RICE UNIVERSITY

DUALITY IN ARCHITECTURE

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A THESIS SUBMITTED
IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF

MASTER IN ARCHITECTURE

THESIS DIRECTOR

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Houston, Texas

May 1968
DUALITY IN ARCHITECTURE

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The concept of duality is recognized by many to be relevant today, when complex and contradictory situations pose no simple solutions. The answers to the problems of today must be found in the inter-play and tension of opposites. This is true from the most simple aspects of everyday life such as the choice between diet or dessert at dinner, to the choice between duty and fighting in a military stalemate or integrity and refusing to fight, to all that we would hope to accomplish.

Duality has long been a tradition in art and literature. The architecture of today should also find its truth and unity in opposites if it considers itself mature and relevant to life.

This is an exploration of the general concept of duality in the literary sense and an analysis of duality with respect to the theory, creative process and the form and space of architecture.
"Methinks I see these things with parted eye,  
When everything seems double."

A Midsummer Night's Dream  
IV, i, 193-194  
Shakespeare
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I. The Concept of Duality
While the primary concern of this thesis is duality in architecture, the nature and scope of duality can best be understood by considering the concept first with respect to relationships which occur in everyday life.

Duality pertains to opposites. More precisely it pertains to a view of life which accepts the tension in the opposites and paradox of human existence. Duality also pertains to the concept of two, and every concept of two is in some way a concept of opposition. Duality does not however preclude relationships which might occur in any other number.

Duality is of a philosophical nature in that it seeks to provide a better understanding of structure and relationships. It is not a complete philosophy, as it does not attempt to define the goals or reason for being, for life, architecture, or any other thing, but in providing a better understanding of relationships, it may provide the basis for a more complete philosophy.

Paul Klee states: "A concept is not thinkable without its opposite. The concept stands apart from its opposite."
The concept of duality may be illustrated by a diagram and the simple duality of good and bad.

![Diagram showing the concepts of good and bad with a neutral point in between.]

"The opposing positions are not fixed; they may slip past one another. Only one point is fixed, the central point in which the concepts lie dormant."

The search for unity therefore does not seek the central point which is dormant, but a unity in which the elements retain their identity and express the vitality and tension of forces in opposition.
Duality confronts us in all aspects of daily living. A short list will illustrate the relevance of duality to our daily life.

<table>
<thead>
<tr>
<th>Life</th>
<th>Death</th>
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<tbody>
<tr>
<td>Material</td>
<td>Spiritual</td>
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<tr>
<td>Good</td>
<td>Evil</td>
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<tr>
<td>Rich</td>
<td>Poor</td>
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<tr>
<td>Sad</td>
<td>Happy</td>
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<tr>
<td>Young</td>
<td>Old</td>
</tr>
<tr>
<td>Refined</td>
<td>Vulgar</td>
</tr>
<tr>
<td>Love</td>
<td>Hate</td>
</tr>
<tr>
<td>Peace</td>
<td>War</td>
</tr>
<tr>
<td>Known</td>
<td>Unknown</td>
</tr>
<tr>
<td>Order</td>
<td>Chaos</td>
</tr>
<tr>
<td>Being</td>
<td>Nothingness</td>
</tr>
<tr>
<td>Failure</td>
<td>Success</td>
</tr>
<tr>
<td>Freedom</td>
<td>Destiny</td>
</tr>
<tr>
<td>Right</td>
<td>Left</td>
</tr>
<tr>
<td>Permanence</td>
<td>Change</td>
</tr>
<tr>
<td>Past</td>
<td>Future</td>
</tr>
</tbody>
</table>

It would be difficult if not absolutely impossible to consider any of these concepts separately without, at the same time, considering its opposite. What is the meaning of male without female, or sadness without happiness? Differentness has its basis in sameness, and sameness emerges from differentness.
The concept of duality is not new, but has been expressed in literature and art through the ages. The idea of unity in duality was common centuries before Christ in the art and literature of the East. The work of Lao Tzu is thought to have been written about the 5th century B.C., and is concerned largely with the concepts of duality.

