a) Show different shapes or kinds of planes.

(b) Show the potential power of different shapes or kinds of planes.
(a) Show different shapes of void spaces.

(b) Show the potential power of different shapes of void spaces
(a) Show different kinds of masses.
(b) Show the potential power of different kind of masses.
V. OPTICAL ILLUSION

Thousands of years ago, both in the East and the West, the building designer found it necessary to consider an important phenomenon; namely, the effect of optical illusion. A current definition of optical illusion is:

"In perception, a misinterpretation of the relationships among presented stimuli, so that what is perceived does not correspond to physical reality."\(^2\)

There are many theories to explain optical illusions, but here, the author will attempt to use the theory of potential power to explain them. The classification by Ladd and Woodworth confines them to five classes, these being:

A) **The illusion of interrupted extent**

This illusion was selected from Ladd and Woodworth's classification, "One-dimensional illusions."\(^3\)

In Figure 5-1, three horizontal lines are equal. One is a solid line, and the others are broken by intervening spaces of differing lengths. In this illusion the interrupting line L2 seems to be longer than the solid line L1, of corresponding length. The intervals between the segments of the broken line L2 are shorter than the segments. There are then not enough spaces for the potential lines which are projected from each segment. In this case the potential forces act against each other. Therefore, L2 seems longer. The intervals between the segment of the broken line L3 are equal to the

\(^2\) P. 580 Hilgard, Ernest R. INTRODUCTION TO PSYCHOLOGY, New York, Harcourt Brace 1953, 1957

\(^3\) P. 6, P. 34 David Katz GESTALT PSYCHOLOGY 1950
segments. The potential lines of each segment just meet, causing an illusion of quick contraction.

B) MUELLER-LYER ILLUSION

This illusion is listed in the third class of Ladd and Woodworth’s classification. “Illusion of confluxion and contrast”, Figure 5-2. The true length of 'a' and 'b' is the same, but, in looking at the figure, we conclude that 'b' is longer than 'a'. Figure 5-3, 1-a, b shows the power of the diagonal lines. Figure 5-3, 2-a, b contains the potential lines of the diagonal lines. This causes the line 'a' to be shorter than 'b'.

C) THE ZOLLNER ILLUSIONS

This illusion is listed in the fourth class of Ladd and Woodworth’s classification, “Illusions of Angles and Direction of lines” (Figure 5-3). The four lines are parallel to each other, but when they are cut by the inclined lines in a different direction, the image is changed. These four lines then do not seem parallel. The potential line of the intersecting line and the potential line of the parallel line have had a resultant force which intersects with the resultant force of the other set of lines. This fact creates the impression that the lines are not parallel.

D) WUNDT ILLUSION

This illusion is representative of Ladd and Woodworth’s fifth classification, “Illusion of area”. The area of these two figures is equal. The figure conditioned by the fact that compactness of

*4 P. 6, P. 47 David Katz GESTALT PSYCHOLOGY 1950
*5 P. 6 David Katz GESTALT PSYCHOLOGY 1950
form appears to diminish the apparent area of the surface. In Figure 5-4, it appears that 'b' is smaller than 'a'. Through the spreading of the potential lines of 'a' and 'b' the line of 'b' is limited by 'a'.

E) VARIABLE ILLUSIONS OF EXTENT

On Figure 5-5, squares striped by parallel stripes appear elongated in the opposite direction from that of the lines. The white parallel stripes in the squares of (b) and (c) have a potential power. This power pushes against the black strips, causing the example 'c' to look longer than 'a'. The example 'b' looks wider than 'a'.

In Figure 5-6, the dot is the same shade in all squares. The dot seems to have a different size, from dark to light, depending upon the background. The dot is large in a light background and smaller in a dark background.

In Figure 5-7 the parallel lines at the wall seem to be curved as in 'a' 'b'. The potential power of the lines causes a resultant force, which makes the surface of the wall appear three dimensional.

In Figure 5-8, the columns always look thinner in the middle part. This is because the two ends are influenced by the potential forces which come from the lintel and the steps.

In Figure 5-9, the lintel between two columns always appears to deflect downward, and the steps appear to curve upward. This is because the two ends of the lintel are lifted by the potential forces of the columns. The ends of the steps are pushed downward.

