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On architecture, nature, and man

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ON ARCHITECTURE, NATURE, AND MAN

by

Kristopher Mark Stuart

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ABSTRACT

On Architecture, Nature, and Man

by

Kristopher Mark Stuart

Mircea Eliade suggests that man's impulse to build stems from the need to physically distinguish the world of culture from the world of nature. Man builds in an attempt to perfect the natural world. It is Henry David Thoreau's assertion that nature, of which man is only a part, is already perfect. In Loren Eiseley's view, man must balance his culture with his irrevocable attachment to nature. Architecture, as an expression of culture, mediates between nature and man. Architecture's creation is inspired through man, and informed by nature. From the earliest civilization this has been true. Thus we may compare the work of Frank Lloyd Wright and Louis I. Kahn, finding that, while their work differs considerably in appearance, in spirit it is remarkably the same. From the work of Wright and Kahn we may conclude that Architecture is indebted to nature as well as to the spirit of man.
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This thesis is an investigation of the relationship between man, nature, and architecture. Such a subject is, of course, broad; it is nevertheless fundamental. Though this is an architectural thesis, the research is rooted in an inquiry into man's relationship to nature. Inherent in the equation is a paradox that stems from man's reliance on nature, and from his need to utilize and therefore defile the natural world to create a world of his own. Man is part of nature, yet at times he finds he must, out of necessity, place himself above the natural world. This thesis is structured in 2 parts. The first part attempts to approach the issue of man's relationship to nature by considering pertinent works of literature by three individuals: the theologian/philosopher Mircea Eliade, the naturalist Henry David Thoreau, and the anthropologist/naturalist Loren Eiseley. The second part attempts to reveal the relationship between nature and architecture through an examination of the thoughts of two great American architects, Frank Lloyd Wright and Louis I. Kahn, as expressed in their words and in their work. It has been the author's hope that such an inquiry may help illuminate architecture as an art which has embodied the relationship between nature, man, and architecture recently, and throughout history. The striking similarities, as well as the differences in the thoughts of these men suggest that perhaps there is no paradox, and where formerly there appeared to be three entities, there may be, in fact, only one.
PART 1
CHAPTER 1
Mircea Eleade

The underlying premise of Mircea Eliade's "The Sacred and the Profane" implies that the world that is laid before man is a world of darkness. It is a world with no apparent structure, and a world without form. The natural world is, in Eliade's own words, the lair of the dragon, "the paradigmatic figure of the marine monster, of the primordial snake, symbol of the cosmic waters, of darkness, night, and death--in short, of the amorphous and virtual, of everything that has not yet acquired a 'form'. "¹

The marine monster, or the primordial snake, is the symbol of a hidden evil, or perhaps the epitome of what is not known, seen, and therefore feared. But Eliade doesn't necessarily imply that the natural world is evil, only that its logic remains hidden. Without form, the world appears to have no purpose, at least none that can be discerned. Eliade does not suggest that the world is empty, only that it is dark, only that it is formless. Eliade speaks of "the preformal modality of cosmic matter . . . of all that precedes and follows life."² What does he mean by "preformal modality"? In a word, he means "chaos," the primordial state of matter. Everything is drawn from chaos, and everything returns to chaos. There is potential, but nothing discernable or tangible. The world consists of space, but space that is homogeneous, undifferentiated and, according to Eliade, "profane". The world consists of matter, but there are no forms to which we can ascribe

² ibid., p. 41.
meaning, no truly "sacred" forms. For humans the natural world is a mystery and, as such, it is to be feared. As Christianity suggests, chaos reigns prior to creation.

Without form the world has no meaning for humans. It is perceived as a sea of relativity, a more or less unending and meaningless series of relationships between things. "The world becomes apprehensible as world, as cosmos, in the measure in which it reveals itself as a sacred world."³ For Eliade, a sacred world is likely to be a world of order, meaning, and purpose. A world that has meaning will have an overriding principle, and it will exist toward some end. When this end becomes apparent, then the world can be understood, and it becomes real. Without a discernible order the world appears to be homogeneous and undifferentiated. If a world is perceived as having no master plan, then it is apparently nothing and it is seen as profane. Eliade entertains the proposition that the question of the meaning of the natural world is probably less important than the question of the meaning of man's world. What is at stake is man's sense of his own purpose, which, as Eliade argues is not manifest in nature.

With no apparent order to the world, the world as given can offer man no focus, no purpose for his life. Eliade recognizes that "human beings cannot live in chaos."⁴ This, of course, is the root of man's impulse to build. Giving form to the formless, visible expression to the unseen, this is one of architecture's most fundamental propositions. Eliade goes on to say that "spatial nonhomogeneity finds expression in the experience of an opposition between space that is sacred--the only real and really existing

³ ibid., p. 64.
⁴ ibid., p. 34.
space--and all other space, the formless expanse surrounding it. Spatial nonhomogeneity is simply the distinction between two kinds of space, sacred space and profane space. But, why does Eliade consider sacred space to be the only real space? Is it, perhaps, because sacred space is the only space we perceive as having real meaning? Sacred space is created space, space which has been given form, and space which acquires meaning. Eliade emphasizes the need for a distinction between the natural world, and the world we desire to create.

Humans cannot live in a world of physical chaos, nor can we exist in spiritual chaos. "The sacred reveals absolute reality and at the same time makes orientation possible; hence, it founds the world in the sense that it fixes the limits and establishes the order of the world." But what does Eliade mean by the concept of "absolute reality"? An absolute reality would exist independent of any other cause; it would be perfect in itself. For humans, absolute reality is the world we perceive, the world we find to be meaningful; it is essentially man's purpose. The sacred reveals man's purpose as it exists independently from whatever purpose nature may or may not have. But, for humans, how does our life acquire meaning and how does it become real? It can only be through the human imagination, for it is through our spirit, and with faith, that we invest ourselves with a higher purpose. This higher purpose we may call human culture, and it is through culture that our world becomes meaningful. What the sacred reveals is human culture, man's absolute reality. Culture gives structure to our world, and it does so by establishing the order of our world. Culture

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5 ibid., p. 20.
6 ibid., p. 30.
provides a focus for our activities. It is an end which our activities can
serve; we may determine where we stand in relation to that end. Man's
impulse to build is a desire to make the world real, to make the human
spirit, as expressed through human culture, manifest.

Humans need a physical and spiritual point of reference. In Eliade's
words, we must locate "a fixed point into the formless fluidity of profane
space, a center into chaos." But precisely what is Eliade suggesting by a
fixed point? Is it to be considered as something physical or spiritual? He
may possibly refer to an actual physical point, for example a center. But
perhaps it is more loosely to be considered a focus, which can be both
physical and spiritual. When the body is aligned with the spirit, the fixed
point represents both. Perhaps Eliade is suggesting that the physical must
coincide with the spiritual. In fact, the physical may be born of the
spiritual. The physical center becomes a manifestation of the spiritual
center, or the physical expression of the absolute. "Nothing can begin,
nothing can be done, without a previous orientation--and any orientation
implies acquiring a fixed point." Orientation is necessary because we must
always know where we stand before we can know where to go. The fixed
point gives us both meaning and its expression. We must orient ourselves
both physically and spiritually. Architecture, as a part of culture, is an
expression of this need. Through the physical we are reminded of the
spiritual. Culture orients the spirit, and architecture manifests the culture.
Establishing a fixed point, or a focus, is the beginning of architecture, and
it is the birth of the manifestation of the spirit.

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7 ibid., p. 63.
8 ibid., p. 22.
Architecture gives form to a formless world, making it tangible and therefore real. Man, out of necessity, becomes the creator of a second world. As Eliade explains, "What is to become 'our world' must first be 'created,' and every creation has a paradigmatic model--the creation of the universe by the gods." And by what process did the gods create the universe? The world of the gods, a world of intention and meaning, is always drawn from the sea of chaos. Our world is the world we inhabit; it is an extension of nature and, yet, it is distinguished from the natural world. In order to create our world it must be drawn from the perceived formlessness of nature, it must be elevated from its previously profane state. What Eliade suggests is that, in essence, humans become gods. Like gods, we exercise our intentions by establishing a threshold where, for us, chaos no longer reigns. The formless world is transcended. Eliade further states that "every construction and every inauguration of a new dwelling are in some measure equivalent to a new beginning, a new life. And every beginning repeats the primordial beginning, when the universe first saw the light of day." Creation is a continual process. Each creation is a new beginning because it is a renewal of the creative spirit, and a renewal of faith. Each time we build we not only transcend the profane, but we resist the return to chaos. We rediscover our purpose, and we remain sacred.

The world Eliade envisions is the world man carves out of the apparent formlessness of the natural world. It is a world man creates out of need; it is born of desire, it is born out of fear. Eliade's world is the world of man's spirit. It is the world of architecture.

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9 ibid., p. 31.
10 ibid., p. 57.
CHAPTER 2

Henry David Thoreau

In Thoreau's writings, the underlying theme is his unwavering faith in the autonomy of nature. Thoreau would agree that the world is a mystery, but he did not find nature impenetrable. He was a keen observer of nature, and his eye was an agent of his intuition. In Thoreau's words: "we shall see but little way if we require to understand what we see. How few things can man measure with the tape of his understanding! How many greater things might he be seeing in the meanwhile!"11 Humans generally fail to understand nature - to perceive its logic or its totality. Nature is not something man can hold in his hand. Thoreau suggests that nature is a logical, rational system which man is unable to comprehend and that man must first have faith in nature before its secrets will be revealed to him. Our lack of understanding stems both from this lack of faith, as well as the lack of attention rather than from nature's guarding its secrets. Man must first begin to see before he can hope to understand.

Humans seem to have a crisis of perception with respect to nature. The world is before us yet still we do not really see it, failing to see either nature's logic or nature's wonder. In perceiving nature, Thoreau recognizes the role of intuition and the significance of faith, as well as the inadequacy of words. In Thoreau's words, there is "a steep and unaccountable transition from what is called a common sense view of things, to an infinitely expanded and liberating one, from seeing things as

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men describe them, to seeing them as men cannot describe them."\(^{12}\) In essence, what is Thoreau saying? He suggests that there are two faces to the world, the physical and intangible. The physical we can touch and describe, but in the realm of the intangible our words begin to fail. Nature's secrets are of a spiritual dimension. We sense nature intuitively, and can only know it through faith. And how can this be liberating? Perhaps if we sense the spirit of nature we can free our perception of the world from the confines of the physical. We will see through nature's manifestations, and we will experience nature itself. As Thoreau warned, "man cannot afford to be a naturalist, to look at nature directly, but only with the side of his eye. He must look through and beyond her."\(^{13}\) He suggests that we can be deceived if we focus only on the physical. The metaphor of 'not seeing the forest for the trees' becomes useful; we are unable to appreciate the totality of nature when we only perceive its isolated manifestations. "How indispensable to a correct study of nature is a perception of her true meaning. The fact will one day flower out into a truth."\(^{14}\) But what constitutes the true meaning? Perhaps it is that nature is spiritual, and that this spirit governs all. According to Thoreau, with faith in nature - and through our intuition - this truth will be revealed.

When we observe only nature's physical aspect we are led to believe that the world is imperfect and incomplete. But the world is actually only imperfect with respect to man's well being. In Thoreau's words: "Nature refuses to sympathize with our sorrow. She seems not to have provided

\(^{12}\) Loren Eiseley, *Francis Bacon and the Modern Dilemma* (Lincoln, Nebraska, The University of Nebraska Press, 1962), pp. 77-78.
\(^{13}\) Shepard, p. 165.
\(^{14}\) Ibid., p. 4.
for, but by a thousand contrivances against, it. She has beveled the margins
of the eyelid that the tears may not overflow on the cheek."¹⁵ He suggests
that nature is a neutral force, working neither for nor against man. Nature
makes no promise for man's survival, though it does provide the means.

The world's physical imperfection stimulates man's impulse to build.

Even Thoreau recognizes the necessity for shelter. He admits that

"man was not made so large limbed and robust but that
he must seek to narrow his world, and wall in a space
such as fitted him. He was at first bare and out of doors;
but though this was pleasant enough in serene and warm
weather, by daylight, the rainy season and winter, to say
nothing of the torrid sun, would perhaps have nipped his
race in the bud if he had not made haste to clothe
himself with the shelter of a house."¹⁶

Through architecture man attempts to overcome his own inadequacies, and
those of the world. Architecture improves man's lot in the face of nature.

Man believes he can improve nature. Thoreau suggests otherwise; "in
order to avoid delusions, I would fain let man go by and behold a universe
in which man is but as a grain of sand."¹⁷ Nature's presence began long
before man, and nature will no doubt see man's final breath. We create
monuments to our civilizations, but they too are ultimately reduced to
grains of sand. Thoreau is confident that this truth will ultimately be
revealed.

In Thoreau's mind, nature is the true creator. He found that nature
needs no agent, for it has its own creative touch. In Thoreau's words,
"nature is full of genius, full of divinity; so that not a snowflake escapes its

¹⁵ Shepard, p. 24.
¹⁷ ibid., p. 124.
fashioning hand." Thoreau observed the crystalline structure and the process of growth which creates the snowflake, and he realized that all natural forms exist by virtue of the logic and structure of nature. Nature creates the snowflake. He further adds:

"The artist changes the direction of Nature and makes her grow according to his idea. If the gall was anticipated when the oak was made, so was the canoe when the birch was made. Genius stings Nature, and she grows according to its idea." He believes that, for man, it is not necessary to defile one world in order to create another. We need not invent or re-create the universe, only harness natures own creative forces. In essence, Thoreau suggests that everything man creates can be discovered hidden within nature. Nature creates the universe and man only discovers its possibilities.