"Is not the space between heaven and earth like a bellows? It is empty without being exhausted." \(^4\)

"If you would have a thing shrink, You must first stretch it; If you would have a thing weakened, You must first strengthen it; If you would have a thing laid aside, You must first set it up; If you would take from a thing, You must first give to it." \(^5\)
Rumi, a Muslim poet and mystic portrays the idea of duality as a way of life and the universe in the following poem.

"Never, in sooth, does the lover seek without being sought by his beloved.
When the lightning of love has shot into this heart, know that there is love in that heart.
When love of God waxes in thy heart, beyond any doubt God hath love for thee.
No sound of clapping comes from one hand without the other hand.
Divine Wisdom is destiny and decree made us lovers of one another.
Because of the fore-ordainment every part of the world is paired with its mate.
In the view of the wise, Heaven is man and Earth woman; Earth fosters what Heaven lets fall.
When Earth lacks heat, Heaven sends it; when she has lost her freshness and moisture, Heaven restores it.
Heaven goes on his rounds, like a husband foraging for the wife's sake;
And Earth is busy with housewiferies: she attends to births and suckling that which she bears.
Regard Earth and Heaven as endowed with intelligence, since they do the work of intelligent beings.
Unless these twain taste pleasure from one another, why are they creeping together like sweethearts?
Without the Earth, how should flower and tree blossom?
What, then, would Heaven's water and heat produce?
As God put desire in man and woman to the end that the world should be preserved by their union,
So hath He implanted in every part of existence the desire for another part.
Day and Night are enemies outwardly; yet both serve one purpose,
Each in love with the other for the sake of perfecting their mutual work,
Without Night, the nature of Man would receive no income, so there would be nothing for Day to spend."
It will be noted that Rumi does not represent the idea of duality as being composed of antagonistic forces which tend to destroy each other. The forces of duality are opposed to each other but need one another for completeness. George Rowley supports this point of view as he points out in a description of Taoism and Confucianism that "they both sought inner reality in a fusion of opposites (but) instead of being a static mean in which the extremes suffered, the Chinese fusion was a dynamic union of opposites which needed one another for completeness."^7

A unity created from opposites has the potential of a dynamic quality only if the opposites are retained. If unity is created by melting the opposites into a single entity, unity may be the result, but so will dullness and monotony. Opposites need each other for their fullest meaning.

"Difficult and easy complete one another, Long and short test one another, High and low determine one another."^8

August Heckscher discusses the relevance of the viewpoint of duality to certain epochs.

"The movement from a view of life as essentially simple and orderly to a view of life as complex and ironic is what every individual passes through in becoming mature. But certain epochs encourage this development; in them the paradoxical or dramatic outlook colors the whole intellectual scene....Amid simplicity and order rationalism is born, but rationalism proves inadequate in
any period of upheaval. Then equilibrium must be created out of opposites. Such inner peace as men gain must represent a tension among contradictions and uncertainties...A feeling for paradox allows seemingly dissimilar things to exist side by side, their very incongruity suggesting a kind of truth."

The fact that this sounds a bit like Robert Venturi, is no accident. Venturi quotes Heckscher in his book, *Complexity and Contradiction in Architecture*. Most of Venturi's philosophy of architecture is based on the same ideas which will be discussed later in this thesis.