P. 157 Edward Bradford Titchener EXPERIMENTAL PSYCHOLOGY (A Manual of Laboratory Practice)
5-1. Line $L_2$ looks longer than line $L_1$ and line $L_3$ looks shorter than line $L_1$. 
5-2. Line "b" looks longer than line "a"
5-3. The four vertical parallel lines do not seem parallel.
5-4. These two figures are equally cut from the same ring belt. Their potential power lines are toward the center of the ring belt. The potential area of figure b is hidden by figure a, therefore b seems smaller than a.
5-5. Squares striped by parallel lines appear elongated in the opposite direction from that of the lines. (3)
The potential power of each dot is different. The dots in the lighter background have more potential power than dots in the darker background. This is caused by the density of the background, which is related to the texture or color.
5-7. The surface is bent by the existing pattern.
5-8. The potential force of the top and bottom line of the column extends from both sides of the column, therefore producing an effect of widening.
The lintel appears to deflect downward.
VI. GESTALT LAW

Gestalt psychologists have given the form concept an exceedingly wide scope and created many laws about the visual field. There are five basic laws, all of which can be related either to the theory of potential lines or to the theory of visual line movement.

THE LAW OF PROXIMITY

"Other things being equal, in a total stimulus situation those elements which are closest to each other tend to form groups." *7 In Figure 6-1, when we see the two pairs of wider lines, at the same time, we think they are either solid or void between the two. If we consider that they are solid as showing in Figure 6-2 "b", the potential lines spread out from the two sides of this solid body, then easily discriminated from the others. If we consider them as void, then the potential lines stretch out from the opposite direction still allowing them to be easily seen.

The dots compose into lines because of the movement of the visual line. The dot has no potential power itself, therefore the composition of dots cannot be explained by the theory of potential power.

THE LAW OF SIMILARITY

"When more than one kind of element is present, those which are similar tend to form groups." *8 In Figure 6-2 the heavy lines combine to form pairs. The empty circles are seen in columns, as are the solid disks. In this instance, grouping takes place because of similarity in spite of the fact that the distances between unlike elements

*7 P. 25 David Katz GESTALT PSYCHOLOGY 1950
*8 Ibid.
are equal to the distances between similar ones. Grouping may also occur when only certain parts of elements have similar color or form. An object often appears uniform, because all areas of its surface have similar color; this similarity may be due to natural or artificial causes. These figures of right hand can be considered either void or solid. If the figure is solid, then the potential power projects outward from the rectangle, but if it is void, then the potential forces project inward.

The circle's arrangement gives a direction of the visual line along which to move. If the circles are marked larger than those in the diagram; we can explain this phenomenon with the lines of potential power which make the circles join together.

THE LAW OF CLOSED FORMS

"Other things being equal, lines which enclose a surface tend to be seen as a unit."

Triangles, squares, and circles are examples of closed surfaces. In Figure 6-3, lines 1, 2; 3, 4; 5, 6; etc. combine forming pairs. But in figure 'b' the lines which combine are 2 and 3, 4 and 5, 6 and 7, etc. Through the potential power diagram we can easily see four rectangles stand out from ten lines.

THE LAW OF GOOD CONTOUR OR COMMON DESTINY

"Parts of a figure which have a 'good' contour or common destiny tend to form units."

In Figure 6-4 (a) one sees a straight line present a good contour and seem to be continuous with another.

#9 P. 25 David Katz GESTALT PSYCHOLOGY 1950
#10 P. 26 Ibid.
They seem to belong together. Figure (b) breaks up into a circle and a trapezoid, because the parts of each have common destiny and a good contour. In Figure (c) lines 1 and 2 combine, while 3 and 4 form a separate unit. The law of good contour is something where the tendency of the potential power and the movement of the visual lines coincide.

**THE LAW OF COMMON MOVEMENT**

"Elements are grouped, when they move simultaneously and in a similar manner." In Figure 6-5, point "1" and "2" and "3" move in the same direction. In the diagram of visual lines, the points 1, 2, and 3 seem to be a separate unit among the other points.

#11 P. 27 David Katz GESTALT PSYCHOLOGY 1950
6-1. The potential lines show the tendency of configuration of the parallel lines. The visual line movement composes the dots into lines.
6-2. The potential lines show how the two pairs of wider lines seem to form solid bodies, easily discriminated from the others. The visual lines show the small circles joining into lines.
6-3. Shows ten parallel lines which can form two different kinds of composition. However, when some of these lines are joined by horizontal lines, only one kind of composition is possible, i.e., resultant loss of visual flexibility.
(a) A series of lines move along in the same direction. They seem as one line because our visual line moves on them and joins them into one line.

(b) When the visual line moves along the line of the circle, the visual line follows the characteristic shape of the circle, even though the circle is intercepted by a trapezoid. The same idea is used in the visual line movement of the trapezoid, even though it is intersected by a circle. So they retain their original shape.

