Bachelor of Architecture Degree Program
Department of Architecture
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BEYOND RHETORIC
A PERSONAL QUEST FOR AN ORGANIC ARCHITECTURE

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Abstract

As the world approaches the millennium, the United States finds itself in much the same position as it was at the close of the nineteenth century: an economic and military power with few clearly defined missions in the world. Now, as then, the United States is able to look inward, both as a nation and as a body of individuals.

We have found that our house needs some fixing up.

Just as our late-Victorian predecessors grappled with the effects of industrialization, we are seeking ways to bring the various forces of our lives into better balance. Americans, currently locked in a cynical consumerism, are slowly becoming wary of their growing detachment from spirituality. This is evidenced in a resurgence in participation in traditional religious life and the growing interest in belief systems other than the Judeo-Christian. Eastern faiths are becoming more popular, as are various other beliefs.

Phase One of the Thesis Project will entail an historical overview of the movement known as Organic Architecture in the United States from its origins in the mid-1800s till now, and will attempt to place Organicism within the broader context of changes in American religious culture over the years. The current state of Organic (also known as Reflexive) philosophy will also be discussed, with the brief introduction of the newer environmental aspects of design as they pertain to a possible enrichment of organically designed buildings. Material to be researched for this phase of the project includes reprints of various historic documents, including religious scriptures, as well as copies and transcriptions of various writings and publications of the Prairie School architects and those who influenced them. A number of scholarly treatments of this subject will also be referenced.

Phase Two will involve the programming, planning and design of an environmental educational facility to be located on the Hults Farm owned by BSU and managed by the Department of Natural Resources and Environmental Management. Representatives of the Department will be directly involved in the design process. Assisted by the use of low energy and healthy building techniques, the design will emphasize interactions between all beings as well as the interaction of all of these with the building itself and the environment. This integration and interaction represents the core theme of organic architecture. All systems are bound together, supporting each other. The extent to which a building’s users are lifted, both physically and spiritually, is determined by the extent to which these interactions are felt and beneficial.
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Foreword

The nun Chiyono
studied for years,
but was unable to find enlightenment.

One night,
she was carrying
an old pail filled with water.

As she was walking along,
she was watching the full moon
reflected in the pail of water.

Suddenly,
the bamboo strips
that held the pail together,
broke,
and the pail fell apart.

The water rushed out;
the moon's reflection disappeared—
and Chiyono became enlightened. ¹

¹ Paul Reps, ed. “No Water, No Moon.” Zen
Part One
Preface
Acknowledgements
Preface

The Autobiography of a Search

My first exposure to famous architecture was in 1972, when, as an eighth grader growing up in the suburbs of Pittsburgh, I visited Frank Lloyd Wright’s Fallingwater while on a school field trip. While most of my classmates treated the visit like most others, that is, an excuse to act up, I, between pangs of longing for a dark-haired classmate, felt I was in the presence of something special. I recall that I could not exactly identify just what it was I was looking at, for I had no notion of organic design. I do recall, however, thinking that there was something Oriental about the house, and I did not think the stair leading from the living room to the stream was at all unusual, as though I had some second sense of the metaphor at work.

Since that experience twenty-five years ago, Wright has been a recurring part of my life. For many years, Wright was the only architect I had ever read about, even after I was exposed to others while teaching drafting at a technical school in Pittsburgh. The graduate architects who instructed the architectural drafting courses would bring in their copies of Progressive Architecture and Architecture, which I would peruse during breaks and lunch. Here I learned the names of the most influential designers of the 1980s: Richard Meier, Peter Eisenman, Michael Graves, Philip Johnson. I learned the buildings and the names, yet there was something missing there. I would find it somewhat later on the second floor of the massive Beaux-Arts Allegheny County Carnegie Library, where I temporarily traded my library card and driver’s license for the opportunity to view Wright’s Wasmuth portfolio, brought to me on a cart in two large boxes bound with string. I spent two hours carefully inspecting the plates, their brown ink on cream board still bright after so many years. I was honored to have seen them.

Architecture would remain nothing more than an on again-off again hobby for several years, as in 1986, I was fortunate enough to be offered a position not too far from my wife’s birthplace in northern Indiana. The trauma of relocation from urban Pittsburgh to the very rural North Manchester, combined with the pressures of a new job, gave me little time for study. However, I soon tracked down one of the trade school instructors who was then working in Chicago. There I was able to see, for the first time, many of Wright’s works first hand, and the plates of the Wasmuth portfolio were finally bettered.

The chase, as someone once wrote, was afoot.

Shortly after the arrival of our second child in 1989, my wife Linda entered nursing school. She soon brought up the possibility of supporting us later so I could return to school. I recall we didn’t deliberate long on this—I would do it, and I would study architecture. After a year of general education courses at Indiana-Purdue Fort Wayne, I was accepted into Ball State’s College of Architecture and Planning and was amazed at the effectiveness of the acculturation process—indoctrination would be closer to the truth. Too many late nights, too much caffeine and too little decent food became the norm, but more pervasive was the design methodology propounded in the design studio—an idea “revealed in the “Concept,” made manifest in the “Form” arrived at through “Theory” filtered

through ‘Process’ as though they were the ends rather than the means.”
I went along with this, but found myself working much longer and harder
than I felt I should have had to. The pace ensured no meaningful rest. I
became irritable, especially at home, where I began to feel like Francis
Coppola’s Captain Willard in *Apocalypse Now*; edgy and nervous, waiting
for the next assignment.

I suspected, after sleeping for sixteen hours straight after the completion
of a particularly grueling project, that there was a better way to learn and
do architecture. My ongoing reading about organic architecture indicated
there was much we were not being made aware of. How could so much
isolation and discomfort within a designer lead to community and comfort
for a building user? How could we make environmentally sensitive
structures if we never get to *be in* the environment? My classmates
would chuckle knowingly as I said such things, and then would quietly
return to their tenth model of the same damned building they’d been
studying for a week. No wonder they didn’t know what it should look
like...

*They had nothing to guide them.* The Process doesn’t consider the client
first, not the user group, not the site, not the context. The first item on the
agenda of the Process is, of all things, the Concept. I began to ask, what
happens when the concept isn’t something I extract from some arcane
theory or arbitrary choice, but one I induce from the realities of all the
relationships inherent in the making of a building? And in that are not
only the physical realities, but the less tangible ones—the personalities,
the emotions, the lives that must be lived within our creations. Will our
buildings support, nurture and invigorate, or merely shelter or worse,
aggravate? Also, what happens when I trust my instincts and feelings
instead of the Process? If I don’t understand the problem in my mind, a
thousand study models won’t help. As Jonathan Hale writes, “So you
find out what requirements must be met...and then, to make a design of it,
you turn those elements over *to your intuition.* (emphasis added).”
What more needs to be done? What, indeed?