Thoreau considered humans to be inseparable from nature. He states: "How rarely a man's love for nature becomes a ruling principle with him, like a youth's affection for a maiden, but more enduring. All nature is my bride." Thoreau implies a choice, but he likely believes we are wed to nature whether we realize it or not. Nature provides the universe and all of its possibilities to man. Though at times a difficult task, it is for man to wrest the secrets of the universe from the natural world. Nature's secrets are manifest in the natural world. Thoreau's assertion is that man, with faith in nature's authority, need only observe in order to discover. In Thoreau's words: "there has been nothing but the sun and the eye since the

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18 ibid., p. 227.  
19 ibid., p. 209.  
20 ibid., p. 268.
beginning."^{21}

The world Thoreau envisions is the world as it is given. It is the world experienced in its primordial state. It is a world that exists either with or without man. It is the world of nature.

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CHAPTER 3
Loren Eiseley

Architecture, the desire to build and to create worlds is, in Loren Eiseley's view, a fundamental human impulse. In his words: "man - for this is in the nature of his inmost being - will build ever anew. It is not in his nature to do otherwise." 22 Eiseley suggests that architecture is innate and in a sense this is true. Many creatures attempt to physically improve their world. 'Worlds' are continually created, and they must be continually renewed. Man builds for a purpose, a product of either desire or need. Eiseley observes that "behind all religions lurks the concept of nature; in the end it (religion) is the name of man's attempt to define and delimit his world, whether seen or unseen." 23 We build in response to the world around us, which we perceive to be a threat to our well-being. But, what is the role of religion? While nature lurks, dark and formless, it is through religion that some humans make sense of the world. Through faith man ascribes meaning to the world. To define and delimit the world is to give it an order, to give it form. We define our world spiritually, and construct it physically, and in doing so we create a world in our image. As Eiseley suggests, a world can be either seen or unseen, which is to say that it can be physical, spiritual, or both. Man builds to satisfy physical needs, and man builds to elevate the spirit. Man's need to create is an expression of his faith in a higher purpose, a purpose that gives his world a meaning that he doesn't perceive in nature. Man always seeks to elevate his world, to create

another world, one that is distinguished from the natural world.

In creating our world we remove ourselves from nature. Our world, our culture, has become in Eiseley's words, "an increasingly time-conscious, future-oriented society of great technical skill, which has fallen out of balance with the natural world about it." But, how have we become time-conscious? Nature and natural time are cyclical. But men of culture no doubt believe that time is linear rather than cyclical. We believe all things progress linearly, and toward some end. In saying that we are future oriented, Eiseley suggests that we are focused on that end, often blind to what surrounds us. We've lost sight of nature, and we've lost touch. When we exclude nature, we lose our balance. Eiseley describes man's world as "a universe displaced from the natural in the common environmental sense of the word. Objects and men are no longer completely within the world we call natural--they are subject to the transpositions which the brain can evoke or project." When a transposition occurs, there is a change in the natural order of things. When we create a world we alter the order of nature. In essence, we split paths with the world of nature. This is where we can begin to fall out of balance. Our purpose becomes distinct from nature, whose guiding forces we fail to perceive. We differentiate ourselves and our creations from the natural world into which we were born. Eiseley warns that "man in the end forgets the message that started him upon his journey." We tend to lose sight of the fact that our roots are in nature.

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25 ibid., p. 142.
26 ibid., p. 127.
Eiseley suggests that man cannot blindly disregard nature. In his own words:

"man is no more natural than the world. In reality he is the creator of a phantom universe, the universe we call culture--a formidable realm of cloud shapes, ideas, potentialities, gods, and cities, which with man’s death will collapse into dust and vanish back into 'expected' nature."27

Man is no more natural than the world because man is but a part of nature. Perhaps Eiseley is suggesting that nature establishes man’s limits. We can conceive of things, but we are unable to create physical things which can transcend nature’s laws. Our world, the world of culture, is really a world of ideas; it is spiritual, and invisible. Like our bodies, in the end the physical manifestations of our ideas will grow tired, and they will be returned to nature. The ideas remain, but they are invisible; they live on, but only in the spiritual world, the realm of potential. In this sense much of our world really is a phantom world. It is only the thought which we control, for nature controls the physical expression. Our ideas can transcend nature, but not our creations. In essence, our world is nothing without nature's unspoken consent.

Humans often fail to perceive nature's significance. We view nature as a separate entity whose concerns are separate from our own. We see man, then nature - and at times there is a conflict. Man is an extension of nature, but not vice versa. We are part of nature. When we see nature as a separate entity, we skew our perception of the world. We really don't see nature. As Eiseley believes, “the world of nature, once seen through the

27 ibid., p. 120.
eye of genius, is never seen in quite the same manner afterward." And what is the eye of genius? We must consider "genius" to be exceptional natural capacity. Genius seems to require knowledge, courage, and freedom from prejudice regarding past experience. Eiseley refers to the man who is able to distance himself from what he has learned, and is able to utilize his natural capacity to perceive. The eye of the learned man may be clouded, while the eye of the genius will be clear. Eiseley recall a somewhat heretical priest having once said, "God asks nothing of the highest soul but attention." And what is it that the eye of genius will see in nature? Man is as much a child of nature as are things in the natural world. The world of nature is the world of flowers and trees, but nature is the invisible force which allows them to be. Yet as a force, it is not directed against man. Nature is a neutral force. There is no conflict, only man's lack of insight and his ignorance. Nature is a totality, a web of interconnectedness; all things are related in nature. Nature gives rise to all things.

Humans often fail to learn from nature; we fail to observe. Perhaps we don't feel the need. We have faith in our own knowledge, which is quite vast. And we have faith in our scientific method. Science, whose ultimate authority is nature, has become man's authority. In the western world we believe that through science we can reconstruct the natural world. We may believe that our understanding of our world springs from our imagination. But Eiseley argues to the contrary, as he quotes Francis Bacon: "we are not to imagine or suppose, but to discover what nature does or may be made to

28 Eiseley, Francis Bacon and the Modern Dilemma, p. 86.
do."  

Bacon's assertion is very clear. As the father of scientific method he implies that science is not pure invention, for scientists only unconceal nature's truth and discover what already exists in the natural world. They discover nature's laws as they observe natural phenomena. Bacon perhaps suggests that everything, which is to say all things and creation itself, begins in nature. As Eiseley quotes Jean Baitaillon, "Really we create nothing. We merely plagiarize nature."

Nature encompasses far too much for us to perceive; we can only imagine the extent of her reach. According to Eiseley: "... the reality we know in our limited lifetimes is dwarfed by the unseen potential of the abyss where science stops." The reality we know is, of course, the physical world; it is the natural world and the world we create. But what in essence is the abyss? We can say that science stops at the edge of the unknown, where it has not penetrated, or simply cannot penetrate. Science actually stops at the threshold of the spiritual realm. John Dewey once said that "the tangible rests precariously upon the untouched and ungrasped." The world we see owes an incredible allegiance to a world we cannot see. Eiseley further states, that "the evolution of the entire universe--stars, elements, life, man--is a process of drawing something out of nothing, out of the utter void of non-being." But how does Eiseley consider the void of non-being? It is certainly the realm of potential. It is likely not the imagination, for the universe is not born of the mind of man. Eiseley

30 Eiseley, Francis Bacon and the Modern Dilemma, p. 6.
33 ibid., p. 28.
34 ibid., p. 45.
implies that there is a greater spirit, a ruling spirit, that gives birth to everything, including man. If we believe Francis Bacon, then the ruling spirit must be the force we call nature. Nature is the realm of potential. Only after consultation with nature's laws do objects become physical presences. The universe is nature. Everything we see in the world has risen from nature, the unseen force, either of its own accord or by some urging. Nature is the utter void of non-being, and nature is the abyss. Nature is the ruling spirit and the world is its voice.

Nature calls to man, whose choice is but to listen. Eiseley says of man:

"at the climatic moment of his journey into space he has met himself at the doorway of the stars. And the looming shadow before him has pointed backward into the entangled gloom of a forest from which it has been his purpose to escape. Man has crossed, in his history, two worlds. He must now enter another and forgotten one, but with the knowledge gained on the pathway to the moon. He must learn that, whatever his powers as a magician, he lies under the spell of a greater and green enchantment which, try as he will, he can never avoid, however far he travels. The spell has been laid on him since the beginning of time—the spell of the natural world from which he sprang."35

Eiseley acknowledges the significance of human culture, but he also emphasizes our reliance on nature. Of man he further warns:

"his second world, drawn from his own brain, has brought him far, but it cannot take him out of nature, nor can he live by escaping into his second world alone . . . he must make, by way of his cultural world, an actual conscious re-entry into the sunflower forest he had thought merely to exploit or abandon. He must do

35 Eiseley, The Invisible Pyramid, pp. 139-140.
this in order to survive."^{36}

Why can't we escape nature by retreating into the world of culture? Because its foundation is in nature. Escape from nature is only an illusion. If we progress it is only with nature's sanction. Eiseley suggests that we can no longer diverge, but must instead re-align our course with that of nature.

In essence, nature is everything. Nature is man's authority. Man, Eiseley writes, "knows intuitively that nature is a reality that existed before him and will survive his individual death."^{37} We want to control our destiny and like to think we can, but we instinctively fear we cannot. "We may see behind nature a divinity which rules it, or we may regard nature itself as a somewhat nebulous and ill-defined deity. Man knows that he springs from nature and not nature from him." As Eiseley suggests, we believe in the higher spirit, in god, whether the spirit is nature itself, or nature's god. "We may adhere to the tangible, but we will still be forced to speak of the 'unknowable.'" We take comfort in the physical world we create, but in Eiseley's words:

"It will still be nature that concerns us as it concerned the Neanderthal. We cannot exorcise the word, refine it semantically though we may. Nature is the receptacle which contains man and into which he finally sinks to rest. It implies all, absolutely all, that man knows or can know."^{38}

The relationship between nature and culture has become man's predicament. We are of nature and yet we try to place ourselves outside of nature. We both embrace and deny nature simultaneously. This has always

\[^{36}\text{ibid., p. 155.}\]
\[^{37}\text{Eiseley, The Star Thrower, p. 225.}\]
\[^{38}\text{ibid.}\]
been architecture's paradox. We must have an inherent reverence for
nature, but to an extent we must also defile it. As Eiseley observes:"the
nature of the human predicament: how nature is to be re-entered; how
man, the relatively unthinking and proud creator of the second world--the
world of culture--may revivify and restore his first world which cherished
and brought him into being."³⁹ We are faced with two worlds, the world
of nature and the world of culture. How is this a predicament? We seem to
be faced with a choice, when in reality there is none; we need them both.
We cannot live in the natural world and we cannot live without nature. We
cannot build a world without altering nature, nor can we build without
nature's blessing.

The world Eiseley describes is a world which, for us, does not exist.
It is the world where man's reverence for nature and his desire to express
are joined as they were always meant to be. Eiseley recalls such worlds -
the worlds of the so-called primitive peoples of the Americas, Africa, and
Australia - but they are virtually forgotten. The world Eiseley describes is
the world where the divergent paths of the first two worlds, nature and
culture, are once again reconciled. It is the third world.

³⁹ Eiseley, The Invisible Pyramid, p. 137.
PART 2
CHAPTER 1
Frank Lloyd Wright

"Architecture I know to be a great spirit. It can never be something which consists of the buildings which have been built by man on earth... mostly now rubbish heaps or soon to be... Architecture is that great living creative spirit which from generation to generation, from age to age, proceeds, persists, creates, according to the nature of man, and his circumstances as they change. That is really architecture... We can only know that all things are in process of flowing in some continuous state of becoming."\(^{40}\)

(Frank Lloyd Wright)

Frank Lloyd Wright realized the omnipresence of a spirit which transcends man, physical reality, and time. The spirit may invade or permeate man's being, but it is not the possession of one man alone. Man may touch the spirit, but he is only its servant. The great spirit precedes creation. Wright refers to architecture as the great spirit, but also warns that architecture is not merely the collection of man's buildings. He suggests that architecture is the process of creation; architecture is not the building, but the spirit that creates the building. In a sense, nature is not the tree, rather the spirit which creates the tree. Creation is physical realization. Things that already exist in spirit are given form, and expression. What is possible becomes tangible. The process of becoming is the realization of the possibilities of the creative spirit; the creative spirit is nature.

Wright considered nature to be the primary source for a philosophy

of architecture. He was an observer of nature, and he held the belief that the possibilities for architecture would be discovered in nature. Wright saw in nature both the process of creation and nature's means of creation. Wright claims his work was influenced by no man; in his life he found only inspiration and confirmation of this point. Nature is a recurring theme in Wright's life and work and his various inspirations invariably find their roots in nature. It was by virtue of these inspirations that his faith in the possibility of the union of nature and culture through architecture was strengthened and his philosophy of architecture crystallized.