That the idea of duality is becoming more acceptable in our time is evidenced by a growing tolerance of other people and ideas in opposition to our own. There is a growing consciousness of the fact that the solution to many of our problems lies not in a one-sided view, but in the tension of opposites. For example, a view of life which concentrates on either the past or future will be less meaningful than a view of life which recognizes man's need to look in both directions and live in the present. Likewise, the man who concentrates on his individuality, may find that he is getting to be a little odd, whereas the person who concentrates on the group may find that he has lost his individuality. The most successful solution to these problems lies in the balance and tension of the opposites which give meaning to each other.
So far, the discussion has been limited to the duality of opposites. Duality also pertains to the concept of two and may be extended to include things which appear to be quite alike. It is common in everyday experience to be confronted with two goods, or two evils. The two may appear to be so much alike that it is difficult to make a choice between them. However, no two things are precisely alike in all respects. No two things can occupy exactly the same position in space and time. One is here while the other is there, or one thing may be to the left, and the other to the right, or top and bottom. Likewise, it is quite possible that one thing is first and the other last. In this way duality as the concept of two is related to the concept of duality as opposites. If indeed both occupy the same position in space and time and are alike in all other respects there is no duality, but unity.
II. Duality in Architecture
"Our recent architecture has suppressed dualities...
But our tendency to distort the program and to subvert
the composition in order to disguise the duality is refuted
by a tradition of accepted dualities, more or less resolved,
at all scales of building and planning -from Gothic portals
and Renaissance windows to the Mannerist facades of the six-
teenth century and Wren's complex pavilions at Greenwich
Hospital." These are the words of Robert Venturi, and the
duality of which he speaks is the duality of composition,
the juxtaposition of two elements.

Duality in architecture occurs both in terms of
opposites and as the concept of two. While the discussion
of duality in the previous section was concerned primarily
with intangible concepts, duality in architecture is
concerned primarily with tangible elements, although
the concept is also relevant to the intangible aspects
of the theory of architecture.

In an age of unrest and upheaval, in which truth and
unity cannot be realized in simple terms, mature thinking
finds truth and unity in opposites. The architecture of
today must also find its truth and unity in opposites if
it considers itself mature and relevant to life.

The concept of duality however transcends a simple
desire to be current and to keep up with the times.
Duality exists whether it is recognized or not, and
architecture cannot as a matter of fact exist without
some basic dualities such as solid and void or light and dark. Duality may be recognized in all aspects of architecture. The following list will illustrate dualities which are common to architecture.

<table>
<thead>
<tr>
<th>Solid</th>
<th>Void</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space</td>
<td>Mass</td>
</tr>
<tr>
<td>Open</td>
<td>Closed</td>
</tr>
<tr>
<td>Light</td>
<td>Heavy</td>
</tr>
<tr>
<td>Order</td>
<td>Chaos</td>
</tr>
<tr>
<td>Form</td>
<td>Function</td>
</tr>
<tr>
<td>Simple</td>
<td>Complex</td>
</tr>
<tr>
<td>Concave</td>
<td>Convex</td>
</tr>
<tr>
<td>Moving</td>
<td>Static</td>
</tr>
<tr>
<td>Same</td>
<td>Different</td>
</tr>
<tr>
<td>Light</td>
<td>Dark</td>
</tr>
<tr>
<td>Theory</td>
<td>Practice</td>
</tr>
<tr>
<td>Part</td>
<td>Whole</td>
</tr>
<tr>
<td>True</td>
<td>False</td>
</tr>
<tr>
<td>Refined</td>
<td>Vulgar</td>
</tr>
<tr>
<td>Tension</td>
<td>Compression</td>
</tr>
<tr>
<td>Client</td>
<td>Architect</td>
</tr>
<tr>
<td>Cost</td>
<td>Budget</td>
</tr>
<tr>
<td>Left</td>
<td>Right</td>
</tr>
<tr>
<td>Upper</td>
<td>Lower</td>
</tr>
<tr>
<td>Inside</td>
<td>Outside</td>
</tr>
</tbody>
</table>
Front  Back
Upper  Lower
Top    Bottom
Above  Below
Open   Closed
Hybrid Pure
Contradictory Straightforward
Boring Interesting
Both-and Either-or
Difficult Easy
Harmony Discord
Possible Impossible
Redundant Succinct
Evolutionary Revolutionary
Common Uncommon
Standard Unstandard
Continuity Discontinuity
Order Disorder
Conventional Unconventional
Long term Short Term
Color Black and White
Black White
Abstract Concrete
Simple Complex
Dominant Recessive
Separated Connected
<table>
<thead>
<tr>
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<th>Interrupted</th>
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<td>Old</td>
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<td>Exclude</td>
</tr>
<tr>
<td>Public</td>
<td>Private</td>
</tr>
<tr>
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<td>Unresolved</td>
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<td>Curved</td>
<td>Straight</td>
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<tr>
<td>Big</td>
<td>Little</td>
</tr>
<tr>
<td>Expanding</td>
<td>Contracting</td>
</tr>
<tr>
<td>Perpendicular</td>
<td>Diagonal</td>
</tr>
<tr>
<td>Duality</td>
<td>Unity</td>
</tr>
</tbody>
</table>