So here we are. Six years and five months after stepping into a university
classroom for the first time, I’ll step into a new classroom of architectural
practice. For now, though, I’ll attempt to answer the above questions and
a few more. But these are *my* answers to *my* questions; my ego isn’t big
enough to presume they are THE ANSWERS—I’m sorry, but you’ll have
to find your own.

On the other hand, if you look inwardly as you read this paper, you may,
just maybe, feel that little warm glow of resonance. If so, you will have
gotten all the answers you’ll need. Enjoy your journey!

Muncie, Indiana
December, 1996

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1 Mark Darrall, “Is This Thing On?” An unpublished paper written as a requirement for ARCH350,
Internship Preparation, under C. Daniel Woodfin.

Acknowledgements

In the spring of 1995, I wrote in a letter to a former co-worker: "...I've learned that life is cyclical and circular in nature, and it's wonderful to see these cycles play out and the circles close to begin another pass. One of those circles (of so many) has closed just the other day..."¹ I find it telling that, nearing the end of my career at Ball State University, David would leave a message on our answering machine telling me that he had found my letter in his briefcase. David's call reminded me that the circle is about to close yet again to begin a new orbit. However, like the orbits of celestial bodies, our life cycles are not identical; every successive orbit has a somewhat different shape and character as all bodies, human and heavenly alike, are constantly influenced by external forces. Some of these external forces have been distant yet easily identified, while others have been exceedingly close and mysterious. While I can't name the latter, there are many I can:

My thesis committee: Professors Uwe Koehler, Patrick George and William Hill—thank you all very much for your guidance and patience with my atypical approach. Professor Tony Costello and Chair Marvin Rosenman offered their open minds, open doors and never-ending care for the students. My "clients," Professor Tim Lyon and Graduate Assistant Regina Miller of the Department of Natural Resources and Environmental Management allowed me the opportunity to learn client technique while developing the design project. Mark Hammons of the University of Minnesota Libraries, my spiritual mentor and Prairie Scholar, introduced me to the metaphysical side of organic architecture and provided endless source material on Purcell and Elmslie. Jay Bieszke, Emily Fisher, Kevin Russell, and D.J. Wiener have been willing to share their ideas, materials and their space on the Path. The Dead Pullet Society provided the perfect combination of philosophy, pragmatism, and chicken wings, not to mention a support network only married guys could understand. Dirk, Lexst and Pratt brought many years of entertainment and inspiring vistas of sound. Architects Howard Alan, Arthur Dyson, Eric Freed, Howard Lawrence, Bart Prince, James Schildt, Laurie Virn and Malcolm Wells all contributed their thoughts on organic and sensitive architecture, and design in general. Fred Stitt and Monika Haaf of the Friends of Kebyar Network News provided a vehicle for the distribution of my "organic survey."

My friends of many years, Manuel Rodriguez and Tom Gleason, remind me that there is truly no such place as far away. My parents Bob and Bernie, my sister Bobbie, and little brother Steven provided their love and guidance, and especially the room to grow. A big hug to my niece Emily.

My boys Jonathan and Kevin understand that I did it for them, too.

My wife Linda first broached the idea of my returning to school without once thinking of what it would mean for herself. I have often felt that my being in school was harder for her than it was for me. I can never repay her sacrifice, but I can promise her the rest of my life...

¹Letter to David Migliorini of North Manchester, Indiana, April, 1995.
Part Two

Spiritual Life
Organic Architecture
A Personal Quest
Introduction

Our identity is tied to the land—our sense of space, both personal and public, is shaped by the prairie and rolling hill. At the time of the founding of the United States, the opportunities were perceived as limitless in a limitless supply of land and resources. Because of this, and as a response to conditions in our industrial cities, we have been compelled to expand westward and outward, recreating in miniature the frontier experience of our forefathers. The ideal of the rugged individual, roughing it in the wilderness, remains with us long after the reality has become mostly unattainable.

However, as a nation of immigrants, we remain strongly connected to our predominantly European roots. At the time of the founding of the United States, these ties were expressed architecturally in English and French Neoclassical styles. In fact, much of our culture at that time, including our philosophy and religion, as a melding of European sources, was imported as a model to be emulated. This stance has historically dominated American thinking, and to this day remains a defining characteristic. However, the Founders saw the new nation as being pluralistic in nature and capable of tolerance toward and acceptance of a wide range of attitudes and beliefs; to that end, the United States has a rich history of individualism as partly evidenced in the large number of ethnic groups and belief systems represented in the US. The American Transcendentalists of the 19th century called for the seeking of a uniquely democratic American culture and way of life. The Transcendentalist movement began at least partly as a response to the intolerance of mainstream Protestantism, and could be seen as the combination of various belief systems including Unitarianism, Free Religion, Hinduism and Buddhism. Many people found sympathy with the romantic ideals expressed by Emerson, Whitman and Thoreau, including sculptor Horatio Greenough, painter Thomas Cole, and architect Louis Sullivan. Though he trained briefly at the Ecole des Beaux Arts and apprenticed under William LeBaron Jenney and Frank Furness, both of whom trained in the atelier system, Sullivan, in the spirit of Emerson, Thoreau, and Whitman, called for art and architecture to be the expression of the uniquely American character. Sullivan’s designs and writings represented the beginnings of what would eventually be known as organic architecture in America.

Sullivan’s younger colleagues, including Frank Lloyd Wright, George Grant Elmslie, Walter Burley Griffin, and others would advance the cause to various degrees. They have become known as the Prairie School, or Progressive, Architects. These designers, predominantly of the American Midwest, explored many themes, including the possibilities of technological integration in design as a proper expression of American values and experience. Another theme, woven inextricably and implicitly throughout, can be tied to Eastern religious and philosophical beliefs, more specifically, the Hindu and Buddhist traditions that had recently become known in the western world. Their adoption of these themes is an evolutionary step out from that of their predecessors, the Transcendentalists, who had found much sympathy with eastern philosophy but were most often content to meld these new modes of thought into their larger value sets. The early organics, in a similar manner, seldom referred to these traditions directly, yet the comparisons are clear. An attempt will be made to show these connections—explicit and

And why we need copy the Doric or the Gothic model? Beauty, convenience, grandeur of thought and quaint expression are as near to us as any, and if the American artist will study with hope and love the precise thing to be done by him, considering the climate, the soil, the length of the day, the wants of the people, the habit and form of the government, he will create a house in which all these will find themselves fitted, and taste and sentiment will be satisfied also.

implied—between the writings of the designers, those of the Transcendentalists, and their Eastern inspiration.