(c) Four curved lines come together at a point, because they meet at a straight angle, then the visual line moves along lines 1 and 2; 3 and 4, they seem like two lines intersecting.
Diagram (a) shows a group of stationary objects. Diagram (b) shows three of the objects moving in the same direction with the same speed. The visual line moves on the three objects, forming them into a group, because they have a constant relationship.
Architects create relationships among geometrical figures or masses. We can call that relationship composition.

The relationship among objects can be recognized either from the potential power of the objects themselves or the movement of the visual line of the viewers. If the distances between objects are very far, the composition of the objects cannot be explained by the potential power, but the relationship can be explained by the movement of the visual line. We approach composition in either of two different ways:

THE COMPOSITION OF THE GEOMETRICAL FIGURE

a. Points—Through the movement of the visual line:
   1. Two points can be composed as a line.
   2. Three points can be composed as a triangle.
   3. Four points can be composed as either a quadrangle or a jagged line.
   4. More points can be composed into numerous kinds of figures. (Fig. 7-1)

b. Lines—Through the movement of the visual line:
   1. Two lines can be composed as a plane.
   2. Three lines can be composed into different kinds of bodies.
   3. More lines can be composed into various kinds of geometrical figures. (see Fig. 7-2)

c. Planes—Through the movement of the visual line:
   1. Planes can be composed into different kinds of figures. (Fig. 7-3)
d. Masses—Through the movement of the visual line:

1. The masses can be considered as independent points if they are far apart.
2. If they are near one another, the relationship between independent masses depends on their potential power. (Fig. 7-4)

**THE ACTUAL PROBLEMS IN COMPOSITION**

**Mass within space:**

1. Do not put a figure of one form into a closed space of a different form if the potential power of the enclosed form exceeds the space of the exterior form.
2. If the exterior form has adequate space, there will be no trouble.
3. If we enclose the figure of one form into the figure of the same form, then the two forms become united as one unit. The potential power is calculated from the exterior form, not from the enclosed form. (Fig. 7-5)

**The characteristics of the geometrical figures:**

Geometrical figures have a different shape and a different character when composing figures. Their potential character must be considered. (Fig. 7-6, 7-7, 7-8, 7-9, 7-10)
7-1. The movements of the visual lines can combine different numbers of dots into different shapes.
7-2. The lines can be composed into different figures by the movement of visual lines.
7-3. The movement of visual lines can sometimes combine surfaces to form a mass.
7-4. Masses can sometimes be composed by the potential lines.
7-5. Putting a figure into space:
(a) The space does not have enough room for the potential power of the figure.
(b) The space has enough room for the potential power of the figure.
(c) The figure has the same shape as the space; they form one body. Hence, there is no problem of potential power in this case.
7-6. The openings on a gable:
(a) Seems all right.
(b) and (c) seems all right.
(d) There are two weak points on the gable. It is not acceptable. The potential lines exceed the roof of the building.
7-7. The mass in a space: In neither case does the space have enough room for the mass.
7-8. (a) These figures should not be used together this way, as shown by the potential lines.
(b) They may be used to form this composition, as shown by their potential lines.
7–9. (a) Poor composition, as explained by the potential lines of the figures.
(b) Good composition, as explained by the potential lines of the figures.
7-10. (a) Poor composition, as explained by the potential lines of the figures.
(b) Good composition, as explained by the potential lines of the figures.
The relationship between the parts of a complicated mass can be called proportion. When the masses join together, combining into a complicated mass, there arises the problem of proportion. Proportion, as well as composition, is directly related to beauty. The purpose of this paper, however, is to study problems of vision and only incidentally to examine the theory of beauty. I should like to mention some theoretical approaches to beauty, which may prove helpful.

There are two ways to approach beauty. One is to find and create beauty, the other, to escape from that which is not beautiful. The purpose of this paper—I say again—is not to provide the key to the former, but it may nevertheless suggest ways in which to achieve the latter.

Visual lines move in a clear direction, in a certain rhythm. In Figure 8-1, 'a' is too complex; the visual lines move without rhythm; there is only confusion. 'b' and 'c' are acceptable. See Figure 8-2, (a) the gable on the right is subordinate in height, the one on the left in width. In building, this is contradictory. When the visual lines move along this building, we get a strange feeling. It therefore needs to be changed into Figure 8-2, (b).

Visual capacity has a certain limitation in mass composition. Mass compositions always follow the diagram we see in Figure 8-3. It appears that our eye can compose only five different masses, because with more than that the movement of the visual line changing too many times, than become confused.
If a building is designed as in Figure 8-4, it is still acceptable, though it is very long, because the composition is simpler than in Figure 8-3 (a), and consists only of two masses. Some buildings develop into skyscrapers. The skyscrapers always have a subdivision which is the determinant of proportion. (Fig. 8-5) There are all possible modes of horizontal subdivision, but our eyes can perceive clearly only those buildings which have no more than three subdivisions. If there are more than three, the movement of the visual line will become confused.