Virtually every concept of Venturi's architecture of "Complexity and Contradiction" is based on a duality as is implied by his terminology of "both-and and either-or".\textsuperscript{12} Venturi however goes from one extreme to another when he attempts to exclude either-or and simplicity in favor of both-and and complexity. Venturi's philosophy carried to its logical extremes leads to a paradox, as both-and would include both both-and and either-or as well as both complexity and simplicity. This is actually inferred in the doctrine of "less is more" of Mies van der Rohe which is expressed as a duality. Venturi implies that more is more which is probably a little too obvious. Although the architecture of Venturi is based on duality, the concept of duality goes beyond complexity and contradiction, to include simplicity and straightforwardness as well.
Duality and the Theory of Architecture

Although the primary relevance of duality in architecture leads to its expression in architectural form, the concept is also useful in the theory and process which leads to expression.

In the theory of architecture the question of form and function has until recently been of primary importance. Which follows which? The question of space and mass, space and form, or solid and void has provoked similar questions with regard to which is the more relevant. In reality form and function give birth to each other when both terms are considered in their broadest contexts where "form includes content drawn from life"\textsuperscript{13} as well as the shape of space and mass, and function is understood to include intellectual and spiritual, as well as physical functions.

With respect to space and mass, space may be considered in some respects to be of a more primary nature than mass, as space appears to be the more abundant and man is able to project himself thru or into space, while this is almost difficult to accomplish with respect to mass. It may be possible to speak of either space or mass, but not in terms of architecture. All architecture is the product of space and mass, and the best architecture is the result of the dynamic interplay of space and mass.
Is architecture an art or a science? Is it the product of intuitive or intellectual creativity? The real question is, where does one category stop, and where does the other begin? The nature of duality suggests that architecture is not just one or the other, and that it is more than a simple combination of both. "Without art, a building is merely a structure; without science, a building is merely sculpture."\textsuperscript{14}

Architecture, like any other creative activity transcends both intuition and intellect in its creation, and while each category retains its identity, creativity when it transcends these categories is more profound than either one, or both combined.
Duality and the Creative Process

Duality may prove to be a useful tool in the process of creating architecture. It may be used as a basis for comparison, or as limits.

As a basis for comparison, duality is useful in aiding the architect to understand the nature of a problem. It is common practice to attempt to determine the nature of a problem by asking what it is in positive terms. This of course has the potential of leading to good results. It is sometimes enlightening however, to ask also what a thing is not or to compare it to something that appears to be its opposite. An example of such a process might take place when asked to design a church. In addition to asking what a church is and what are the characteristics of this particular religion, it is useful to ask what is not a church, and what type of religion is this opposite to. Obviously, or maybe not so obvious, a church is not a restaurant, or filling station. What then should be different about the church than these other buildings? Also, the Catholic religion is in many ways opposite to the Unitarian religion. What then should be the expression of either one as opposed to the other? This line of comparison has the potential for creating a rich and meaningful expression and a dynamic unity which gives evidence of the tension between what a thing is, and what it is not.
Duality is also useful as a design tool by establishing limits. The architect often approaches a problem with preconceived ideas which may or may not be valid. It is necessary to flush the mind if a truly creative result is to be expected. To assist in emptying the mind of a few preconceived ideas and expanding the possibilities, the concept of duality may be used to establish limits which in reality break down the limits of preconceived ideas.