The late 19th and early 20th centuries were filled with incredible leaps in scientific and technological progress, as well as an ever-increasing knowledge of the non-Western world. Science had reached, by this time, a position of notable authority among all classes, and the effect of Darwinism was to call into question the very backbone of the predominant faith of the West. The work of Einstein and Minkowski bore directly on cosmology as the theories of relativity introduced to the public a new notion of time as a fourth dimension. Others, operating both within and without the scientific mainstream, began to study the possible properties of time. Where most scientists explained time as being a property of space, some would explain it as additionally being the driving force of growth and consciousness. Growth and consciousness, in organic design, is often approached metaphorically through the understanding and adoption of patterns inherent in nature. Growth in nature is analogous to the nature of life itself. Where Sullivan and Elmslie chose methods more or less representational of vegetative elements to express this theme, Wright tended toward abstraction.

The Prairie School, after enjoying popular and critical acclaim for the first decade of the new century, had fallen out of favor by the end of World War One, to be replaced by the International Style and yet another revival of older European themes. However, the practitioners of organic design, particularly Wright, kept the movement alive by constant writing and speaking, often taking the new European style to task in stinging critiques. Wright’s contemporaries William Gray Purcell and George Grant Elmslie represented the gentler faction within the movement, defending their work as retaining true connections to the modern while embodying timeless and universal values that transcend the fashion of the moment. The next generations of organic designers, most notably Bruce Goff and his successors Bart Prince, Arthur Dyson, and others, to this day continue in the tradition of highly personalized, highly expressive architectural design, seeking to capture a notion, a pulse, that responds not to some intellectual premise or abstraction of theory, but to human and environmental needs. Some of this newer generation of designers have incorporated the new philosophies of environmentalism into their design, where the structure now interacts directly with the human and non-human environments. This shift represents the next step in this evolutionary culture, as previously this interaction was most often merely metaphorical in nature as suggested by Wright’s rubric of “the outside coming in.”

While it is difficult to deny the cyclical nature of patterns of belief, many feel the stage has been set for a long-lasting change of heart. Americans, currently locked in a cynical consumerism, are slowly becoming wary of their detachment from spirituality and are seeking a grounding for their lives. There is an increased interest in spirituality as evidenced in growing participation in not only the mainstream religions of the United States, i.e., Protestantism, Judaism, and Catholicism, but also in Eastern faiths by non-Easterners, as well as various alternative systems. Our spiritual diversity seems to have exceeded our ethnic diversity. Additionally, there seems to be a growing awareness that a more integrative lifestyle is not
only desirable, but necessary—we are eating better, exercising more, and taking better care of our local physical environments. Traditionally Western ideas of reductive analysis are giving way to systems theory. There is a sense that we can no longer view our spiritual lives as being apart from these other aspects, as is apparent within a concept of holistic wellness, where five aspects of life—physical, mental, spiritual, environmental and social—are considered to be mutually supporting and interdependent.

This quest for a more integrated life may be addressed, not merely in a religious manner, but within a broader cultural framework, one aspect of which is design. Organic design, also known as “reflexive” design, is an expression of an organic philosophy, and is not limited to architecture. It acknowledges the forces within every sentient being and considers these forces as primary in the expression of ideas. Intuition, emotion, environment, action, and continually evolving interaction are the primary tools of organic design. Organic design is ideally democratic in nature as it is considerate of all these interrelationships; it should be accessible, accommodating, and uplifting to its users. Buildings made in this manner may be highly technical or incorporate only indigenous materials and practices, yet must be sensitive to the natural, built, and socioeconomic context.

The primary objective of the thesis is to develop and articulate a personal understanding of organic design within the context of America’s spiritual culture. The framework for this understanding will be established through the exploration of organicism as it has evolved from its beginnings in the US in the mid-19th century. Most studies of the Progressive architects concentrate on formal and social issues; I feel it may be possible to offer a new evaluation of their work as part of a larger movement seeking a rejuvenated and integrative American spiritual life. To do so, it will be necessary to establish that this quest is inextricably tied to the national identity; this will hopefully be achieved by briefly investigating the cyclical nature of spiritual attitudes in America from its founding. The mid-late 1800s will be studied in somewhat more depth, as this period saw the introduction of the eastern beliefs that partially inspired the American Transcendentalists, whose ideas in turn would serve as the foundations for organic philosophy. A brief history of organicism in the United States and its current state will be developed; while not comprehensive nor within the realm of undergraduate work, this work may serve as a foundation for further study.

The secondary objective of the thesis is to test the hypothesis: that an architecture based on the values of the original Prairie School architects, i.e., the myriad interrelationships of humans and environments, understood consciously and intuitively, rather than intellectually and theoretically, may prove a more fitting and enriching means of providing habitable structures at the approach of the millennium. Following this is the conception of organic philosophy as having an evolutionary nature. While these core values may not have changed appreciably, their expression and application should. It is proposed that this next evolutionary phase will entail the design of environmentally sensitive structures, thereby allowing the human/non-human relationship to be
actively mediated by the building, rather than only operating metaphorically. For the project to be successful, these interrelationships must be realized and supported throughout the design process. The proposed project, an environmental education center, will be developed for and with the active participation of the University's Department of Natural Resources and Environmental Management. Such a project is anticipated to be a satisfactory exploration of the thesis topic, as environmental learning centers can play a significant role in making explicit the benefits of an environmentally aware lifestyle. Additionally, the project will directly benefit by the existence of a real client, user group, and site, as the designer's personal biases and limitations are tempered and the ego held in check in the interest of the project.
The Spiritual Life of the United States

The Calvinist Tradition and An Effect of the Enlightenment: Deism

The first English settlements in the New World were established by more-or-less Calvinist sects who sought to create "...a society...in which church and state, Moses and Aaron, "were coordinate authorities, strengthening each other jointly to enforce the moral law." This particularly stringent form of Protestantism set the tone for the religious culture of the United States; its undercurrents may be realized to this day in the fundamentalist churches, whose teachings tend to be more strict and less inclusive than those of other, more tolerant mainstream faiths. It is interesting to compare the nature of shifting currents of thought of today to these older traditions. Kerry Walters' introductory discourse on the history and influence of Deism in the United States reveals that early America was far from being the theologically cohesive, i.e. Protestant, entity it is typically assumed to have been. Walters firmly establishes that theological dissent was quite the norm as the Enlightenment spread to the colonies. He also presents evidence suggesting a cyclical element to these changes.