LIFE

Frank Lloyd Wright (fig. 1) was born on June 8, 1867, in the small town of Richland Center, Wisconsin. His father, William Russell Cary Wright, was a minister's son from Massachusetts. His mother, Anna Lloyd Jones, was a Welsh immigrant from nearby Hillside, Wisconsin. Wright's youth was somewhat unstable, as the family moved around a great deal, six towns in four states before he was eleven years old. In 1885, his parents divorced, after which he never saw his father again. He was very close to his mother, but both of his parents were to leave lasting impressions on his life and work.

William Wright was a man with many interests: he was a practicing lawyer, a musician, a teacher, a politician, and a clergyman. He was a wanderer, endlessly searching but never seeming to find fulfillment in his life. He had migrated west in 1859 to establish himself as a lawyer. As a
gifted orator, he became an ordained minister in 1863. The family moved from town to town each time he found a new congregation. As William Wright was a man of moods, often depressed or withdrawn, Frank had little contact with his father. But it was William's love of music which had a deep impact on Frank. He attributed his lifelong attraction to Bach and Beethoven to his father's stimulation. Wright often compared music to architecture, suggesting his father taught him to make structural comparisons between the two.

Anna Lloyd Wright was a member of a tightly knit Unitarian family with eleven children. They were a prosperous clan with a reverence for books and learning. Anna became a teacher. She was also a lover of nature, intrigued by its forms and processes. Wright maintained that his architectural career was chosen for him by his mother prior to his birth; she is rumored to have decorated Frank's nursery with pictures of English Cathedrals. A much more influential gesture were the Froebel "gifts" she acquired for her children. Anna had visited the 1876 Centennial exposition in Philadelphia where she saw a display of the Froebelian toys. Friederich Froebel, a German educational theorist was the pioneer of the "kindergarten" concept. Froebel taught that natural objects could be expressed through basic geometry. In the "gifts," wooden blocks, cards, and paper of pure geometric forms were used to channel the child's play toward a knowledge of composition, relationships, and nature itself. Wright often acknowledged the influence of his mother and the impact of the "gifts."

As a child Wright was popular, though somewhat shy. He would
often retire to the attic to read, draw, or paint. As a teen-ager he spent the summers working on his uncle's farm, where he was in close contact with nature. The constructive patterns of the Froebel "gifts" formed a foundation for his observation of nature, in which he saw nature's structures, seeing into and seeing outward from within. In school, however, he was not so attentive and his grades evidence this; they were not outstanding. He nevertheless, was admitted to the University of Wisconsin as a "special student". He studied civil engineering, received average marks, and left after one year.

Wright moved to Chicago in 1887. He secured employment with Joseph Lyman Silsbee, a prominent architect of Queen Ann residences. Wright's began to acquire an interest in residential architecture while under Silsbee's tutelage. The environment was stimulating and Wright learned quickly. In November of 1887 Wright executed his first independent commission, the Hillside Home School for his aunts, Ellen and Jane. Silsbee was supportive, giving him time off to supervise construction.

By 1889, Wright had entered the firm of Adler and Sullivan as a sketch developer. At that time, the firm was working on Chicago's Auditorium building. Adler and Sullivan was one of Chicago's most exciting firms and the opportunity proved exceptional. Wright recieved incomparable training through philosophical conversations with Louis Sullivan and his brilliant engineer Dankmar Adler. He quickly rose to the position of draftsman and eventually head draftsman. Sullivan recognized his abilities and offered him the responsibility for the firm's residential commissions. In addition, Wright soon began to take his own commissions,
"moonlighting" to pay for his new home and studio in Oak Park. Wright worked on theatres and office buildings at Sullivan's office during the day, on the residences at his own studio at night. Sullivan disapproved of his increasing independence and the two parted company in 1893.

Wright began to practice independently at the age of 25. His early work was confined primarily to Chicago and its suburbs. Though he received large commissions for the Larkin Company Building in Buffalo and Unity Church and Parish House in Oak Park, the vast majority of Wright's work through 1910 was residential, with many homes designed for his native suburb of Oak Park. Wright's early houses, as typified by the Martin house of 1904 and the Robie house of 1909, were radical departures from traditional homes of the period. Wright's emphasis on spatial extension, deep sheltering eaves, and continuous horizontals tended to sympathize with plane of the earth and the broad expanse of the midwestern terrain. Wright's "prairie" houses established his interest in the landscape and his reputation as an architect with a vision.

Following a European trip in 1910, and the publication of his work abroad (the Wasmuth portfolio of 1911), Wright's reputation began to extend beyond Chicago. Between 1911 to 1930 Wright received commissions globally, spending much time in Japan and on the west coast. He began construction of his own residence, Taliesin, in Wisconsin, in 1911. He then spent seven years in Japan, supervising the construction of the Imperial Hotel and other commissions. While in Japan, Wright became a collector of Japanese wood-block prints. His work in California included several residences in which he devised a clever system of concrete-block
construction; The blocks were "knitted" together with steel rods and the joints were subsequently filled with concrete. The Millard house of 1923 is perhaps the finest example of this construction. The great depression signaled the end of this phase of Wright's career.

Following the depression, Wright continued to elaborate on the themes of his earlier career, completing some of his most successful projects, including the Kaufmann house of 1936, the Hanna house of 1937, and Wright's winter residence, Taliesin West, in 1938. Wright's work of this period shows a mature expression of the relationship between the building and the landscape. "Fallingwater," Wright's name for the Kaufmann house, appears to grow from the rock of the Pennsylvania hills as it projects over the waterfall which passes below. At Taliesin West, the structure appears to rise from the desert floor. The Hanna House uses a form of concrete slab construction that Wright would use extensively in later projects. In the late thirties and forties, Wright began to experiment with various building techniques, leading to designs for a variety of potentially inexpensive, owner-built homes which he termed 'Usonian.'

Wright had a reputation for designing a building at the drop of a hat, as one story tells of him designing "Fallingwater" in the three hours it took his clients, after a conversation by phone, to drive from Chicago to Wisconsin. His buildings were also notoriously over the client's budget. Wright continued to build until his death in 1959. His later work - after 1941 - while still noteworthy, tends to be much more stylistic than his early work, less an embodiment of the principles upon which his most successful works were founded.
INSPIRATION

Nature was the ruling principle in Wright's work as he was, above all, an observer of nature. He discovered the principles of order and unity in nature; order gave life its form and unity gave form its life. Wright had a deep appreciation for the humble weeds of the prairie, finding them to embody these principles. He would often venture out on horseback to collect them.41 David Van Zanten describes the library in Wright's Oak Park studio as a museum-laboratory, containing objects of nature whose secrets Wright was able to discover after close examination, perhaps extracting the essentials of his designs (fig. 2).42 In weeds, Wright saw the natural patterns of structure, and the order of nature as detailed by D'Arcy Thompson in his 1917 treatise On Growth and Form. Wright discovered science in nature and he realized the possibility of drawing architecture from nature. Wright understood the nature of the organism, through which he formulated a notion of architecture as 'organic,' conceiving a building as an organism. A natural organism is a living entity, a product of circumstance, a unified response to function, material, and environmental forces. Architecture has similar concerns for function, materials, and the landscape. A building of course is not an organism, nor a living entity, but Wright nevertheless found this analogy to be useful. He realized the possibility of creating in the manner of nature, through order and the process of growth. He began to consider the architect as 'nature's

42 ibid., p. 80.
instrument.' His observations of order and growth in nature were to form the roots of his work.

The harmony between nature and culture is an underlying theme in Wright's work. His contact with Japanese culture stimulated his thought on this subject. During his travels to Japan, Wright found the Japanese people to be "harmonious with . . . the heart of nature." 43 While in Japan, Wright became a passionate collector of Japanese wood-block prints (fig. 3). They proved to be a source of great inspiration for him. He greatly admired the prints because they exhibited "spirituality, purity, and harmony with nature." 44 In Japanese prints, Wright discovered how to observe nature. In his own words, "when you once start with these prints, you never look at nature the same way after." 45 In these prints, he saw an elimination of the unnecessary, an abstraction of nature, a simplification through which nature became clear. Wright was sometimes seen sketching over the prints, analyzing their underlying compositional order. The Japanese often used either simple geometric elements to form a fabric, or lines of direction upon which the composition was developed. The underlying structure both controlled the composition and imparted a particular character and sense of unity to each print. In addition, the wood-block prints exhibited a sense of a limitless space, a quality which Wright sought to incorporate into his architecture. In Hiroshige's "A Night View of the Eight Great Places of Buyo Kanazawa" one sees that the formation of geese imitates the forms of the land (fig. 4). In reality, nature appears

43 ibid., p. 146.
44 ibid., p. 151.
45 ibid., p. 143.
FIGURE 3
much more chaotic than the prints portray. The prints idealize nature through visual order. According to Eliade, they are sacred portrayals of the profane world. The idealization of nature is Wright's most fundamental architectural proposition.

Wright's greatest inspiration came from his former mentor and employer; Louis Sullivan, whom he referred to as his "Lieber Meister" or "Dear Master" (fig. 5). Wright credits Sullivan for guiding him to nature as a source for architecture. Sullivan's reverence for nature is expressed in his statement of faith in "that architecture which shall speak with clearness, with eloquence, and with warmth, of the fullness, the completeness of man's intercourse with nature and with his fellow man."46 He believed in the world where nature and culture could achieve harmony. Sullivan nevertheless found, "to his annoyance, that in the architectural art of his day, the spirit of man was not free."47 Sullivan's work embodies the relationship between emotion and the intellect and man's longing for artistic freedom. The desire for freedom springs from man's emotions; this desire found its expression in Sullivan's ornament. For Sullivan, the building was inspired by the rational requirements of function and the needs of culture. It was created through knowledge of science and math, but expressed itself through its ornament. The ornament was the final element; it represented the flowering of the building and the mark of the individual; the ornament represented the release of the soul. In contrast to the rational geometric structure of the building, the natural motifs of

Sullivan's ornament expressed man's spirit. Though regulated by and dependent on the 'rational' requirements of function and structure in architecture, Sullivan considered the emotional expression to be superior. In the Guaranty Building of 1894-1895 in Buffalo, New York, a twelve-story office block, the 'rational' structure is visually dominant, but its surfaces are inundated with the expressive freedom of natural forms (fig. 6). Similarly, in Carson, Pirie, Scott, of 1902-1903, a twelve-story retail department store in Chicago, Sullivan overlays the rational structure with expressive forms (fig. 7). In this particular example the ornament of the lower levels, though still geometrically dependent, begins to subsume the rational and achieve a presence of its own. Sullivan's ornament was the superior expression of the freedom of man's spirit and his intercourse with nature.

Sullivan's ornament presents an idealized image of nature, rather than an expression of nature's process. His ornament was generated from the strict rules of mathematics and geometry, with regulating lines establishing patterns of development (fig. 8). Regarding mathematics, Sullivan states: "Mathematics, etc. etc., came into being in response to a desire in the human breast to come nearer to nature."48 Sullivan viewed science as a product of man's culture which could free man to create, to bring him closer to the spirit of nature. It was through architecture that he sought to achieve "the redemption of his soul."49 But in Sullivan's architecture, nature is consciously expressed only as an ornamental image. The freedom he sought was dependent on the rational forms and regulating

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49 ibid., p. 197.
FIGURE 8
lines on which his ornament was based. Freedom was an illusion. Though
his reverence for nature was great, the role of nature in his architecture
was actually minor, contained within the ornament, the final stroke of the
artists' brush.

WORK

Wright's career begins with Sullivan's ideas concerning nature and
architecture. Wright acknowledged the potential to accomplish Sullivan's
objectives - the integration of nature and culture - through geometric
means. He elaborated on the notion of the relationship between natural
forms and geometry based on his own observations of nature throughout
his career. Yet it is here that Wright's thinking clearly departs from that of
his master. Whereas Sullivan saw nature within science, Wright saw science
within nature. Wright considered nature to be a process and a source out of
which architecture could rise. He essentially proposed Sullivan's antithesis;
that nature is architecture's beginning, rather than an end. This can be
illustrated by focusing on the ornament in Sullivan's work and the plan in
Wright's work. Sullivan's method for creating organic ornament -
development according to a geometric pattern - became Wright's means for
creating an organic architecture. While Sullivan applied nature to the
surface of the building, Wright accepted nature as the essence of his
architecture.

Wright was confident that architecture could grow out of nature; his
architectural ideas were an expression of his faith in nature as an
architectural source. His observations of nature stimulated his thought concerning order and geometry, as well as his notions of integration and continuity. Wright's treatment of the landscape and his use of materials were also functions of his reverence for nature. Drawing from nature, he believed in the principle of growth as a means of creation. Man doesn't invent the world; rather he simply harnesses nature and his 'world' begins to grow. This belief is a reflection of Wright's notion of the role of the architect as nature's agent. Through his work Wright attempted to elaborate these ideas in an effort to accomplish what, in Wright's words, "Lieber Meister had not reached."\(^{50}\)

**Order.** Wright believed in order as an architectural determinant, and he considered the establishment of a geometric system, the cell or the grid, to be the seed. His early work is considered to be geometrically abstract, lacking any direct reference to nature. But Wright learned the lesson of structure and geometric order in nature, learning from the weeds he collected and from his observations of the world. On his uncle's farm as a youth, and in the library of his Oak Park studio, he saw that objects in nature grow from the single cell to the organism. The natural origins of Wright's work becomes apparent when viewed in this light, i.e. in terms of the cell and the organism. The 'whole' of the organism begins with the part, the cell or the unit, and the unit determines the growth as well as the final form of the organism. To use an analogy, Wright, as the architect, essentially plants a seed; he creates the unit first, and through the unit he develops an ordered fabric creating a work of architecture.