For example:

When we get an idea of what the most sensible solution might be, it may be possible to benefit from considering what appears to be the least sensible.

When thinking of what the lowest cost solution would be, thinking in terms of the highest cost may stimulate a fresh approach.

When thinking of something very small, think also of something very large.

When thinking of something very low, think also of something very high, or think of the lowest as opposed to the highest.

When pondering a unified solution, consider also a fragmented solution.

Any form or space we may consider, may be increased in scope and made more meaningful by considering the limits of opposites.

There is sometimes a danger of dismissing an apparently ridiculous concept by this process before its significance is realized. This should be guarded against, as the most bizarre ideas often carry the seeds of meaningful
and appropriate solutions.

Duality does not consist only in bringing opposing forces together in a dynamic unity, or of unifying forces which happen to present themselves in a particular situation, but it is also the expression of one quality through the expression of the opposite quality.

"True simplicity comes at the end of an exploration of complexity, from a concise summing up of all that really needs to be said." Simplicity may express complexity. A large structure may give a sense of lightness, and a small building need not be small in strength or character. Although a particular situation may call for a structure which is both small and light, and in which opposites are not expressed, all concepts derive their fullest meaning from their opposites. Therefore, it is helpful to consider heaviness when the goal is lightness, as thinking in terms of opposites helps to understand the nature of what we are trying to express.
Duality in Form and Space

Man in his search for meaning constantly gathers bits and pieces together to form recognized wholes. In this way a structural hierarchy is built up, and a sense of unity and order replaces chaos.

The bits and pieces are each a unity in themselves. Together, these make up a larger unity, and several of these combine to form a unity of yet a higher order. This structural hierarchy may be seen in the gathering of essentials which make a home, a neighborhood, a community, a city, a region, a state, a nation, the world, the universe, and on to infinity. Each of these is a spatial unity in which man realizes a freedom of movement appropriate to the level he is related to at a specific time.

The purpose of architecture is to organize this spatial hierarchy in terms of mass and space for the best use of man. This organization should always establish a whole which can be recognized as such within this order, and
in which man may realize this freedom of movement, both physical and visual within the order.

The concept of duality in architectural form will be considered with respect to the types of duality, unity within the duality, and the freedom of movement within the order.

The two basic types of duality previously discussed, also occur in architectural form.

Duality in form may exist as an expression of opposites which do not necessarily manifest themselves as two separate elements, but rather as characteristics of a single or double element.

Duality may also be expressed simply as two elements, such as two towers, two entrances, etc. This type of duality may be called juxtaposed duality. Juxtaposed duality may be expressed as a duality of opposites or as a duality in which the opposing characteristics are not important, although there is always a degree of opposition in this type of duality.
The duality of opposites is common to all architecture. It relies on the opposite nature of the elements rather than on the opposition of the elements in the composition.

The dualities of solid and void, dark and light, transparent and solid are often taken for granted because they are usually found in most architecture, and architecture cannot even exist without some of them. Although this type of duality may be common, it should not be dismissed as being too common to be considered seriously. The greatest potential of this duality is not realized simply by the use of elements of an opposite nature, but becomes quite effective when the opposite natures of the elements are played against each other.

Windows scattered about in a somewhat even manner as was done on the back elevation of the Guild House by Venturi and Rauch, Cope and Lippincott, results in the glass becoming part of the wall pattern rather than
being a transparent element contrasted to the solidness of the wall as was done in the Wiley House by Philip Johnson. Walter Gropius effectively used the contrasting elements of transparent and solid in much of his early work, such as the Bauhaus, at Dessau.

Duality of opposites is also effectively used in the Villa Savoye by Le Corbusier. Large open areas and areas of glass are contrasted with large solid areas, and the curve of the lower floor is played against the overall rectangular floor plan. Le Corbusier was a master in the use of dualities of opposites, particularly his expression of the geometric and organic traditions within a single building. Although most of his buildings could be considered to be of a rectangular geometry, this geometry is always played against the curved and diagonal elements resulting in a unity of extreme vitality and interest.