Enlightenment thinking, in the form of a collection of works by Francis Bacon, John Locke, and Isaac Newton which were gifted to Yale in 1714, opened the door for new theological ideas through its emphasis on a mechanistic model of reality, empiricism, and man's ability to reason. It is important to note here that until this time, the standard cosmology taught in the colonial colleges was grounded in "...Aristotelian physics...the earth was at the center of the universe and that the four elements were the basic constituents of reality."

The Christian establishment saw Deism as a direct threat to spiritual life; belief systems not following the dictates of the Protestant teachings—the depravity of man, his inability to fathom God, the belief in salvation through Christ and the concept of Trinity—were seen as heretical and an abomination. However, it could be argued that the spirit of Deism, more than its tenets, constituted the major threat to Christianity's primacy. Deism's natural religion declares God's existence knowable by man's ability to reason through direct observation of the empirical evidence of Nature. This partly exposed the contradictory nature of the Christian orthodoxy, which held that, in utter depravity, man must continually search the depths of his soul with his reason, though his reason was insufficient to perceive his redemption, which could come only through Christ's interventions—no good works or intentions could bring salvation. American philosophers, caught up in the spirit of the New Learning, found this illogical theology offensive to the sense of order Newton brought to the Universe. One example of this dichotomy is the concept of Trinity. Christians hold that God is three entities, Father, Son (Christ) and Holy Spirit, and also one. This "violated...one of the very foundations of rational thought and discourse: the principle of noncontradiction." Other concepts, such as the divinity of Christ, and the mystery of his resurrection, were also held by the deists to be contrary to logic, not grounded in experience, and therefore superstitious in nature.

The deists were also enraged by Christianity's intolerance of viewpoints other than those dictated by dogma; "Franklin, Jefferson, and Paine were particularly angered and disgusted by what they saw as historical Christianity's...unwillingness to countenance heterodoxy in religious

2 Walters' anthology features essays by such prominent American thinkers as Benjamin Franklin (I Believe in One God, Creator of the Universe), Thomas Jefferson (Reason and Free Inquiry Are the Only Effectual Agents Against Errors), Ethan Allen (Nature is God's Revelation) and Thomas Paine (My Own Mind is My Own Church).
3 Walters, p.14; Earth, Air, Fire and Water being the four elements.
4 Walters, p.29.
persuasion.”" Indeed, persecution of heretics was the norm, and the
deists themselves, though they professed the power of a Supreme Being,
were vilified as atheists by Christian commentators of the time. This sense
of equity and justice in the face of intolerance and rigidity informed their
roles as reformers and eventual designers of the new nation. American
deists championed causes that would eventually appear in the Declaration
of Independence and Constitution; some of these issues, particularity
the extent to which the state should sanction or participate in spiritual
life, remain controversial to this day.

The beginning of the nineteenth century signaled the end of deism in
America as the leaders of the movement gradually passed away; without
the strong voices of Thomas Paine, Elihu Palmer, and Thomas Jefferson
to defend it, deism began to “collapse under its own weight.” New
attacks on deism on intellectual grounds were mounted by David Hume,
who claimed that the “necessary causations” dictated by the Newtonian
model as being self-evident, were in fact subject to human
misinterpretation due to the nature of experiential observation.” While
this in itself would not undo deism, Hume’s concept, while highly
theoretical, exposed a flaw of the deist philosophy that would be drawn
upon by others in the dismantling of the Enlightenment’s universe. Kant
pointed out that humans have the freedom to behave irrationally and
unpredictably, and in doing so, may no longer be “regarded as just another
class of rationally analyzable material bodies.” The net effect of this was
to reveal the deists’ mechanistic model of the cosmos as no less simplistic
and shallow as the superstitious theology of the Calvinists.

Deism failed not only on an intellectual level, but on an emotional level as
well. Mircea Eliade, in The Sacred and the Profane, insists that
spirituality and religious practice must contain an element of mystery,
most often centering on the distinction between the sacred and profane
worlds, to be fulfilling;” the hyperrational God of the deists, because of
His accessibility through reason, could not satisfy this human need. The
deists’ model rendered God as nearly irrelevant, and humans not much
more so—merely cogs in a cosmic machine, humans were held to be
ineffectual in the greater scheme. This dissatisfaction resulted in a backlash
of fundamentalism known as the “Second Great Awakening,” geared
toward the rejuvenation of mainstream religious life, and “characterized
by its emphasis on personal piety, salvationism and anti-intellectualism.”
Mainstream congregations grew tremendously during this period from
the late 1700s to mid 1800s, essentially putting the deistic movement
permanently to rest.

The Introduction of Eastern Philosophy

With the increasing awareness of non-western cultures, the theological
discourse rapidly expanded to include not only variations on the Judeo-
Christian theme, but a wide variety of alternative viewpoints. The
introduction to the United States of Hindu and Buddhist texts in the early
1800s fueled this expanded discussion, and greatly informed the
Romantics, whose American leaders included Ralph Waldo Emerson,
Henry David Thoreau, and Walt Whitman.

5 Walters, p.31.
6 Walters, p.34.
7 Walters, p.36.
8 Walters, p.39.
9 Mircea Eliade, The Sacred and The Profane: The
Nature of Religion. Willard Trask, trans. (San
Diego: Harcourt, 1959) A study of the nature of
religion from a phenomenological viewpoint.
10 Eliade, p.63 and passim.
11 Walters, p.42.
Thomas Tweed\textsuperscript{13} shows that knowledge of Buddhism in the United States was inconsistent, with translations of scriptures being done not only by scholars but by Christian missionaries, leading to a widely variable quality—of not merely linguistic, but theological—interpretations. The discussion of Buddhism in the US is said to have begun in New England in 1844 when Henry David Thoreau translated a Buddhist text for a Transcendentalist publication.\textsuperscript{14} There was a certain level of sympathy for eastern traditions among the liberals of New England, but for the most part, Buddhism was seen by the strongly Protestant majority to be a dangerous influence.