This approach is evident in Wright's early work, such as the house for Darwin D. Martin of 1904, in Buffalo, New York (fig. 9). Darwin Martin was a good client and a close friend of Wright's, offering support (which included financial means) whenever Wright was in need. The Martin House was designed to the last detail by Wright, including the furniture and stained-glass. Wright also created surrounding gardens, as the Martins were very much interested in horticulture. The house is constructed of slender "Roman" bricks, concrete floors with ceramic mosaics, white oak wood work, and tiled roofs. The brilliance of the house lies in its plan, which exhibits the "tartan" grid, composed of alternating large and small cells which Wright often utilized during this period (figs. 10, 11). The grid suggests the axes of development within the plan, originating at the hearth. The living area extends outward into the "floricycle", and the pergola extends through the gardens to the conservatory, garage, and stable. In addition, the large and small cells of the grid correspond to space and structure in the plan. The free-standing groups of piers about the living room form chambers which contain radiators, and supply fresh air. The grid determines each aspect of the plan.

Wright's use of the cellular system can also be seen in the "Honeycomb" house of 1936, for Paul R. and Jean Hanna, in Palo Alto, California (fig. 12). Wright, convinced that the 120-degree angle would provide more flexibility for human movement, utilized the hexagonal cell as seen in the cross-section of the honeycomb (fig. 13). The Hannas were educators; Paul Hanna was a professor at Stanford University. They
required a home for themselves and their three children. The house was to be located on the brow of a hill, and would utilize an open plan incorporating gardens and terraces. The house is constructed of wood and brick on a concrete slab, with the clients themselves involved in the construction. This particular house became a model for Wright's later work with pre-fabricated dwellings. Once the slab was poured, strips of metal were set into the concrete to indicate the location of walls, and the house began to rise from the slab. The hexagonal hearth is the seed of the plan and the hexagonal grid determines spatial development (figs. 14, 15). Though the grid is utilized only in plan, the hexagon permeates the entire work, including the furniture which Wright designed. The cell consistently determines all facets of the entire organism. As the Hanna family grew and children moved away, the house required several alterations to which the architect consented and executed in accordance with the established order of the plan. Because of the pre-programmed nature of the geometry, the changes were easily made and the additions became natural extensions of the original work.

In actuality, the use of the grid or the cell is characteristic of all of Wright's work. As David Van Zanten explains, "Wright had developed a system by which a design could be made to generate itself on the office boards once Wright had set it in motion with a general layout."

51 The order created an internal logic based on geometry - a natural law so to speak. Once the order was established, the design was set in motion, and it only had to be followed logically to completion. In his use of order Wright

51 ibid., p. 70.
is sympathetic to Eliade’s position regarding the establishment of a fixed point, an orientation which allows the process of creation to begin. For Wright, the hearth was the generative cell and the visible expression of the spiritual center of the home. Wright’s work is also consistent with Thoreau’s observation of the snowflake, and nature's means of creation; that is, as evidenced by the snowflake, nature can create an infinite variety through the establishment of a single order. Once the cell is established its nature takes over.

Integration. Wright discussed the necessity for a complete harmony in architecture, which he expressed as integration. In his words:

"integration, is life. It is the first principle of any growth that the thing grown be no mere aggregation. Integration as entity is first essential. And integration means that no part of anything is of any great value in itself except as it be integrate part of the harmonious whole."\(^{52}\)

Integration is the composition of the whole from its constituent parts, each part existing both independently and as part of the whole. When architects speak of a building which acknowledges the contribution of each of its parts (each element achieving significance as a piece of the whole), such a building is said to have integrity. The concept of integration suggests that the whole is much more than the sum of its parts. Wright describes integration as "continuity in the concept of the building as a whole." He further states that "any building should be complete, including all within itself. Instead of many things, one thing."\(^ {53}\) In Wright's architecture this notion translates into an integration of the distinct physical elements of a

\(^{52}\) Wright, The Natural House, p. 22.
\(^{53}\) ibid., p. 19.
building, as well as the continuity of space, reverberating from the interior to the exterior, and vice versa.

Wright's notion of integration is expressed in the house for Frederick C. Robie of 1906, in Chicago (fig. 16). The house is a multiple story city dwelling with a southern exposure. Wright's challenge was to create an environment of "airiness" while maintaining privacy. The living areas are raised above the level of the street. The house is open to the south, facing the street, with a balcony and an enclosed garden. It is constructed of slender brown bricks, stone trimmings, tiled roofs, and copper cornices. Geometrically abstract in appearance, its lines are crisp and precise. Wright manipulates these lines successfully integrating the various planes and forms; indeed the separate parts appear to have grown from each other. The distinctions between the separate wings and the separate floors of the house are blurred intentionally. The individual brick piers of the south facade are unified by the long horizontal of the balcony in front of them. The low, deep eaves of the roofs produce strong horizontal lines, thereby establishing a kinship between the upper and lower levels. Finally, the continuous horizontals of the exterior serve to unify the composition's distinct elements.

Wright further integrates the building in its spatial development. As is evident in the plan of the Robie house, spaces interpenetrate each other (figs. 17, 18). The interior spaces of the living and dining areas are distinct and yet they are fused, growing together yet expanding independently along an axis which has its origin at the hearth; from the living area one experiences the flow of space beyond the hearth, a free-standing mass
which anchors the house, and the dining area (fig. 19). The exterior space penetrates into the interior by way of the balcony, offering the residents contact with the street on their own terms. The exterior space, defined by both the balcony and the garden, becomes a bridge between the living and dining areas. Wright also attempts to unify the spaces of each level of the house; the placement of the open stair at the hearth creates a shaft of space, a transcendent movement from floor to floor, and a spatial integration from bottom to top.

Throughout the interior, Wright uses the wood mouldings and trim to unify the mass. The building at once appears to be both expanding and contracting, and Wright's treatment of the interior reinforces both. The mouldings of the living area are generated by the structure of the house, as they spring from the brick piers of the south wall, expressing the span of the beams in the ceiling. The mouldings visually unify the interior mass, strapping it together to stabilize it, while they also reveal the module of the plan; the mouldings express the incremental expansion of the living areas away from the hearth (fig. 19). In Wright's work, his notion of integration is carried through to all aspects of the building, so that his work appears as if its growth were controlled by some unseen natural force, seeming to be a pulsing, "living" expression of its forces of creation.

Integration is life; it is harmony and harmony is the giver of life. Moreover, it is the subtle but profound difference between a collection of organs and an organism. This is Wright's understanding: that any entity can be "no mere aggregation." This is also Thoreau's understanding as his writings describe the relationships he viewed in nature, the harmony, the
integration. Thoreau said: "Man is but the place where I stand," suggesting that the world is bigger than man and nature is much more than the sum total of all natural phenomena, of which man is only one. Similarly, Loren Eiseley said that "man is no more natural than the world." In his statement, Eiseley considers that man draws his significance from nature and is only significant as an integral piece of nature, which is omnipresent. Though Thoreau and Eiseley describe man's relationship to nature, they are speaking of their recognition of the relationship between the part and the whole. And Wright would likely have concluded that such relationships are as significant in architecture as they are in nature.

**Landscape.** Wright drew inspiration in the natural landscape, and was especially concerned with the relationship between the architecture and the land. Wright viewed the siting of a building as the opportunity to integrate architecture and nature. In Wright's words, "it is in the nature of any organic building to grow from its site, come out of the ground into the light - the ground itself held always as a component basic part of the building itself."54 In Wright's architecture, the natural landscape imparts its particular character to the work of man.

This thought is perhaps nowhere better expressed than in the homes Wright built for himself in Wisconsin and Arizona. His homes were important to him, as they were places of work as well as refuge. He constructed three homes for himself and designed perhaps three others. His first home was a suburban dwelling located in the Oak Park section of Chicago. Wright provided for all aspects of his daily life in each of the

54 ibid., p. 44.
homes he built for himself, including his working studio and offices. His employees became extended family, and he treated them as such, providing living quarters for his ‘fellowship’ in both Wisconsin and Arizona. The Fellows contributed to the maintenance of the household. This of course was no small task, for Wright sought to live off the land, with gardens and orchards as an integral part of the architecture. His homes were not mere shelters; rather, they were compounds which were designed to facilitate a life of continual contact with nature. His homes tied him to the landscape and to nature, as they very much appear to grow from the landscape, expressing a living relationship with the land.

The hills of Wisconsin became the setting for Wright’s second home, “Taliesin” (1911), located on a hill near Spring Green, Wisconsin. Taliesin was originally planned as a summer house for his mother, Anna. Mrs. Wright, however, encouraged Frank to adopt Taliesin as his home, as a refuge where he could find peace. Taliesin became a self-sufficient country dwelling with, in addition to the living quarters, a farm unit including livestock, orchards, and gardens. Built of native yellow limestone, cypress boards, and cedar shingles and furnished with his prized collection of art from the orient, Taliesin became a life-long labor for Wright, requiring extensive rebuilding following fires to the living quarters in 1914 and 1925. Wright continued to make additions to his home, expanding the living areas and the studio wing until his death in 1959.

Taliesin is a Welsh word which means “shining brow” alluding to the brow of the hill on which the house is sited. The name is an appropriate expression of Wright’s intention, as the house becomes an extension of the
hill, both growing from it and maintaining its profile (fig. 20). Wright felt
that the house had to conform to the brow of the hill, for anything 'on' the
hill would have destroyed it. The stone-work of the building's walls, in
fact, imitates the appearance of the stratified stone in the hill with its layers
exposed through the ages. The slopes of the roofs also imitate the gentle
slope of the hill, no doubt a lesson from his Japanese prints. Nature accepts
the architecture unequivocally and the architecture in turn embraces the
nature which surrounds it. The gardens, nestled between the wings, are
g eo met r ical ly com posed, with architectural elements touching nature, and
nature responding (figs. 21, 22). Joseph Connors writes, "the artificial
structure reaches out and fraternizes with the natural environment, inviting
flower and vine in turn to clamber over walls and flourish within curb of
brick and stone, each mingling with each."55 Nature is infused with visual
order rather than eliminated. The same can be said of the surrounding
orchards, whose neatly planted trees foreshadow the predominance of
order which culminates in the work of architecture (figs. 23, 24). Through
the orchards and gardens Wright establishes very broad thresholds between
the world of nature and the world of man. The hill imparts its character to
the architecture, and likewise the architect imparts his character to the hill.

The floor of the desert is the site for Wright's third home, his winter
home, Taliesin West (1936), near Scottsdale, Arizona. Recuperating from a
bout with pneumonia in Phoenix during 1936, Wright selected a site to
create a winter home for his Taliesin Fellowship. Wright summoned his
entourage from Wisconsin to Arizona and they all camped out while they

FIGURE 24
built. The challenge in the desert was to build an economical structure which could withstand high winds and intense heat. Wright found rocks of many colors on the site on the site, hard and difficult to cut, but each with a flat side. Moreover, they were plentiful, and they were free. The rocks inspired the so-called "desert rubble masonry." Wooden forms were constructed and the rocks were placed within, with the flat side against the wall of the form. Then a very firm mixture of concrete was added to solidify the wall. The walls are battered to conform to the angles of the mountains which served as the back-drop (figs. 25, 26). Responding dramatically to both the site and the construction techniques and materials, the walls are spanned with redwood beams and stretched white canvas, pitched at an angle. Taliesin West presents "the imagery of the 'house not built by human hands' but rather assembled out of rocks deposited at the beginning of geological time."56 The colors and textures of the desert are pulled into the structure. The weathered rocks strewn about the floor of the Arizona desert appear have been gathered by some unseen force as nature begins to transform itself into architecture (fig. 27). Even upon completion Taliesin West assumes the character of a desert camp, appearing more as an excavation than a building. The planting of orchards suggests the order of man's work. Desert plants are ordered and cultivated in terraces throughout the complex. The architecture gathers in the surrounding desert to create gardens similar in spirit to those of Taliesin in Wisconsin (fig. 28). As in Wisconsin, architecture and nature are fused. Taliesin West is part of the desert. As the desert crosses the threshold of man it inspires a

56 ibid., p. 15.
garden and is encouraged to bloom, while the walls Wright erected stand as constant reminders of the origin of the work with the desert beyond.

The placement of the building in the landscape represents the interaction of nature and culture. Here again, Wright viewed this relationship as one of integration. He draws the materials of the landscape into the architecture, in this case the walls and the gardens. He created architecture in the landscape as if he imagined that the work was already buried in the land, just waiting for cause to come forth. Thoreau's words again come to mind: "genius stings nature, and she grows according to its idea." One imagines that Thoreau was thinking of Taliesin when he penned those words, or perhaps that they could even be Wright's. Wright simply allowed the architecture, by virtue of order, to rise from the land and, with his guidance of course, be formed by its circumstances. The relationship Wright establishes between architecture and landscape finds sympathy in Eliade's establishment of a symbolic threshold between the world that exists and the world man creates, between order and chaos, and between the sacred and the profane. Wright's concern for the landscape involves much more than the careful placement of a building - essentially an object - into the natural environment. Wright's attitude toward the landscape, as evidenced in his personal abodes, must be considered to be nothing less than the consecration of the natural world, the making of a sacred landscape.