The problem of proportion can be examined by the theory of the visual line movement. We can investigate the problem of proportion through the balance of optical weight and the work of the visual line, as described in Chapter II.
8-1. (a) The dormer windows are three different shapes, which gives a confused appearance. (b) and (c) show acceptable arrangements.
8-2. (a) The gable on the right is subordinate in height; the one on the left in width. Because the visual line likes to move on the way it has before, these two gables are not in the same proportion, therefore, the visual line does not like to move on it. (b) Correct arrangement, because the two gables have same proportion.
8-3. Development of one type of composition from another. (4)
8-4. (a) Nine masses compose one building which still looks like three parts, since masses 1, 2, 3, and 4 are the same as 6, 7, 8, and 9. Then we can consider left, center, and right as the only three parts.

(b) Eight masses compose one building, which may be considered as having only two parts, "1, 2, 3, 4, 5, 6, 7" and "8". This is because 1, 3, 5, and 7 are the same shape and join together 2, 4, and 6 as a unit.
Diagram of all possible modes of horizontal divisions. More than three subdivisions, the relation of them is not a simple ratio, then the visual line moving on it gets confused.
The author believes the factors listed in this chapter have a relation to the theories discussed in the previous chapters. However, these factors have not been fully developed, since they do not specifically relate to the main thesis. These factors are color, light, texture and pattern.

**COLOR**

1. Colors have different effects in different places.
2. Colors can join different independent things together. (Fig. 9-la)
3. Different colors can divide one thing into two parts. (Fig. 9-lb)
4. An object of darker color seems smaller than an object of lighter color. (Fig. 9-lc)
5. If there is a dark spot, surrounded by lighter color, the dark part looks like a hole. Potential lines can be drawn from the boundary line to the center. (Fig. 9-2a)
6. Where there is darker color around lighter color, the darker makes the lighter part look like a solid body, which can project out some potential lines. (Fig. 9-2b)
7. Colors have certain forces. The activity of a color depends on the concentration of the molecular density of the color. The order of the activity of the colors depends on the order which they set; the most active color is red.

**LIGHT**

Light is another important factor in the visual response to architectural design. The effect of light depends on its strength.
With the use of light, either natural or artificial, you can change the whole view magically.

1. When we change the opening of a room, i.e., we get a completely different reaction. (Fig. 9-4)

2. Artificial light can help emphasize the most beautiful parts and at the same time, the lack of light may cover the ugly parts.

3. Artificial light can change the color of the object.

TEXTURE AND PATTERN

Texture and pattern have effect on the composition and proportion. Their effect is not as strong as the effect of colors, but they still have as marked an effect on buildings, i.e.:

1. Many different kinds of composition may be achieved by composing different patterns of the same material. (Fig. 9-3a)

2. Different kinds of texture and pattern give a different optical weight and feeling. (Fig. 9-3b)
9-1. Shows the functions of color:
(a) Color can compose the independent objects into a single composition.
(b) Different colors can divide a mass into two parts.
(c) The same object with different colors: The light, warm colored one seems bigger than the one in the dark, cold color.
9-2. The same size circle; the one in (a) seems bigger than the one in (b).
9-3. (a) Shows texture same as pattern; both of them can be composed into different planes.
(b) Different kinds of texture giving different impressions and having different optical weights.
9-4. The different arrangements of the windows results in different reactions.
X. CONCLUSION

The intent of this paper has been to investigate visual images. Through the investigation of different phases, the author has organized his concepts in accordance with three theories:

1. Theory of visual line movement.
2. Theory of view point.
3. Theory of potential power.

The theory of view point helps us to be discriminating in the selection of the point from which we can obtain the best view. Both the theories of visual line movement and potential power provide a way of studying the composition and proportion of architecture. Furthermore the author has used the theory of potential power to explain optical illusion. Most facts which are explained by Gestalt laws can also be explained by the theory of potential power and some, by the theory of the visual line movement. Color, light, texture, and pattern are important elements which influence the image.

This paper is a starting point of the study of vision in architecture. The author feels that in the near future, there will be a new theory created to examine the problem of urban design (space design.) That theory may well be called The Theory of Potential Power of Space, which, the author imagines, must be related to Kant's and Lao Tse's philosophies. I sincerely hope that I have been able to give through my paper, some suggestions and contributions which will prove helpful and valuable for the further development of architecture.
Lao Tse has said: "The Tao that can be told is not the permanent Tao; the names that can be given are not the permanent names." I hope there will be new developments which will bring us ever nearer to the permanent Tao of vision in architecture.
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