Buddhism’s teachings of the universal consciousness (with no allowance for an individual immortal soul) and Nirvana as the ultimate goal, was perceived by commentators of the period to be pessimistic and passive in nature. This ran counter to the prevailing mainstream attitude of optimism and activism, which themselves represented a change from the Calvinist theology of human depravity.\textsuperscript{14} Tweed suggests that this attitudinal shift was in part due to “...the enthusiasm about Western expansion and technological advance.”\textsuperscript{15} Many adherents and sympathizers of Buddhism, in the last years of the nineteenth century, were drawn by its apparent compatibility with the advances of western science, most notably Darwinism, and its ability to tolerate a wide range of viewpoints. These attributes would be in keeping with the nation’s growing role in the world scene, as well as a response to the pressures of modernization.

Scientific advances such as Darwinism combined with the expansion of the religious dialogue, as well as “...social forces such as industrialization, urbanization, and immigration...”\textsuperscript{16} to cause mainstream Protestantism a significant amount of concern. Tweed traces the growth of interest in Buddhism in the United States from academic to popular culture,\textsuperscript{17} most notably in the first World’s Parliament of Religions held in 1893 at the Columbian Exposition in Chicago, where Anagarika Dharmapala and Soyen Shaku, (who would both become leaders and popularizers of Buddhism in America) presented papers on the Asian tradition. Richard Seager’s study of the Parliament places it, and the Columbian Exposition as a whole, within the context of the United States as an emergent superpower. Cloaked in what he terms the “Columbian myth”\textsuperscript{18} built upon images of Western Christian (and especially Protestant) superiority to stack the deck against the religious traditions of the non-Christian East. Even while calling for a new universal spirituality, the Parliament’s organizers, whether knowingly or not, placed numerous obstacles in the path of the representatives of the Eastern faiths.

The World’s Parliament of Religions had been, in part, organized by Jenkin Lloyd Jones, the uncle of Frank Lloyd Wright.\textsuperscript{19} None of the major actors in the early Organic movement mention attending any of the presentations. However, it is reasonable to assume Sullivan, Wright, Emlisle and Purcell would have been well aware of the transactions of the Parliament, as Seager shows the Parliament was well-represented in the local and national press.\textsuperscript{20} Wright would likely have also conversed with his uncle, who would, only five years later, hire Wright and Dwight Perkins to prepare designs for Jones’ Abraham Lincoln Center, which Joseph Siry shows to have been a powerful influence upon Wright’s formal


\textsuperscript{13} Tweed, p.2.

\textsuperscript{14} Mark Hammons, a student of both Eastern cultures and the Prairie School, summarizes the ideal of Nirvana, and the possible cause for its misperception by Westerners: “The concept of the void is not non-existence, but the absence of ego. Whether there is or is not any existence outside the mind is a long-standing doctrinal argument in various schools of Buddhism—but all agree that the essence of experience is the mind, that the mind exists entwined with the phenomenological world in a process of experience called "karma." Resolving this karma sets the mind free. The free mind is 4-D; i.e., not individualized into a specific (read: relative) time/place. Therefore, removed of individuality, there is no phenomenology—only the Void. The void is... that which is indescribable. The nature of its existence is beyond conceptualization.” Personal correspondence, November, 1996.

\textsuperscript{15} Tweed, p.10.

\textsuperscript{16} Tweed, p.26.

\textsuperscript{17} Tweed, Ch. 2, pp.26-48.


\textsuperscript{20} Seager, passim.
approach to the later Unity Temple. 21

The Transcendentalist Response and a National Culture

Continual progress and growth, enabled by the vast availability of resources and land, are defining characteristics of Americans. Our sense of space is derived more from the open landscape than from the compact town. The Transcendentalists, and later, the Organics, would see progress and growth as apt metaphors for the nature of the consciousness behind all things; this would find expression in the nature themes of Sullivan’s and Wright’s architecture, as well as Purcell’s fascination with machine processes.

William Stein’s introductory essay to reprints of two translations of Hindu scripture takes the position that they would have been influential to Ralph Waldo Emerson and Henry David Thoreau in the formation of their philosophies. 22 Rajah Rammohun Roy (1774-1833) was a religious reformer in India who began his career at the age of sixteen by calling for the rejection of orthodox polytheism in India. He plead, instead, for the creation of a monotheistic religion based on the texts of the Vedanta and the Upanishads, and Kopf shows him to be aligned with the Unitarian movement’s push for general religious and social reform, operating an a path paralleling that of the Harvard Unitarians. 23

Stein relates Roy’s desire to ecumenize the Hindus, holding that while he held to the Vedic Scriptures as the foundation, “Roy and his disciples strove to find the common basis underlying all the great religions.” 24 Stein paraphrases the articles of the creed of Roy’s Brahma Samaj society to show the notable conformity with the later ideas of Emerson and Thoreau:

1. The book of nature and intuition supplies the basis of religious faith.
2. ...they do accept with respect and pleasure any religious truth contained in any book (emphasis original).
3. ...the religious condition of man is progressive...
4. ...the fundamental doctrines of their religion are also the basis of every true religion.
5. They believe in the existence of one Supreme God...
6. They believe in the immortality and progressive state of the soul, and declare that there is a state of conscious existence succeeding life in this world and supplementary to it as respects the action of the universal moral government.
7. They believe in the providential care of the divine Father.
8. ...love towards Him and the performance of the works which He loves, constitute His worship.
9. ...They maintain that they can adore Him at any time and at

...The one Self never moves,
yet is too swift for the mind.
The senses cannot reach It,
It is ever beyond their grasp.
Remaining still, It outstrips all activity,
Yet in It rests the breath of all that moves.

It moves, yet moves not.
It is far, yet It is near.
It is within all this,
And yet without all this.

He who sees everything as nothing but the Self,
and the Self in everything he sees,

Such a seer withdraws from nothing
For the enlightened, all that exists is nothing but the Self.
So how could any suffering or delusion continue
for those who know this Oneness?
He who pervades all, is radiant,
unbounded and untainted,
inulnerable and pure.
He is the knower, the one Mind,
 omnipresent and self-sufficient.
He has harmonised diversity throughout eternal time.
Into a blinding darkness go they who worship
action alone...

Alistair Shafer and Peter Russell. The Upanishads.

21 Siry, pp.36-50 and passim.
22 William Stein, Two Brahman Sources of Emerson and Thoreau: Facsimile Reproductions of Rajah Rammohun Roy and William Ward (Gainesville: Scholar’s Facsimiles, 1967). There appears to be some uncertainty as to whether the Rajah’s name was Roy or Ray; they are used both ways in numerous publications.
24 Stein, p.vi.
any place, provided that the time and the place are calculated to compose and direct the mind towards Him.