Materials. Wright was inspired by the materials that he found in the natural landscape and his reverence for nature is evidenced by the manner in which he used all materials. Wright believed that a study of materials
would reveal their hidden nature. In his own words:

"I began, in my fashion, to study the nature of materials . . . I began to learn to see brick as brick. I learned to see wood as wood and learned to see concrete or glass or metal each for itself and all as themselves."

He saw, for example, that the tensile nature of wood and steel contrasts with the compressive nature of concrete and stone. But in addition to an understanding of the essential qualities of materials, Wright's work also implies an understanding of the natural order of materials and the sense of propriety which materials evoke.

Wright's sense of the nature and use of material is showcased in his two homes, Taliesin and Taliesin West. At Taliesin, as in all his work, Wright maintains the natural order of the wood and stone. The order of the structure imitates the order of the surrounding landscape. In the natural world, trees grow from the hillside, composed of stratified stone, its layers deposited over long periods of time. In Wright's architecture, wood springs from concrete and stone, each material set to recall its origin. As stone is formed by centuries of compression, it is naturally suited to resolve the compressive forces in a building. The stone at Taliesin is set in layers, protruding courses enhancing the image the stratification (see figs. 21, 22). As the tension within a tree's limb resists the earth's pull, wood is suited to the requirements of a span. In the drafting studio at Taliesin, located in the former Hillside Home School of 1902, short stone piers support wood trusses, each appearing as an abstract tree, with the room's dappled light enhancing the image of the Wisconsin forest (fig. 29).

Similarly at Taliesin West, the compressive potential of the stone found on

57 Wright, The Natural House, p. 21.
the floor of the desert is realized in the walls of the building. The stones of
the walls recall their former state as scattered about the desert (see figs. 25,
26). In both projects, the stone raises the building from the ground and the
wood creates a canopy. Wright utilized the essence of the materials to
suggest images of the natural world.

In contrast to Wright's work for himself is his use of material in the
house for Alice Millard of 1923, in Pasadena, California. The first of a
series of similar houses Wright designed for California clients, the Millard
house embodies the essence of both material and technique. Artistically
inclined, Mrs. Millard was a collector of antiques and books. She required
only a modest house for her 'difficult' site, a sloping lot at the bottom of a
ravine. Wright gave Mrs. Millard "La Miniatura," a fire-proof house for
her collections (fig. 30). The small, three-story house is constructed of
concrete block on concrete slabs. The textured blocks were set to form a
double wall, with steel rods in the joints, which were then filled with
concrete (fig. 31). Expanding on his use of order, the concrete block
became the unit of the three-dimensional matrix which controlled the
design of the house. Wright considered the "textile" block construction to
be a genuine expression of modern industry and, though intended to be an
inexpensive, mass-production technique, the textured castings were in fact
custom designs and the blocks were rather easily broken and difficult to
work with. The fragile nature of the blocks was likely due to their
composition, as Wright sought to incorporate material excavated from the
site into the mixture. Nevertheless, the Millard house remains a unique
expression of method. Wright's sensitivity to the material, in this instance
concrete, inspired the creation of the blocks, the technique for joining the blocks, and thereby inspired the final form of the work. The house stands as evidence of the nature of this process. Though Wright referred to the house as "a kind of tree itself, standing among the trees," the image of the house is secondary. Along with the vast majority of Wright's work, "La Miniatura" must be considered as the embodiment of nature, of material and technique.

Wright recognized that each material offers various limits and possibilities for architecture, qualities which are rooted in nature. As Thoreau suggests, the canoe was anticipated when the birch was made; in other words, nature created the possibility for the canoe when it created the birch tree. Thoreau hints at the creative potential that nature provides, potential that is contained within all materials. If one considers Eiseley's thinking, his quote of Francis Bacon comes to mind: "we are not to imagine or suppose, but to discover, what nature does or may be made to do." Bacon's statement clearly implies that the potential for architecture resides in the nature of material. Regarding materials, Wright said: "In this particular, as you may see, architecture is going back to learn from the natural source of all natural things."\(^{58}\) Wright sought to realize the natural potential of the material and to translate this potential into architecture. His work is a transformation of natural material from a state of chaos into a state of order. At Taliesin West, the architecture is the difference between the scattered rocks of the desert and the ordered rocks of the wall. Architecture is material which, in Eliade's view, has been made sacred

\(^{58}\) ibid., p. 52.
through order.

**Growth.** As has been noted, Wright had many architectural ideas, but he really had, in essence, only one principle: each of his buildings in some fashion exhibits the principle of growth, as seen in the processes of nature. All of his ideas emanated from this principle. Wright's architecture, like nature, was a process of becoming. It is an architecture that grows and draws inspiration from the character of the landscape, and it grows according to the qualities of the materials which are found in the land and used in the building. His buildings grow both physically and spatially, from the individual unit or cell of the grid into the organism, the integrated whole. As in a crystal the invisible geometric order provides the essential structure which guides the development of the architecture. As in nature's creations, Wright's architecture grows by virtue of the architect's desires, and, also as in nature, according to its prescribed order. The process of growth is nature's means of creation.

Wright believed architecture to be an art of representation, as Neil Levine states, "in the classical meaning of that word as the imitation of nature." He imitated the processes as well as the forms of nature. But Wright warned: "I know with what suspicion the man is regarded who refers matters of fine art back to nature." Nevertheless, he had faith in the potential harmony between man and nature, and saw the role of the architect as nature's agent, revealing nature's possibilities. As Donald Hoffman quotes Wright: "Nature is nothing less than the principle that

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60 Ibid., p. 85.
gives life its form and character, Wright said; nature is not only the source, but the measure."\textsuperscript{61}

\textsuperscript{61} ibid., p. 93.
CHAPTER 2
Louis I. Kahn

"What is has always been. A validity true to man presents itself to a man in circumstance. A man can be a catalyst to a validity. Yet it has to await its realization. It has to be given presence. But validity is always there, as though it were in the air. But circumstantially, it could only grow to the realization when one says, I realize it is so. The artist is only a vehicle for what has always been. Nothing can really be given presence unless it already exists potentially."

(Louis I. Kahn)

Louis Kahn's faith in an eternal spirit which precedes all physical presence is best expressed in his words: "What is has always been." He suggests that the potential for the physical world dwells within the spiritual world, and it does so eternally. Both Kahn's thought and his work reflect his faith in this spirit. But that which is eternal is also invisible. While the forces of nature give rise to countless physical things, many possibilities remain unseen. Certain other possibilities, which Kahn terms validities, are akin to man's desires; they are seldom manifest of their own accord, rather they are realized through man's inspiration. Kahn's validities, like all possibilities, exist in spirit long before they are either desired or realized; everything is first possible before it becomes tangible, before it is created. Man is a catalyst by virtue of his desire to create, his desire to express. He can harness nature's forces and touch the spirit of creation. Kahn suggests that this is really the province of the artist, a medium who bridges the invisible and the tangible, bringing what is possible into the light. Man does

not invent the world he can see, he merely gives presence to the possibilities which he cannot see.

Kahn considered architecture to be an art, as much the vessel of the human spirit as either painting or sculpture. All arts have their materials and their means of expression; architecture's means and its possibilities are different from those of the other arts. Architects are forced to accept intangible laws which the painter and the sculptor can disregard. These intangible laws are simply the laws of nature. Kahn recognized that everything visible must answer to that which is invisible, the laws and the spirit of nature. Kahn considered architecture not as man's invention, but as man's discovery, which is to say, his realization of nature's possibilities. It is nature which grants architecture its brushes and its paint, its means for creating the tangible. As Kahn said, "To learn this, to understand this, is giving the man the tools for making the incredible, that which nature cannot make."\(^\text{63}\)

**LIFE**

Louis Isadore Kahn was born in 1901, on the island of Osel in Estonia (fig. 32). His father, Leopold Kahn, was Estonian and a member of the paymaster corps of the Russian army. His mother, Bertha Mendehlson, was Latvian; she came from a family of comfortable means. Both of his parents were Jews and, upon Louis's entry into the world, they were poor. Leopold Kahn emigrated to America in 1904, finding work in

\(^{63}\) ibid., p. 103.
Philadelphia. Bertha followed with Louis and his younger brother and sister in 1906. The Kahn's settled in a poor immigrant district on the edge of Center City, moving often during their first years in America. Leopold was a talented designer and glass painter, though he found little employment in this field. A back injury prevented him from finding work as a laborer. The family survived primarily on Bertha's work, making samples of knitted woolen clothing for garment manufacturers.

Both of Kahn's parents were talented, Bertha as a musician, Leopold as a draftsman and designer. They passed their talents and interests to their children. Louis was an especially gifted child. He began to draw at an early age, with Leopold encouraging his efforts. In addition to her musical talent, Bertha Kahn was also well-educated, having been exposed to the influences of culture as a privileged child in Latvia. Bertha studied literature as a youth and she continued to read a great deal throughout her life. Louis was very close to his mother. Her love of German literature, especially the writings of Goethe and Schiller, no doubt exerted an influence upon Louis.

Louis was a shy child, the product of an accident of his youth. Entranced by the bright colors of the flames, his face was severely burned and scarred when his curiosity drew him too close to a coal fire. Nevertheless, his aptitude in drawing garnered attention. While in grammar school, Kahn took courses in drawing, painting, and sculpture at the Public Industrial Art School. His drawings won a series of citywide prizes. He also took lessons in piano, showing an instinctive talent for music. Kahn was later admitted to Central High School, the very selective
"flagship" of the Philadelphia public school system.

It was in his senior year at Central High School that Kahn's attention became focused toward architecture. He took a course on architectural history which combined lectures and drawing assignments. This was to have a tremendous impact on him. He subsequently decided to forego his plans to study painting at the Pennsylvania Academy of Fine Arts in order to instead attend the University of Pennsylvania to study architecture.

The University of Pennsylvania at this time (1920) had the strongest architectural program in the country. The school was modeled after the Ecole des Beaux-Arts of Paris, with the Frenchman Paul Phillipe Cret (1876-1945) heading the design program. Cret considered architecture to be an art of problem-solving in which the demands of the client's program were translated into substance by the creative architect. The emphasis of Beaux-Arts teaching was on planning. This influence would surface in Kahn's later work. The environment at Penn was competitive, and Kahn did well. Throughout his career, Kahn acknowledged the lessons he learned from Cret and the Beaux-Arts at Penn. Rendering techniques offered lessons in light and shadow, and the poché or "pocketing" of spaces within masonry that was typical of Beaux-Arts plans is thought by some to have inspired Kahn's notion of "servant" and "served" spaces. He received his Bachelor's Degree in Architecture in 1924.

Kahn spent the next 25 years working as an architect and planner, educating himself and refining his thought. Upon graduation he went to work in the office of John Molitor, City Architect of Philadelphia. By living with his parents he was able to save enough money for a long
European trip. He landed in England on May 3, 1928, then passed through Germany, Scandinavia, Estonia and Latvia, Austria and Hungary, Italy and Greece, and finally France. He was very much drawn to Greek and Roman antiquity, as well as the Italian Romanesque. This can be seen in his travel sketches of the Temple of Athena at Paestum and the Italian city of Siena. In April 1929 Kahn sailed for home. Immediately upon his return he went to work in the office of his former teacher, Paul Cret. The market crash of 1929 followed shortly thereafter and Kahn was unemployed.

For the next 15-20 years Kahn concerned himself with the problems of public housing. With the onset of war this concern translated into housing for the industrial workers. During this period he was influenced by the work of Mies van der Rohe and Buckminster Fuller as he experimented with various means of economical construction using lightweight steel, concrete block, and other inexpensive materials. He concerned himself with the most recent issues in architecture and was aware of the current architectural aesthetic in Europe. In these years he came to revere Walter Gropius, perhaps for his sense of social responsibility rather than for his architectural accomplishments. Kahn became involved with various government agencies and organizations, but perhaps more important with such architects as Alfred Kastner and Oscar Stonorov. In 1930 he met George Howe, the architect of the Philadelphia Savings Fund Society Building of 1932, and the two became close friends.

For Kahn, life changed in 1947. He was hired as a Visiting Critic at Yale University and he soon became Chief Critic of Design. The academic atmosphere at Yale was fertile for Kahn; hence, this became a period of
transition. He began to develop as a teacher and his sense of design began to crystallize. Kahn spent the academic year of 1950-51 at the American Academy in Rome, a bastion of the American Beaux-Arts tradition. He took the opportunity to tour the Mediterranean, to see the great pyramids and sites throughout Italy and Greece, some of which he had visited before. He returned to Yale in 1951. His roots in the Beaux-Arts tradition began to take hold as he gained faith in his original training. Kahn work was slowly parting in form and materials from the efforts of his earlier years and his work was beginning to exhibit his maturing sense of the integration of structure and space.