The Goldenberg house project of Louis I. Kahn, contrasts the diagonal
in a plan which is basically rectangular.
The architecture of Kahn, like that of
Le Corbusier is also characterized by
the geometric and organic expression of
form in a single composition.

In an urban situation, the
duality may take place between different
buildings rather than within the same
building. This may be observed in a
neighborhood when a house with extremely
simple lines is placed in a neighborhood
where the houses are generally of a
complex or traditional nature. This
contrast may potentially change a sit¬
uation from one of monotony to one of
vitality.

Duality of opposites is not usually
a cause of disunity within a composition,
and unity may be achieved by normal
attention to the overall order and
structure of the concept. The primary
concern of this type of duality is a
unity of vitality and interest, which
may be achieved when the opposites
are expressed to give each pole of the
duality its fullest meaning.

Much of the interest of this type of duality is derived from the fact that the viewer is given a choice. He may follow a rectangular wall, or a curved or diagonal wall. He may move along a solid plane, or project his vision thru a window or opening. The opposite natures of the duality also support each other and give meaning to each other because they are opposite. The curve is more meaningful played against a straight line. The transparent wall derives meaning from the opaqueness of the solid wall. This principle remains constant in the concept of duality.
When duality is juxtaposed, the opposition of the elements is due to their relationship in the composition of solid and void.

The division of unity into two equal parts is the most definitive division possible. It is less likely to be perceived as a unity than any other division. The division of three reads as a unity almost as easily as does one itself, as the center of the composition remains a strong focal point, and the parts begin to take on the characteristics of a group, which is also true of any number larger than three. Unity is complete and a group is complete, but duality is incomplete and opposed to unity. The division into two parts is therefore the nearest to unity, yet the most distant from it.

Duality may in some respects be considered a basis for ambiguity, but with respect to the division of parts, it is the most unequivocal and profound division which exists.
Two human characteristics affect the duality of the double element.

First, man has a tendency to balance a composition at its centroid. If the centroid of the composition falls at its center, the balance is strongest and most complete. This tendency places a greater importance on whatever elements occur at these points of the composition.

The second characteristic is the tendency of man to project his movements through space, visually and physically. If he is deprived of this freedom he experiences frustration. But freedom exists only relative to restriction. It is possible to think of movement in infinite space, but in fact such movement could not be experienced visually without a reference point. Plastic form in architecture serves as a reference for freedom of movement in architectural space. This tendency does, however, place emphasis on the spatial portion of a composition through which man may project his movements.
Due to the combination of these two human characteristics, a composition in which the center or centroid is spatial allows freedom of movement, and a composition in which the center or centroid is solid and cannot be penetrated, restricts freedom of movement similar to a solid plane.

A single space of course is not restrictive. The composition of two spaces side by side, forces the individual to make a choice of right or left. Since the center cannot be penetrated, the attention of the individual is spread to the left and right.

The division of three again allows easy penetration and is little more restrictive than unity. This also applies to divisions into numbers greater than three in which the centroid is spatial.

The division of four begins to read as a group, but functions similar to the division of two. The center divider tends to deflect movement in two directions. This principle also applies to a division of larger numbers with a center divider.
The question of duality is not always an easy matter, even though the division of two is most definitive. The most elementary situations sometimes appear to be quite ambiguous.

The single element of mass appears to be a definite statement of unity, but it is a divider which deflects in two directions and creates a division of two, therefore it could be considered a duality. Two elements appear as obvious duality, yet there is an easy penetration of the single space which is defined by the duality.

The problem becomes much clearer when the reference to space and mass is specific. A single element of mass creates a duality of space; a double element of mass creates a single or triple element of space, and so on.

When the scale is small, or frames space for physical human movement, the spatial element dominates. When the scale increases, such as in high rise towers, the masses gain in importance.
Due to the importance of the centroid in a composition, it has a strong influence on unity. Emphasis on the solid centroid tends to disunity as it deflects attention outward. The spatial centroid emphasizes unity.