10. ...holiness can be attained by elevating and purifying the mind.

11. They put no faith in rites or ceremonies, nor do they believe in penances as instrumental in obtaining the grace of God. They declare that moral righteousness, the gaining of wisdom, divine contemplation, charity and the cultivation of devotional feelings are their rites and ceremonies. They further say, govern and regulate your feelings, discharge your duties to God and to man, and you will gain everlasting blessedness; purify your heart, cultivate devotional feelings and you will see Him who is unseen.25

Under colonization, many educated Indians had surrendered their ethnic beliefs to those imposed by the British, but Roy's teachings sparked a renewed interest among Indians in their "...spiritual heritage."26 Long-forgotten manuscripts were "...collected, edited, and translated into the popular dialects."27 Interest in Indian culture and philosophy had grown in Europe at the same time, thereby enabling the opening of a concerted dialogue between East and West. Roy's confrontations with the English Trinitarian missionaries in England drew notice in New England; Stein shows that a prominent Unitarian journal, The Christian Register, had, from 1821-2, written sympathetic accounts of Roy's work. The Unitarians felt the "...archaic Protestant dogma..."28 taught by the Trinitarians went against the more fundamental principles of Christianity.

Stein maintains that Emerson and Thoreau could not help but be at least aware of Roy's writings; his controversial views were printed among Roy's translations of the Vedanta and the Upanishads, which Emerson and Thoreau would print in their Transcendentalist publication, Dial. Stein also posits that "(o) though Emerson never specifically mentions Roy's translations of the Indian scriptures, he continually echoes their metaphysical postulates in his oracular preachments."29 Thoreau's case, on the other hand, is more clear: Stein cites Thoreau's quotation from the Vedanta relating to religious tolerance. Stein further notes Thoreau's direct references to the Vedas in Chapter XI ("Higher Laws") of On Walden Pond.

Stein concludes that while there may have been disagreement among the various compilers of the scriptures providing "...a rational understanding of the supersensible truth,"30 "...they tacitly maintain the position that the path used to climb the mountain of wisdom is ultimately of no importance: the view from the summit is identical for all men. Doubtless it is this attitude that was congenial to the imagination of Emerson and Thoreau."31 For them, as well as the other Transcendentalists, the call for tolerance and self-reliance embodied in the Hindu scriptures would have been instrumental in the formulation of their views pertaining to the creation of a uniquely American culture free of the social and religious dogma of Europe. Emerson attended Harvard Divinity School, which at the time, was the traditional training ground for Unitarian ministers.

We live in succession, in division, in parts, in particles. Meantime within man is the soul of the whole; the wise silence; the universal beauty, to which every part and particle is equally related, the eternal ONE. And this deep power in which we exist and whose beatitude is all accessible to us, is not only self-sufficing and perfect in every hour, but the act of seeing and the thing seen, the seer and the spectacle, the subject and the object, are one. We see the world piece by piece, as the sun, the moon, the animal, the tree; but the whole, of which these are the shining parts, is the soul.


25 Stein, pp.vii-viii.
26 Stein, pp.viii.
27 Stein, pp.viii.
28 Stein, p.x.
29 Stein, p.x.
30 Stein, p.xix.
31 Stein, p.xix.
Unitarianism’s greatest break from Protestant theology was the concept of a rational yet intuitive knowledge, rather than revelation. This was sympathetic with Eastern philosophy and not dissimilar from the earlier Deism, and Kopf shows the Unitarians to be seeking a faith that was "...a reflection of a new social conscience and consciousness,"32 compatible with the needs of a painfully modernizing industrial society and a culture of science. However, the American Unitarian church’s insistence on a doctrine and creed drove Emerson away. Transcendentalism and Unitarianism will be investigated below for their influences on the various early Organic architects.

Roy, in the Introduction to his translation of the *Vedas*, establishes that it is within human nature to reduce the subject of our worship to tangible, knowable objects, and that this leads to an imperfect or perverted understanding of the nature of God.33 He offers instead that humans should "...direct all researches towards the surrounding objects, viewed either collectively or individually, bearing in mind their regular, wise, and wonderful combinations and arrangements; since such researches cannot fail...to lead an unbiased mind to a notion of a Supreme Existence, who so sublimely designs and disposes of them, as is every where traced through the universe."34 This is obviously a call to seek God in nature’s patterns, to which the Transcendentalists refer, and the Progressive architects used metaphorically. Both Sullivan and Wright wrote extensively about the observation of nature as a conduit to the understanding of Life itself. Sullivan and Elmslie drew on mystical geometries and botanical motifs rendered in a representative way; the seed and seed pod was a dominant figure in their ornamental patterns. The Moonduk-Opunishud declares God to be the source of "...the first sensitive particle, or the seed of the universe..."35 Wright, in the way of Oriental art, used abstraction to reveal the essential patterns underlying natural forms, which Sullivan would often refer to as “Character.”

Roy states it is a basic tenet of Hindu belief that all creatures, being of God, are themselves an embodiment of God; however, Roy declares this to be allegorical in nature, otherwise, “there would be a necessity for acknowledging many independent creators...which is directly contrary to common sense, and to the repeated authority of the Ved (sic).”36 The *Vedas* also declare God to be omnipresent in all creatures while also being distinct and above them. In Western terms, it could be said that we are full of God’s spirit, but this should be seen in a much broader sense than the similar Christian concept of the “Holy Spirit.” This can be seen to represent the concept of an intimate bond between all creatures—we are, both body and soul, a part of a single universal entity—consciousness, which transcends time, culture and religion.37

Roy warns of the dangers of idolatry and materialism among the Hindus of his time, yet his message can be seen as pertinent to both late-Victorian America and our current state of cynicism and consumerism. Having placed undue emphasis on our material wealth, and subjugated our ability to reason to the popular media, we have become "...devoted to idol worship; —the source of prejudice and superstition, and of the total destruction of moral principle...”38 Then as now, we seek some means of balancing the individualistic drive of capitalism and a communal spiritual

32 Kopf, p.5.
33 The Hindu tradition is polytheistic, and the Vedas do not speak of "God." As shown below, Roy is evidently attempting to restate Hindu themes in terms more compatible with Western, and Unitarian, thinking.
34 Roy, p.viii, in Stein.
35 Roy, p.32, in Stein.
36 Roy, p.13, in Stein.
37 Nowhere have I seen this idea expressed as well as in Emerson’s essay on Nature: “In the woods, we return to reason and faith...Standing on the bare ground,—my head bathed by the blithe air, and uplifted into infinite space,—all mean egotism vanishes. I become a transparent eyeball. I am nothing. I see all. The currents of the Universal Being circulate through me; I am part or particle of God.”
38 Roy, p.26, in Stein.
life. For many it is found in the mainstream churches, but for many, possibly sensing that the Western traditions only feed the ego and desires, other means would be sought.