Kahn's mature work begins with his commission for the addition to the Yale University Art Gallery of 1951, the first of his most successful buildings. By now he had abandoned his earlier use of steel in favor of the solidity of concrete and brick. The following 24 years saw the flowering of his thought. His commissions for projects throughout the globe grew in size and significance. Kahn received commissions for places of gathering, places of work, and places of worship. This included the projects for the Jewish Community Center of 1954-59, the Tribune Review building of 1958-61, and the First Unitarian Church of 1959-67. He created structures for science, education, art, and government, evidenced by the Salk Institute for Biological Research of 1959-65, the Indian School of Administration of 1963, and the Kimbell Museum of Fine Art of 1967-72. This series includes the Center for government at Dacca, Bangladesh, begun in 1962 and completed in 1982. Kahn's buildings often took years from commission to completion, with Kahn spending much time on design and often making
changes. Kahn's buildings were also rather expensive, as he was very much concerned with the quality of materials and workmanship in each building. Consequently, though many of Kahn's buildings were executed, many other significant projects were not.

INSPIRATION

Louis Kahn's philosophy of architecture is often characterized as elusive. He spoke a great deal, yet there is some difficulty in reconciling his words with his work. This is perhaps intentional. Kahn wrestled with words. Like a sage, he recognized the inadequacy of words, and realized that spoken truths must necessarily be half-truths. This should serve as a caution when examining the life of Kahn, for any aspect of a man's life, viewed in isolation, can offer only a fragment of the man. By all accounts, Louis I. Kahn was a man of great curiosity. There were many things which had an impact on his life. There are themes which permeate his thought and work, themes related to time, nature, and the spirit of man, themes which his various influences confirm. The extent to which his work was affected by any particular thing, one can only guess. The influences on Kahn were extremely varied and diverse.

Kahn was intrigued by the notion of time, and understood human history as its documentation. Western historians often interpret history in terms of a linearly constructed time, where all things progress toward some pre-ordained end. Kahn viewed history as a more complex event through the evidence of man's continued expression of himself and his
culture. He recognized that certain works of the past continued to be able to speak clearly of their origins, thereby extending themselves into the present to provide inspiration for the future. In Kahn's words, "the time of a work holds its own validity from which the sense of truth can be drawn to inspire a work of another time." 64 He discovered the timelessness of certain works of art. Upon his visit to Egypt in 1951, he found evidence in the great pyramids, as they continue to express something of the aspirations of their creators (fig. 33). In Kahn's words, "the pyramids seem to want to tell us of its motivations and its meeting with nature in order to be." 65 As Joseph Burton notes, Kahn's was also fascinated with primitive means of communication, writings and symbols. Burton suggests a relationship between Kahn's work and Egyptian hieroglyphics, and the pictograms of the American Indians and the Chinese (fig. 34). 66 Without debating the relative merits of the different languages, it is significant to note that these languages are based on various forms and symbols whose meanings are either inherent or assigned, as opposed to the Roman alphabet whose symbols represent sounds. There is an uncanny resemblance between the plans of Kahn's buildings and the pictograms of the American Indian, but the extent to which the influence is direct is a matter for speculation (fig. 35). His interest in primitive languages was likely related to their continued ability communicate across time. Kahn believed that "the primitive case is more an indication of value than the sophisticated case. To accept something at the very, very beginning, without precedent is an infinitely

65 ibid., p. 79.
66 ibid., pp. 76-77.
mā   sereru   en   serāu   au   ementuf
after the manner of a servant, for it was he

ā   āritu-nef   hēbsu   auf   her   sēsem
who made the clothes, it was he who followed

e-m-sa   nai-f   au   er   sēset
after his [Anpu's] cattle in the fields,

ā   ementuf   ā   āritu   sēka
he it was who did the ploughing,

ementuf   ām-wait   au   ementuf   ā
he it was who laboured, he it was who

āritu-nef   aput   neb   enti  em
performed the duties all which were connected with

sēset   ā-tu   au   ptu   serāu
the fields; and behold was the young man

henutī   nefer   ān   un   ḫēnēnu-f
a farmer excellent, not existed the like of him

FIGURE 34
stronger statement than how it is extended in later years.\textsuperscript{67} Kahn was interested in the timelessness of the ideas which inspire creations. Though admittedly not a scholar, he often spoke of wanting to read "Volume Zero," the book which precedes all books. Volume Zero is the book which transcends time; it is the book of origins and as such, it can never be written. It is the book of man's ideas and inspirations.

Kahn had profound faith in the human spirit, the agent of man's creativity and he considered art to be its expression. In his words, "the aspirations built in man, his motivation to be, is the core of all ritual and all design."\textsuperscript{68} Kahn's thought displays a remarkable affinity with the words of various philosophers who, throughout history, have entertained ideas of art, nature, and man. But what is artistic creation and what is art? All that man creates lies within the realm of art. By Aristotle's definition, art "partly completes what nature cannot bring to a finish, and partly imitates her."\textsuperscript{69} He describes art as making, bringing things into being which are capable of being. Aristotle suggests, for example, that while nature does creates stone, the stone that is present in the natural world has not of its own accord assumed the form of a Temple. Man must do this. Aristotle does suggest, however, that the stone offers the possibility for the creation of the Temple and that the means for its creation can be discovered in nature. Through art, man gives form to that which nature does not create, or that which does not exist by virtue of the processes of nature. Art is man's creation.

\textsuperscript{67} ibid., p. 83.
\textsuperscript{68} Wurman, \textit{What will be has always been: the Words of Louis I. Kahn}, p. 183.
Kahn considered art to be the timeless reflection of the ideas of man. Art conveys an idea as an image. What man creates as art, apart from the natural world, becomes the record of his existence. In discussing man's creativity, Martin Heidegger states that, "the Temple, in its standing there, first gives to things their look and to men their outlook on themselves."\(^\text{70}\) In citing the Greek Temple, Heidegger describes art as the visible expression of the culture of man. It reflects man's aspiration (fig. 36). Art becomes the vessel for the human spirit, granting the spirit presence outside the human body; art gives voice to man's ambition so that ideas are able to transcend the collective body of man. It is through art that cultures are able to communicate across time. In Kahn's words, "art is really the only language of man."\(^\text{71}\) The Temple, as is true of any work of art, is significant as an expression of an inspiration, of an idea which transcends the physical manifestation. It is the idea which inspires the creation of the work of art.

Kahn considered ideas to be pure, the essence of the human spirit. The physical things which ideas inspire can never be as pure. According to Plato, "ideas" are universal, timeless, and they are immutable; they are shared by all humans. In contrast, physical things are particular, temporary, and subject to change. Plato considered artistic inspiration to be divine in nature, stating that "every poet has some muse from which he is suspended."\(^\text{72}\) Inspiration is divine by virtue of ideas, which are perfect and nearest to the spirit of the gods and the spirit of creation. Ideas are the

\(^{71}\) Wurman, \textit{What will be has always been: the Words of Louis I. Kahn}, p. 1.
\(^{72}\) Hofstadter and Kuhns, \textit{Philosophies of Art and Beauty}, p. 56.
expression of the human spirit. They are pure, like white light, the most perfect light. Kahn speaks of "the white light and the black shadow," which of course do not exist in the natural world.\textsuperscript{73} When light leaps across the void of space something is always lost. What may or may not have been perfect is always diminished. White light is a pure idea, an inspiration, and the black shadow its perfect reflection. The most pure expression of an idea must exist within the mind of man.

Kahn considered the expression to be as important as the idea. In his words, "you can have a thought, but a thought has no presence until you call on nature to exercise its powers of order, to make it manifest."\textsuperscript{74} Kahn suggests that art, that which Aristotle defines as bringing things into being, is as much rooted in nature as in the soul of man. The method of construction must precede the creation of a building. Architecture cannot be created without the knowledge of how it shall be made. At some point in his past man first learned the process of making a building. Imagine a time when there was no building to inspire the creation of others; at this time the knowledge of technique (the knowledge of making) could presumably only have come from nature so that art, as Aristotle states, "partly imitates her." Aristotle adds: "thus if a house, for example, had been a thing made by nature, it would have been made in the same way as it is now by art."\textsuperscript{75} Architecture embodies both the spirit of man and the spirit of nature. The human spirit is a catalyst for the creation of that which nature does not create, but the spirit of nature determines how it is made.

\textsuperscript{73} Wurman, \textit{What will be has always been: the Words of Louis I. Kahn}, p. 14.
\textsuperscript{74} ibid., p. 1.
\textsuperscript{75} Hofstadter and Kuhn, \textit{Philosophies of Art and Beauty}, p. 87.
Kahn was fascinated with nature. It has significantly influenced Kahn’s thought and his work. One might not imagine this to be true, however, given Kahn's background. He was a child of the city. Nevertheless, Joseph Burton relates that Kahn once advised his nephew that, if he could only read one book in his life, he should read D'Arcy Thompson's "On Growth and Form."\(^{76}\) Thompson describes order in nature, and details the relationships between structure and form in natural organisms. As Thompson notes, the metacarpal bone of a vulture shows to man the form of a Warren truss, a natural response to the forces within the vulture's wing (fig. 37).\(^ {77}\) Kahn saw in nature the order which allowed things to exist. In his words: "Nature makes its designs through the tenets of order."\(^ {78}\) Kahn also saw in nature that all things possess what he described as the "will to be." He states that "the rose wants to be a rose, and man wants to be man."\(^ {79}\) Kahn realized that all things embody nature, as expressed in the physical form. Again according to Kahn: "Nature makes nonconsciously what man makes consciously."\(^ {80}\) Nature does not choose what is created. Man, on the other hand, does; all art is man's conscious expression. Nature is indifferent toward man's creations. Kahn said: "Nature accommodated anything that wanted to be. It is impartial. Nature rejected what it couldn't do."\(^ {81}\) Nature can only condone a creation which adheres to its laws. He was especially fascinated with the way things are made in nature, nature's processes, and nature's constructions. For example

\(^{76}\) Burton, *Perspecta* 20, p. 83.


\(^{78}\) Wurman, *What will be has always been: the Words of Louis I. Kahn*, p. 260.

\(^{79}\) ibid., p. 84.

\(^{80}\) ibid., p. 127.

\(^{81}\) ibid., p. 147.
He noticed that "everything that nature makes, it records in what it makes how it is made. In the rock is the record of the rock. In man is the record of man." Kahn had tremendous respect for nature, as evidenced by his words: "It must be considered nothing short of a human miracle to have thought of a building which doesn't in any way resemble what is in nature and which could not have been done if nature hadn't approved its making." 

WORK

Kahn's architectural ideas are born of his reverence for the ways of nature, as well as of his desire to give expression to the culture of man. Yet between his words and his work those ideas can still be elusive. While his work attempts to express universal ideas, it is also very personal. Kahn reaches deep to the sources of inspiration, to nature, and to the spirit of man; and, like all humans, he reaches within himself. From these sources he draws his ideas and principles; thus he speaks of architecture in terms of form, order, structure, and light; his sense of materials and methods of construction is an extension of these ideas. His architecture is the embodiment of his quest for beginnings. Kahn distills the essence from all that he sees in the natural world, and it is the essence which his architecture attempts to reconstitute as something tangible. Kahn's sense of the integration of nature and culture is perhaps comparable to the work of ancient Greeks, whose spirit he greatly admired. His architecture does not

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82 ibid., p. 15.  
83 ibid., p. 1.
imitate nature, but his work embodies the essence of nature, and the essence of man.

**Form.** Kahn's notion of form was the beginning of his architecture. In his own words, "form is the nature of something." Kahn considered form not as something physical, not as a shape, but as something spiritual, the *inspiration* for design. For Kahn, form is considered universal rather than particular, yet it is also very flexible, capable of stimulating a variety of designs. As such it is closely related to Plato's notion of *ideas*, his distinction between the universal and the particular. Kahn tried to realize the universal aspect of the building, its form, through the particulars of the building, the design. Kahn says: "for me it is usually the sense of the building in its core, its full meaning, its nature, not its shape." Form is the essence of Kahn's architecture.

Kahn's sense of form is expressed in his design for the First Unitarian Church and School of 1959-69, in Rochester, New York. Constructed of brick, concrete, and concrete block, the program primarily required spaces for a meeting hall and classrooms, and additional supporting spaces for offices, a kitchen, and a library. An early design for the project shows Kahn's feeling for the relationship between the church and the school, which became the basis for the design (fig. 38). The form is the order of the spaces, expressed as the relationship between the intellectual and the spiritual, between the space of worship and the classroom spaces of the school. The space of worship is the square

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84 ibid., p. 152.  
85 ibid., p. 200.
sanctuary, located at the center of the project, with a circular ambulatory signifying its spiritual nature. The other spaces encircle the sanctuary, enhancing its prominence, and recognizing the significance of gathering for the congregation. The sanctuary is the focus of the school, with the school intended as the place to address the spiritual issues which religion provokes. The form is inspired by an idea about the nature of the congregation. This idea exists independent of the physical expression. The sense of the original form remains (fig. 39). The circular ambulatory has become rectangular, but the order of the spaces, in particular the relationship between them, is clear, though less 'pure' in expression. The spaces of the offices and the library have been transformed based on need, but still the sanctuary retains its prominence. The design is a particular expression of the universal idea which the form describes. The shape of the building has been altered, but the the nature of the congregation, the relationship between the intellectual and spiritual - the building as a religious institution - are retained in the form.