Inflection is another means of providing unity. Two elements of a duality may of course inflect towards each other to imply unity or away from each other to cause disunity.

Unity also depends on the proximity of the parts. Parts grouped in close proximity will appear more unified than parts scattered at a distance.

The "dominant binder" is another important means of achieving unity. It may be in the form of a continuous outline, a dominating pattern, or color, shape, or any feature which dominates the composition to the extent that it reads as a whole.

Although man constantly searches for unity, there is also the danger of providing too much unity and producing a result which is bland and lifeless.
Rowley speaks of the obligation towards dynamic unity when he says:

"When you expand you must think of gathering up, or else the composition will fly apart through the explosive tendency of creativity, and the structural unity of the whole will be lost; when you pull the parts together you should think of the vital force which gave them birth, or else the result will be a dead mechanical adjustment and the whole will have missed the life breath of the spirit." 18

The center divider and double element of space restricts, deflects and causes tension. The double element of mass may pull apart or emphasize the center space. Duality is therefore a means of providing unity or disunity, depending upon the situation.

Venturi suggests that the obligation toward the whole does not preclude the building which is unresolved. 19 Although there is undoubtedly occasion for the unresolved building, it should be used with discrimination, as an exception to the general rule.
III. Examples of Duality in Architecture
Sompting Tower of Anglo-Saxon England expresses duality with a center ridge which divides the solid walls. The shape of the roof and molding at mid-height resolve the duality and provide unity to the square tower which is inherently a rather unified element. The introduction of the redundant center ridges which deflect to the sides, and unite with the roof molding to make giant arrows pointing to the sky, appears as a deliberate attempt to add humor and vitality to a composition which in other ways is quite static.
The "Fifty by Fifty" House Project by Mies van der Rohe is a fine example of several dualities. The extreme transparency of the enclosing glass wall is played against the solid masses of the interior. Of special interest in this case is the single column which divides each elevation into two equal parts and deflects visual movement to each side and around, in a situation which normally would draw visual movement to the inside and through the building.

The addition of the center column actually opposes and contradicts the transparency of the glass wall. It is a very definitive gesture which adds vitality and tension to the square plan which by itself represents a very unified situation.
The double window of the Palazzo Strozzi, Florence, is an example of the use of duality in the early Renaissance. The heavy stone arch is obviously adequate to span the opening without the addition of the little column in the center. It represents a duality of that which is necessary and that which is redundant. It is also in opposition to the window opening itself, as it creates tension and frustration by deflecting vision to the sides rather than through the opening. It is a paradox, a deliberate act to give human scale and add strength and vitality to an otherwise unified and static situation.
Sullivan's Farmers' and Merchants' Union Bank in Columbus, Ohio, is an example of duality in recent times. The facade is divided at the ground level by a center pilaster which deflects to the entrance on one side and a window on the other. Unity is achieved by the heavy lintel which is divided into three parts with a large center panel, but the prominent dividers of the lintel reinforce the duality. The heavy arch which occurs near the centroid of the composition and suggests penetration at this point is the strongest resolving factor of the duality in this case. The duality of this example adds a degree of tension and vitality, but it is weakened by the strong unifying elements of the heavy lintel and arched window.
S. Maria Della Spina, Pisa, expresses a very strong duality. The center pilaster deflects to the two entrances. The two pediments above the doors reinforce the duality, but a third pediment at the center reinforces the unity. The horizontal moldings and bands of masonry also reinforce the unity. If the center pediment were removed, this little church would almost give the impression of two smaller buildings. Even as it exists, it would be no surprise to find two identical spaces on the interior, with perhaps a shoe repair shop on one side and a small bar on the other.
This residence in Chestnut Hill, Pa by Venturi and Rauch appears as a double element from the front, but due to the strong inflection toward the central entrance space, it creates little tension or disunity. The double element is in fact an illusion and therefore a duality of true and false.