The Growth of Alternative Belief Systems

As indicated by the tone of the Columbian Exposition, where developing non-Western cultures such as those in Africa and the South Pacific, and even those of some European nations, were treated much as sideshow attractions,\(^3\) the predominant culture of the United States in the 1890s was overwhelmingly Protestant and capitalist. However, the growing awareness of Eastern cultures and religious traditions found sympathy among certain populations of Americans from every location and socioeconomic position. Many of these followers carried out their beliefs covertly, or modified them so they may continue to function in their social and economic circles. Others would live their struggle to reconcile their religious upbringing with these new possibilities.

Especially notable was Paul Carus (1852-1919), who, as an activist for Buddhism in America, strove to make Buddhism compatible with Western lifestyles and viewpoints. His paper entitled "Science and Revelation," presented at the World's Parliament of Religions,\(^4\) revolved on the theme of science as being compatible with religious life, and how both should strive for the "...impartial recognition of the truth,"\(^5\) while never explicitly mentioning Buddhism. In fact, Carus went out of his way to avoid Buddhism;\(^6\) he makes mention of Greece and Rome and intersperses Greek, Latin and Hebrew terms into his speech, suggesting that he was well aware of the political and social climate in which he was operating. Carus was an astute German-American who, while sympathetic to and closely involved with American Buddhism, refused to convert. Tweed suggests that Carus was unable to reconcile his desire for activism with the passive nature of Buddhism.\(^7\) Tweed further characterizes Carus as a rationalist opposed to the occultism of some Buddhist sects.\(^8\) Perhaps Carus felt he could further the cause of a pure, scientific Buddhism best if he maintained a less defined position.

This period saw a large number of associations and societies formed around the newly-learned traditions of the East. One of the more familiar, that continues to this day, is the Theosophical Society. Emmett Greenwalt's history of the Point Loma Community, a communal group begun by Katherine Tingley in 1897\(^9\) gives a brief history of the Theosophical Movement and its evolution. Theosophy is translated literally as "divine wisdom,"\(^10\) but may be considered to be any contemplation about the nature of God and the universe. Theosophy as a way of thought was tolerant of any and all religions and traditions; it was the study and comparison of these that was to lead to the implied wisdom. Greenwalt notes that this ecumenism did not win any favors for Theosophy among the established mainstream faiths. Theosophy was not known in popular circles until the creation of the Theosophical Society in 1875 by Helena Petrovna Blavatsky and Henry Steel Olcott. These founders were involved in the popular spiritualism of the day, and Blavatsky had spent some time in the East where she claimed (with neither proof nor disproof) to have learned from Tibetan Lamas.

\(^3\) In fact, these cultures were represented, not in the White City, nor even on the main lakeshore grounds, but in what was termed the Midway Plaisance, where they were installed among industrial and commercial exhibitors in "Villages." Perhaps a study of Disney's Epcot Center is called for from this perspective. Map in Seager, p. 85.

\(^4\) Barrows v.2, pp.978-81.

\(^5\) Barrows, p.981.

\(^6\) apart from a cryptic footnote in Barrows v. 2, p.980.

\(^7\) Tweed p.155.

\(^8\) Tweed, pp.105-6.


\(^10\) Greenwalt, p.1.
The timing was fortuitous. The increasing status of science, and the work of Darwin in particular, seemed to suggest a "soulless nature," much as the Newtonian cosmology of the Deists had reduced humans to mere actors of preordained roles earlier in the century. The Theosophical Society would reject the orthodoxy of science and the mainstream faiths in favor of a mixed philosophy of many, mostly Eastern, traditions.

Upon the death of Blavatsky an Englishwoman, Annie Besant, and William Quan Judge, inherited the leadership of the Society. They and Olcott spent several years battling over this leadership role, with Olcott and Besant eventually heading the Society in India and Judge the New York faction. Theosophy was presented by Besant and Judge, in concert with G.N. Chakravarti, at the World's Parliament of Religions in 1893. Judge met Katherine Tingely, a social reformer and spiritualist, in New York, and upon his death, maneuvered to place herself in the leadership role of the Theosophical Society in America. Tingely would later found the Point Loma Community, which, from Greenwalt's description, seemed to function in ways very similar to Frank Lloyd Wright's Taliesin Fellowship with its integrated educational and communal living. Theosophy, as well as its successor, Rudolph Steiner's anthroposophical movement, drew the interest of several of the Organics, including Walter Burley Griffin and Marion Mahoney.

A contemporary of the Theosophical Society was Mary Baker Eddy's Christian Science movement. Essays on the women of Theosophy and Eddy in Wessinger's volume, make a clear case for the argument that spiritual leadership apart from the orthodox faiths was one of very few such roles available to women in the late Victorian period. Woman leaders, both religious and social, of the late Victorian period would clear the way for the remarkable contribution of women to the Progressive agenda of the early twentieth century. William Gray Purcell practiced Christian Science for some period, to apparently mixed benefit.

Other organizations were devoted to the traditional teachings of the Eastern faiths, most of which were formed somewhat after the turn of the century following large migrations of Asians. As the numbers of Asians in the United States increased over this century, the presence and practice of Eastern faiths have become more common, and the interaction between these and mainstream American faiths has modified both.

Joseph Tamney documents the introduction and evolution of Buddhism in the United States and its role in popular and religious and intellectual culture to the present day. The 1950s brought Eastern thinking into the national consciousness as exhibited in "Beat Zen" and is now fully integrated into American culture. Components of Buddhism and other Eastern philosophies are discussed in Sunday schools and catechisms, and represent the backbone of the various New Age faiths.

Evolutionary changes in philosophical and theological thinking have been a constant in the life of the United States and the world as a whole, and the relationship between East and West has always been highly interactive. However, the nature of that interaction has changed from the days of the early Christianizing missions, with their paternalistic and condescending attitude toward other traditions. Even as the people of

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47 Greenwalt, p.3.
49 Greenwalt, chapters V-XVIII, but especially IX.
52 Hammons, "Purcell and Elmslie," p.219; Purcell Papers, Architectural Records, Purcell and Elmslie Archives, Parabibographies (volume for 1908), entry of December 29, 1908.
54 Tamney, American Society, pp.xiii, 45-78.
55 Tamney, American Society, pp.157-74.
the United States seem to want to become more conservative and "traditional," there is no denying the impact of our relations with other cultures. We now find ourselves in a new pluralist ecumenism, where our Western faiths are a bit more Eastern and the Eastern a bit more Western, and God lives, in one form or another—on the Internet.