The Salk Institute for Biological Studies of 1959-65, in La Jolla, California, is also a successful example of Kahn's sense of form (fig. 40). As its name states, the institute was designed for Dr. Jonas Salk, creator of the Polio vaccine, as a place for biological research, yet it was also to be a place where Salk could "invite a man like Picasso." Constructed of concrete and weathered teak, the building is sited on the edge of a bluff which overlooks the Pacific ocean. The institute is composed of two wings joined by a court, each wing containing large laboratory spaces, large service spaces which house mechanical equipment, and research spaces for
individual scientists. The form establishes the relationships between laboratory spaces, research spaces, and the court. The section shows the disposition of the 'servant' spaces, the laboratory spaces, and the study spaces (fig. 41). The servant spaces are contained within the Vierendeel trusses, with the study spaces on the same level, and the laboratory spaces on the levels between. The study spaces face the court, and each laboratory has a balcony which does the same. In plan, Kahn orders the relationship between laboratory, study, court, and by virtue of the court, the world beyond (figs. 42, 43). All working spaces are drawn into the barren, travertine court, whose narrow stream of water directs man's attention to the outside world, to the distant sea and infinity beyond (fig. 44). In the form of the Salk Institute, Kahn expresses the relationship between the man, his work, and the world; he expresses the harmony between nature, culture, and man.

In Kahn's work, the form always precedes the design. Form should perhaps be considered as Kahn's means of drawing architecture from what Loren Eiseley describes as "the utter void of non-being."86 Eiseley's void being the spiritual realm, form represents Kahn's sojourn into the void, and design his return. In Kahn's words, "form is the religion of beginning."87 Each work is a new beginning and Kahn begins where things have no presence. He has an implied faith in John Dewey's statement that "the tangible rests precariously upon the untouched and ungrasped."88 Between its ideal form and its real expression, the First Unitarian Church

86 see note 34.
87 Burton, Perspecta 20, p. 90.
88 see note 33.
exhibits just such a relationship. Essentially for Kahn, form is the ordering of architectural spaces. Form is the revelation of the spiritual order, and design its disclosure. Just as Eliade describes man's need for a sacred center, the form of a building establishes the sacredness of the work and hence the spiritual order from which the design proceeds.

Order. The concern for order is the most fundamental aspect of Kahn's architecture. In Kahn's words: "Order is." Kahn understood the concept of order to be so universally applied that words can only exclude its possible manifestations. He adds: "Order is the embodiment of all the laws of nature, the giver of presences." Kahn suggests that all things exist by virtue of order and that order is the means of creation. Order determines the way things interact, establishing the relationships between things; through order things achieve balance and harmony, which is the very essence of nature. The implications of order permeate Kahn's work. Order is inherent in his notion of form and in each of his architectural ideas. The significance of order can be seen in the plan, in Kahn's use of geometry, and in the disposition of spaces. Order is the basic principle, the foundation for the structural framework which creates the spaces, for the use and joining of materials to create the structure, and for the process of construction which creates the architecture.

Kahn's use of order can be seen in his project for the Jewish Community Center of 1954-59, near Trenton, New Jersey. The center was to include a gymnasium, a bath house for the outdoor swimming pool, a social hall, and spaces for a variety of other social activities. Kahn uses a

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89 Wurman, What will be has always been: The Words of Louis I. Kahn, p. 33.
‘tartan’ grid to develop the plan, creating three spatial units, 10 x 10, 10 x 20, 20 x 20 (figs. 45, 46). The smaller units represent functional considerations such as mechanical, circulation, storage spaces, and spaces which serve the larger social spaces. This represents the beginning of Kahn's distinction between the 'servant' and 'served' spaces in his work. The model of the project shows the emphasis on the cellular nature of the plan, as Kahn maintains the integrity of the cell (fig. 47). As each cell is a separate structural unit, the structure reinforces the geometry. For a variety of reasons (including cost) the project was not built.

Kahn managed, however, to execute the Bath House for the Trenton Community Center in 1956. A very modest commission, Kahn viewed the bath house as the crystallization of his thought, and indeed it was to inspire all of his subsequent work. The Bath House pavilions are constructed of concrete block with wood-framed roofs (fig. 48). The pure geometry of the plan reiterates the module used in the community center. Four modules, representing shower rooms and a basket room, are grouped around an open court (fig. 49). The corners of each module serve dual purposes, as support for the roof and as the servant spaces. In essence they are hollow poché, and a reference to Kahn's Beaux-Arts background. The order of the structure and the order of the space reinforce each other. Through geometric order he establishes the relationship between the servant and served spaces of each bath and the relationship of the baths to each other.

Kahn often referred to the plan of a building as a society of rooms. History records that a society exists by virtue of some order. In architecture, the order brings the separate requirements of a building
together to create a whole. Kahn uses geometric order and the notion of the cell to create unity within the work. As Kahn said: "The laws of nature work in harmony with each other. Order is this harmony." The difficulty lies not in bringing things together, but rather bringing them together in harmony. Order creates the potential for harmony among the spaces of a building, as between the servant and served spaces of the Trenton Bath Houses. The harmony of the relationships lets it be seen as something sacred, as an entity rather than an aggregation of spaces. As the words of Mircea Eliade suggest, form is distinguished from the formless by virtue of order.

**Structure.** The order of structure is a significant element in all of Kahn's work. Kahn retained the services of the very capable engineer August Komendant. Komendant was a wizard with concrete, and a pioneer in pre-stressed and pre-fabricated concrete elements. Kahn did not view structure as an engineer would, nor did he appear to be interested in engineering challenges. Rather, Kahn understood the relationship between structure and form and the creative possibilities of structure as expressed in the natural world. In Kahn's words, "structure is the maker of light because the structure releases the spaces between and that is life-giving." This is a very significant statement, as it describes in very short order his idea of structure: "the structure releases the spaces between and that is life-giving." Kahn suggests a direct relevance between structure and space, the two being inseparable with one giving rise to the other.

His project for a concrete skyscraper of 1957 is one of his most

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90 ibid., p. 126.
91 ibid., p. 155.
remarkable structural conceptions. Commissioned by the American Concrete Manufacturers' Association (ACMA), Kahn proposed the use of pre-stressed, pre-cast concrete floor slabs within a tetrahedral frame of concrete members (fig. 50). The system was inspired by his desire to resist the forces of the wind on the building. He describes the project as "the employment of freeing nature, the way nature makes things."\textsuperscript{92} It exhibits an understanding of how something can be created almost intuitively, as Kahn "never deviated from the natural spiral growth of the tetrahedrons;"\textsuperscript{93} he merely allowed the stable form of the tetrahedron to determine the design. The practicality of the project may be debated, but it nevertheless demonstrates an awareness of the natural process of geometric growth, and the creation of structure through order.

The Kimbell Art Museum in Fort Worth, Texas (1966-72) is one of Kahn's finest and most structurally elegant buildings. Constructed of concrete and travertine marble, the museum sits on a park-like urban site. It was designed to house a diverse collection of art, including a collection of diminutive 19th century artifacts. The quality of light within the museum was very much a consideration; many of the art objects were crafted in natural light and Kahn felt this condition should be retained for viewing in the galleries. Designed with the aid of engineer August Komendant, these goals are realized by a structural system consisting of three bays of concrete cycloid vaults, each vault twenty-five feet in width, one hundred feet in length, and born by only four concrete columns (figs. 51, 52). The ceiling space between and parallel to the length of the vaults is

\textsuperscript{92} ibid., p. 193.
\textsuperscript{93} ibid.
FIGURE 50
utilized for mechanical services. The apex of each vault is sliced lengthwise to permit the entrance of natural light (fig. 53). In addition, the vaults are broken at various locations to create three interior courts which further introduce light and nature to the art. The significance of the vaults is manifold: they grant the building its presence, they form the space, and they allow light into the various spaces. These three aspects are inseparable in the Kimbell; space is not one thing and structure another, rather space, structure, and light all exist by virtue of the cycloid vault. The vaults are the essence and reality of the building. The seemingly unnecessary porches testify to this, as they suggest the origin of the building, and reveal how the interior spaces are made (fig. 54). The travertine walls are treated as infill panels, while concrete signifies the structure. The walls of the ends of the vaults have a ribbon of glass between the top of the wall and the curve of the vault creating a reveal, thereby suggesting the vault's autonomy. The significance of the structural order cannot be overstated. In the Kimbell Museum, Kahn aligns the orders of structure, space, and light in creating a unified expression, and perhaps a perfect work of architecture.

Structure gives presence to things in the natural world. Kahn realized this; his notion of structure is rooted in nature. In his words: "Nature is the maker. It is the giver of presences." Kahn's statement recalls the words of Thoreau, who states that "nature is full of genius, full of divinity; so that not a snowflake escapes its fashioning hand." But how is nature the giver of life? Order is nature's means, but order is in itself not a thing, yet order makes structure possible. Structure resists the

94 ibid., p. 1.
95 see note 8.
surrounding forces which threaten the existence of the organism. Structure makes life possible. D'Arcy Thompson describes the structure of life forms in skeletons, shells, and various other organisms, while also describing the relationships between the structure and the organism. Structure allows the possibility for architectural expression. The structure is the beginning of the realization of the idea, the creation of the tangible. Kahn viewed structure primarily as a means of expression. But in his work, the expression and the means of expression are inseparable. In this respect Kahn is sympathetic to Eliade, who suggests that man builds to align the physical world with the spirit of man. Structure is relevant in Kahn's work as a vehicle for achieving the alignment of man's spiritual desire and his physical creation.

Kahn viewed the construction of a building as essentially a process of ordering. He found the process to be inspiring. In his architecture he accounted for the order of time, the stages through which construction proceeds. He considered the order of materials, as they are transformed from separate entities into architecture. His architecture reveals its process of creation. In his words: "If we were to train ourselves to draw as we build, from the bottom up, when we do, stopping our pencil to make a mark at the joints of pouring or erecting, ornament would grow out of our love for the expression of method."\textsuperscript{96} The process of construction often has a particular order, as does nature, which derives from the nature of the structure and the nature of the materials by which it will be created. Any process invariably leaves its marks on the building, various joints and

\textsuperscript{96} Wurman, \textit{What will be has always been: The Words of Louis I. Kahn}, p. 258.
seams, marks which detail the history of the process, and the order of the work. Kahn accepted these marks, and in fact he celebrated them. Kahn said: "The joint is the beginning of ornament. Where two things come together you want to celebrate the two coming together. Ornament is adornment of the event of two materials coming together."\(^97\)

Kahn's sense of method is realized in the Tribune Review building of 1958-61, in Greensburg, Pennsylvania, a town just to the east of Pittsburgh. The program called for offices and a printing plant for the Tribune Review, a small local newspaper (fig. 55). The building is not well known, but is nevertheless one of the clearest examples of Kahn's ideas of space, structure, materials, process, and light. The plan is very simple, a central spine of servant spaces with two large flanking spaces (figs. 56, 57). The structure and materials are also very simple, as economy was a significant consideration. The building consists of pre-cast concrete beams bearing on brick columns, with non-load-bearing concrete block walls and concrete planks for the roof (fig. 58). The bricks of the columns, smaller in size and higher in density than the concrete block of the wall, emphasize their role as compression members. Kahn 'celebrates' the meeting of the concrete beam and the brick column with the insertion of a marble impost block at the point of bearing (fig. 59). He also glorifies the meeting of the block wall and the brick column by inserting a strip of marble in the joint (fig. 60). The space between the columns provided an opportunity to introduce light, which Kahn has done with 'key-hole' windows; the windows are the full width between the columns at the top,

\(^97\) ibid., p. 239.
FIGURE 56
FIGURE 58
and rather narrow at the floor; they provide a moderate amount of light from above, a view to outside from below, and they maintain necessary wall space (fig. 61). Though a very modest building, the Tribune Review building is a wonderful expression of the method of bringing materials together and the process of creation. It is sad to note, however, that the building received an addition in recent years which does little honor to Kahn's effort.

Kahn's concern for method is also in evidence in the Kimbell Art Museum in Fort Worth. Constructed of cast-in-place concrete and travertine marble, the marks of the construction process receive significant expression throughout. The concrete is the structural material, while the travertine suggests non-load-bearing walls. Kahn acknowledges the process of casting concrete, involving the construction of forms and their subsequent movement, creating a seam between each pour. The seams appear as very crisp grid of lines on the surface of the concrete identifying the dimensions of the forms. The concrete forms must be tied together to prevent them from separating while the concrete is poured; this is accomplished with wire ties which leave small holes in the surface of the concrete when the forms are removed. Kahn exercises great care in the placement of these ties, creating an ordered pattern of marks over the surface of the building (fig. 62). And where concrete meets travertine he creates a line of shadow, revealing the distinction between the two materials and allowing each to express its unique character.

The process of joining materials contributes to the aesthetic of Kahn's architecture. Kahn professed a morality concerning the nature of
materials and the manner in which they are employed. He speaks of understanding the essential qualities of materials; for example, "knowing concrete immediately, as though you talked to every grain of it, knowing it in that way." Kahn's discussion with a brick - in which he asks the brick "what it wants to be" - is famous. This is Kahn's expression of his desire to reveal each material's particular limits and possibilities so that each material will be used in a way which honors its best qualities. Kahn's basic question: "Can the material express itself?" How does the material express itself? Material expresses itself as an integral element, conveying its potential in the creation of structure, contributing to the architecture in a meaningful rather than superfluous fashion so that without its contribution the work would be diminished.