The relative simplicity of the exterior is opposed to the complexity of the interior space. The diagonal and curved elements are opposed to the rectangular configuration of the plan and the exterior scale of the house and entry suggest a much larger interior.

The extreme complexities and contradictions of this example represent a paradox in that they are not problems which could not have been solved in a simple way with a little effort. Instead, Venturi has deliberately chosen to introduce elements of opposition to add a note of paradox and vitality to a simple problem.
The two towers of the World Trade Center in New York City, are square in plan and identical in height and appearance. The duality in this example is juxtaposed.

Due to the large scale of this project, many different impressions of it will be realized from different views and distances from the project. At times the space between them may seem important, and at other times it will not even be visible.

Since the towers are square and non-directional, each tower is complete in itself and relatively static. If there were only one tower in this complex the result would be rather ponderous and dull. The duality of the towers gives a sense of vitality which is emphasized by their arrangement in an unresolved manner which suggest extension in a diagonal direction or completion by reflection in a symmetrical manner. Unity is restored however by the fact that the towers are identical in appearance and emerge from a common complex at ground level.
The 860 Lake Shore Drive Apartments by Mies van der Rohe, are alike in appearance and height, and rise independently from a common plaza. They are rectangular in configuration with a 3 to 5 ratio of side dimensions.

The towers are directional and may be extended quite easily in the same way that a line or a plane may be extended. The relationship of the towers is such that the directional nature of one tower interferes with the other tower. This interference causes a transfer of energy from one tower to the other, which causes the composition to resolve itself by rotation. Due to this characteristic the towers in this case compliment each other and emphasize the spatial aspect of the composition. Although the duality in this case does not create much tension and unity is quite strong, it does save this apartment complex from the monumental effect created by a single tower such as the Seagram Building.
The Brazilian Congress Building by Oscar Niemeyer, makes use of duality to express duality in the function of the building which is to house the Senate and the House of Representatives with their related facilities.

The two half-spheres of the legislative chambers suggest the sameness of the activities by the sameness of their shape, which could almost be a single sphere cut in half. The differentness of the activities is emphasized by the separation and inversion of the shapes.

The two towers of the office building represent
the most direct confrontation of duality possible, but the effect is softened by the shape of the towers which inflect toward each other, and by the bridge which spans them at mid-height. There is no question about the unity of the towers, or of the entire complex, which is cradled in a depression between two roads, which would give unity to virtually any composition that could be placed on the site.

The dualities of this project are quite meaningful and add interest and vitality to the whole, but the strong unity of the project with its lack of restrictions reduces the tension to a comparatively low level, with a resulting loss of vitality.
IV. Conclusion
The concept of duality represents a view of life which accepts the tension in the opposites and paradox of human existence. It is in this sense that duality is expressed in art and literature. The opposites of good and evil, war and peace or love and hate, are concepts which give meaning to each other while they remain in opposition. They exist in tension, each trying to overcome the other.

The tangible opposites in the form of architecture, such as space and mass or a simple element and a complex element are not directly analogous to the duality of intangible concepts such as good and evil or love and hate. Tangible elements may exist in tension and represent a paradox, but they do not try to overcome each other.

Duality in architecture affects unity and order, it influences the freedom of man’s movement in space. It also helps to clarify opposing ideas in the theory of architecture. It can be an extremely useful tool in helping to understand the nature of a problem, and for freeing the imagination in the creative process.

Duality in architecture is unnecessary. Certainly much good architecture has been created without it. But the vitality of life transcends its necessities, and to the architect with taste, wit and a knowledge of its potential, duality is a powerful tool for creating architecture which expresses the tension and vitality of human existence.
Footnotes


3Ibid., p. 14.


5Ibid., (XXXVI, 79)


8Ibid., p. 8


11Ibid., p. 90.

12Ibid., p. 23.


14Ibid.


17. Ibid., p. 98.


20. Ibid., pp. 117-121.
Bibliography