Kahn's concern for material is very much evidenced by his use of brick in the Indian Institute of Management in Ahmedabad, India (1962-74). The project called for educational structures, dormitories for students, and residences for teachers (figs. 63, 64). A primary concern was protection from the sun and the heat, for which Kahn designed courtyards, light wells, and covered verandas. The materials are brick and concrete. As brick was readily available, Kahn chose to fully exploit it as a structural material. His decision to build with brick is essentially a commitment to the material, its limits and possibilities. Kahn acknowledges both the strengths and faults of the material. By understanding the nature of the brick, 'what it wants to be,' he is able to utilize all the options the brick gives him. The entire project consists of structural brick walls. When Kahn wants to make

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98 ibid., p. 33.
99 ibid., p. 237.
an opening in a wall, he doesn't forsake the brick in favor of steel. Rather, he understands the way brick can span an opening. Referring to the arch as the beam of the brick, Kahn creates the various openings using flat arches, round arches, and depressed arches (fig. 65). In creating the depressed arch, he uses concrete in tension to contain the spring of the arch. In doing so, he acknowledges the limits of concrete and brick, yet manages to display the strength of each, honoring both. He makes a commitment to each material, recognizing that what it can do, it wants to do. The resulting form is not as much an aesthetic as it is a philosophy. As Kahn explains his brickwork: "It's not a motif. It's in the order of brick."\footnote{100}

Kahn's philosophy concerning materials and process is really a philosophy of creation, an understanding of how things are made. In his view, the truly great architect does not invent, he does not make a building as he wants it to be, rather he makes it as the material allows it to be, based on what can only loosely be called the nature of the material. Such an architect allows nature to create. The truly great architect is Thoreau's genius, who "stings nature, and she grows according to (his) idea."\footnote{101} But what is the nature of material? It is useful to once again recall Thoreau, who warns that "man cannot afford to be a naturalist, to look at nature directly, but only with the side of his eye. He must look through and beyond her." The architect must be concerned not simply with the appearance of brick, but with the inherent qualities of brick. Thus, Kahn is compelled to ask the brick rhetorically 'what it wants to be.' Kahn's philosophy is really a vision of the world as Eiseley imagined, where man's

\footnote{100 ibid., p. 195.}
\footnote{101 see note 9.}
intentions fall in harmony with the ways of nature, and where man is "not to imagine or suppose, but to discover what nature does or can be made to do."\textsuperscript{102} The nature of a material is really its potential, a potential which man discovers rather than invents. Kahn's architecture attempts to realize this potential. Nature is the beginning of architecture, and 'sacred' space is its end. He attempts to discover how architecture can be created, rather than how it can be made to appear. Kahn focuses on the inception of architecture in beginning, for example, with the nature of a brick - what it is and how it can be used - rather than with the appearance of the brickwork. His philosophy of architecture is firmly rooted in its beginnings as well as its end, and in its nature as expressed in the form.

In Kahn's words, "there is such a thing as a need to begin all over again."\textsuperscript{103} Kahn's architecture embodies his quest for beginnings, his consultation with the world before creation and the world beyond creation. He treated each work as a new beginning. Kahn saw the need to continually re-evaluate the spirit of man and the creative potential of nature, the forces which catalyze the presence of architecture. Kahn viewed architecture as a process of creation and he discovered its model in the natural world. In Kahn's words, "Nature is highly experimental. It is a phenomenon of becoming merely because things are fated to become."\textsuperscript{104} Kahn's architectural ideas reflect a process of architectural manifestation, of bringing a work into being. Anything that can ever exist in the world exists

\textsuperscript{102} see note 30.
\textsuperscript{103} ibid., p. 205.
\textsuperscript{104} ibid., p. 147.
already within the realm of possibility - in nature and in man. It only needs to be born. As Kahn said: "what will be has always been." For Kahn, architecture is the embodiment of a process of dragging possibilities of the spirit into the light. It is a process of beginning, and becoming.
CONCLUSION
In the above examined works of both literature and architecture, there are reflections of nature which hopefully have become rather clear. Nature is ingrained in human existence and—at least to some degree—in the human consciousness. But in reality, what role does nature play in the creation of architecture? We often consider architecture to be an endeavor which is separate from nature. Architecture attempts to create another world, to either augment or displace the natural world. Architecture is a world above the common, the natural world; it is nature adapted to human use. Through architecture, man accomplishes what nature is unable to do. But is the world man creates superior to the natural world? Grass continues to grow within the seams of man's world. Is nature ever really displaced? Architecture, it would appear, like man, is not above but rather beneath the broad canopy of nature. In literature these are the warnings of Thoreau and Eiseley. Nature is not a force to be overcome, but rather one to be accepted, understood, and perhaps harnessed. In architecture, these are the lessons of Frank Lloyd Wright and Louis I. Kahn.

The distinctions between Wright and Kahn are generally apparent, for in many respects the two men were a century apart. Wright was born and raised as a country boy, in constant touch with nature. Though he was fascinated with technology, Wright is widely considered to have been a 19th century romantic, a naturalist in a modern world. Kahn, on the other hand, was raised where he would always remain: in the city. Despite his interest in the antiquities, Kahn was clearly a 20th century man, a modern architect with classical roots.

Such distinctions are reflected in their respective works, as the
architecture of each man conveys a very different impression. The works of Wright appear to be alive and expanding, as if they were growing and changing. The works of Kahn, on the other hand, appear perfected, confined and complete. It is useful, for example, to compare Wright's plan for Taliesin with Kahn's plan for the Salk Institute. While Taliesin embraces the hillside and merges with its surroundings, the Salk Institute perches on the edge of the ravine and merely gestures to the sea. Similarly, while Wright's work is tangible and earthly, that of Kahn is almost metaphysical and ethereal. The stratified stone walls at Taliesin are reminiscent of the familiar earth, while the concrete walls of the Salk Institute appear abstract in their patterned perfection. One can also compare the gardens of Taliesin, where architecture and nature meet in a gesture of mutual respect, with to the court of the Salk Institute, where it seems a man must stand in solitude. Kahn's work would appear to reject the natural world that Wright's work embraces.

While one is quite clearly able to see the impact of nature in the architecture of Frank Lloyd Wright, one must look beyond the surface to see nature's influence in the work of Kahn. But nature is indeed present in the architecture of both men. Nature, as Thoreau explains, is a force which evades human perception. Nature - not to be confused with the natural world - is essentially proto-physical. Nature gives rise to everything in the natural world. It is an ever changing force while at the same time an eternal constant. Nature is both the balance of relationships between all that exists and the process of achieving this balance. Modeled on nature's various orders - structures and processes - there are internal forces which
give rise to the architecture of both Wright and Kahn. But the work of each man is distinct. Wright's work often alludes directly to the natural world through his use of wood and stone. Kahn's work is generally devoid of such references, instead representing nature in a more subliminal fashion. Each architect possesses a unique aesthetic. Nevertheless, it may be fair to say that if Wright's work were devoid of its natural imagery, as in fact some of his buildings are, his buildings would appear remarkably similar to Kahn's. The reverse may be true if Wright's aesthetic were applied to Kahn's work.

Thus it is possible to look beyond the particular aesthetic of each work in order to perceive the essential similarities. If we compare, for example, Frank Lloyd Wright's Martin house with Louis Kahn's Trenton Community Center, we see a similar use of the 'tartan' grid. The Martin House and the Trenton Community Center are vastly different works, and yet in plan they can be reduced to the same pattern. The grid is a deterministic pattern which gives an order, a structure, and a means for architectural development. Kahn more rigidly adheres to the grid's implied laws than does Wright, but they both utilize the grid's pattern to distinguish the various formal and functional aspects of the plan. Furthermore, there is a universal similarity which involves more than the use of pattern, for it is really found in the process of controlled development through the use of an ordering system such as the grid. In many respects, a work of architecture is a model of nature's processes, as patterns of structure and growth are the fundamental means of creation in the natural world.

Perhaps the most striking example of similarity in the work of
Wright and Kahn can be found between Wright's Administration Building for the S. C. Johnson and Son Company (Johnson Wax) (1936), and Kahn's factory for Olivetti-Underwood (1966-70). Each architect desired to create a large, open space, a desire which inspired virtually identical solutions. The plan for Johnson Wax indicates a grid of columns (fig. 66), as does the plan for Olivetti (fig. 67). Each column represents an umbrella-like structure which forms a structural unit. In Wright's building these units are circular (fig. 68), while in Kahn's building they are octagonal (fig. 69). Each building is a field of structural elements creating a vast space (figs. 70, 71). The spaces between the structural elements permit light to enter from above. Order, structure, space, and light are given by a single system in each case. The buildings are different but the architecture is the same. One could argue that one work inspired the other, but another view may be that nature led two architects to the same conclusion.

Architecture is creation. As in nature, it is a process through which something tangible is brought into existence by virtue of order, structure, growth and change. In this respect every work of architecture is similar to every other, and every architect is akin. One must question whether modern architects possess any more wisdom than the ancients. Similarly, one must consider whether in two thousand years we have managed to erect a finer monument than the Greek Parthenon. As the architect Le Corbusier once said, "there is no such thing as a primitive man; there are only primitive means." And as Jean Rostand once advised, "already at the origin of the species man was equal to what he was destined to become."\(^{105}\)

\(^{105}\) Eiseley, \textit{The Invisible Pyramid}, p. 51.
Nature may be the greatest architect. The creatures that spring from
nature by virtue of order - order that can be discovered in all of nature's
creations - are infinitely varied and nothing short of fantastic. The
processes of nature are extremely complex, and yet its structures tend
toward simplicity. The wonder of nature's ways can be discovered in even
the most simple things. One need only consider some of nature's more
modest creations such as the snowflake, the shell, and the honeycomb to
appreciate the architecture of nature. Appreciation of nature is not a love
of flowers or trees, but and understanding of its processes and its impact.
All things begin and end in nature. Nature permeates the entire physical
universe. It is part of all things we see, and even more that we do not see.
The natural world holds many potential lessons for architects.

Man must have an inherent distrust for the natural world. Nature has
no stake in man's survival. As Eliade reminds us, it is man's distrust of
nature which fuels his impulse to build. But as Thoreau and Eiseley
suggest, there is also a voice which speaks for the need of a harmonious
relationship between nature and culture. We no longer fear nature, nor
perhaps do we revere nature as we once did. We cannot, however, deny
our attachment to nature. This was as true for Wright and Thoreau in the
19th century as it was for Kahn and Eiseley in the 20th century. This
attitude is reflected in their words and in their works. The architect Louis
Sullivan once said, "that, thro' the rotating seasons, thro' the procession of
the years, thro' the march of the centuries, permeating all, sustaining all,
there murmurs the still, small voice of a power that holds us in the hollow
of its hand." Man is a creator, and yet man himself is only a creature.
Architecture too is nature's child. Like all else it exists only as it has been sanctioned by nature. Man may preside over the natural world but he cannot transcend nature.

And so the relationship between nature and man would seem to be a paradox. There is both a perceived opposition and an undeniable link. But in his opposition to the natural world does man ever really defy nature? It is certain that man may effect nature's balance, but nature always strikes a new balance. If we level a forest, nature accepts a desert. The forest has been defiled, but not nature. Nature has not been changed, only its balance. Similarly, man could never erect a structure which defies nature, as things sometimes appear. The cantilevered beam seems to defy gravity when, in reality, gravity makes it work. In order to defy gravity at one end of a beam, gravity must be harnessed at the other end. Buildings are both created and destroyed by nature's forces. It may be that, given man's occasional failure to perceive the essence of nature, his conflict with nature is but an illusion. We are deceived when we see only part of the picture. Ultimately, we must consider that between man and nature there is no opposition, and there is no paradox.

It may be fair to assume that virtually all of man's creations would not exist if man had not discovered them. For example, nature does not appear to create buildings of its own accord. Man is certainly a creative force. But it is also fair to say that man's architecture could not exist if nature did not allow it. Men can imagine many things, but the thoughts of men are not tangible. In the mind or on a sheet of paper things and ideas are only approximations of reality. Nature allows these things to be real
and tangible. It is quite possible that the only thing a man can create without consulting nature is another man.

The essential truth is that, in the process of the creation of architecture, there must first be a moment in which each individual must ask himself what he wants to do, and there must also be a moment when that same individual asks nature how to do it. Architecture, therefore, is part of the bridge between nature and man. To the world, man offers his spirit and his ideas. To man, nature offers infinite possibility. Man will always build. The ideas that inspire these efforts belong to all men, in all times. But the structures that are created, alas, belong to nature, in the beginning as well as in the end. As Loren Eiseley states much more eloquently:

"There comes a time when the thistles spring up over man's ruins with a sense of relief. It is as though the wasting away of power through time had brought with it the retreat of something shadowy and not untouched with evil. The tiny incremental thoughts of men tend to congeal in strange vast fabrics, from gladiatorial coliseums to skyscrapers, and then mutually demand release. In the end the mind rejects the hewn stone and rusting iron it has used as a visible expression of its dream. Instead it asks release for new casts at eternity, new opportunities to confine in fanes the uncapturable and elusive gods."106

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