**Cyclical Tendencies and The Resurgent Search for Spirituality**

The moralizing tone of the 1980s and early 1990s, with which the citizens of the United States were admonished by cynical politicians to return to "traditional values", has been for the most part overtaken by a genuine interest and dialogue regarding spiritual life. *Time* magazine has featured religion or topics pertaining to spirituality several times in 1996 alone. From the Dead Sea Scroll controversy to sightings of the Blessed Virgin to New Ager and earth religions, we as both a society and nation of individuals seem to seeking something beyond the cynical materialistic culture of the Reagan-Bush era. However, these shifting attitudes are nothing new; as noted above, the people of the United States has always ridden a wave of spirituality. From the Calvinist settlers to the Deists, from the mainstream Protestants to the Theosophists, from the Roman Catholics to the Beats to now, this wave's crest has grown increasingly higher as each successive cycle has evolved, though the more pessimistic might say the troughs have merely sunk lower.

What has remained constant is the understanding within many that the spiritual component of their lives is critically important to the other facets of their progression in the world. I feel that as the understanding of consciousness grows among more and more people, they will realize that the form in which they pursue their personal understanding is not as important as the fact that it exists, and that this consciousness is shared among all beings.

True sympathy for other traditions—not the platitudes and bromides of "multiculturalism"—will bring lessons to all. Our culture has already been modified greatly by the presence of many ethnic and religious groups in the United States; only the most remote and ill-informed portions of the nation still have monolithic and homogeneous attitudes, and these areas are becoming increasingly fewer due to the advances made in communications technology. However, this is not evidence of a top-down cultural rebuild. Communities must maintain their unique identities in response to their natural and social environment; they must be free to evolve, to grow, as their makeup and environment changes. The nation, as a collection of communities, which themselves are collections of individuals, is in every way an organic entity, and is forever tied to each and every one of its citizens.
Organic Design in the United States

An Etymology of the Idea

The term Organic itself has always been problematic, at least for those outside the movement. This may be in part due to the stubborn pervasiveness of the word—the Random House College Dictionary lists at least 24 words with the same root and several others that appear similar enough. The dictionary lists, for Organic, 12 definitions ranging from the chemical to the legal to the biological—almost any of which (except for the legal one) could be seen as at least somewhat relevant to architecture. The architectural definition is succinct: "noting or pertaining to architecture regarded as having the directness of form and economy of material common to organisms." As far as it goes, it is correct; however, it seems to be incomplete considering the incredible volume of writing done in the name of organic architecture over the years. The definition of Organic as applied to architecture has a rich and complex history as evidence of its evolutionary nature.

Joseph Rykwert traces the term from its Greek origin meaning "instrument' or 'tool'" to Kant's broader understanding of organism as "...of a thing that has an interior binding purpose—a purpose that secured the different parts of the whole to one another in an intimate interdependence, and yet has a design unto itself." Rykwert shows that by the 1830s, advances in science had begun to affect the term's usage and meaning as it became associated with the conception of a "vital force" behind all matter, as well as the attendant stages of birth, growth and decay. Georges Cuvier is credited as establishing a new taxonomy of animals according to their functions and interrelationships rather than appearances, which was apparently highly influential to Gottfried Semper and Eugene Viollet-le-Duc, whose works in turn inspired generations of architects and artists, including Horatio Greenough, Louis Sullivan and Frank Lloyd Wright. As shown below, Greenough was especially important as an early proponent of the organic in art, but Rykwert names Leopold Eidlitz as being possibly much more influential, as his The Nature and Function of Art, More Especially of Architecture establishes themes Louis Sullivan would adopt nearly in their entirety.

In his Kindergarten Chats, Sullivan establishes his rhetorical position on the use of term Organic. In Part XIV, entitled "Growth and Decay," he states,

...we should at the beginning fix in mind the values of the correlated words, organism, structure, function, growth, development, form. All these words imply the initiating pressure of a living force and a resultant structure or mechanism whereby such invisible force is made manifest and operative. The pressure, we call Function: the resultant, Form. Hence the law of function and form discernible throughout nature.

However, Sullivan sees a certain danger to the application of words to architecture, taking a rather postmodern view towards the inherently slippery nature of text, noting that "words, when written, can be modified or developed in significance only, or nearly so, by association with other words...when once they are treated dynamically and pictorially, their power

The method of nature: who could ever analyze it? That rushing stream will not stop to be observed. We can never surprise nature in a course, never be ahead of a thread; never tell where to set the first stone. The bird hastens to lay her egg: the egg hastens to be a bird. The wholeness we admire in the order of the world, is the result of infinite distribution. Its smoothness is the smoothness of the pitch of the cataract. Its permanence is a perpetual inchoation. Every natural fact is an emanation, and that from which it emanates is an emanation also, and from every emanation is a new emanation. If anything could stand still, it would be crushed and dissipated by the torrent it resisted, and if it were a mind, would be crazed, as insane persons are those who hold fast to one thought, and do not flow with the course of nature. Not the cause, but an ever novel effect, nature descends always from above. It is unbroken obedience. The beauty of these fair objects is imported into them from a metaphysical and eternal spring. In all animal and vegetable forms, the physiologist conceives that no chemistry, no mechanics, can account for the facts, but a mysterious principle of life must be assumed, which not only inhabits the organ, but makes the organ...


58 Rykwert, p.11.
59 Rykwert, p.15.
60 Louis H. Sullivan, Kindergarten Chats and Other Writings (New York: Dover, 1979) 48. This passage apparently differs significantly in the 1934 book edition of Kindergarten Chats edited by Sullivan's long time friend and correspondent, Claude Bragdon and quoted in Lewis Mumford, Roots of Contemporary American Architecture (New York: Dover, 1972), p.74. There, "...organ, organize, organization, organism..." are substituted. One can only suppose that Bragdon was attempting to hone the etymological and rhetorical point.
to convey thought increases enormously; still let it always be understood that the powers are not in the words so much as in the mind and heart of him who uses them as his instrument.”61 While this may be seen as analogous to a mode of architectural design in which formal composition is expressive of creative intent, Sullivan is quite firm in not letting the analogy get out of hand. He warns the imaginary pupil of Kindergarten Chats that architecture has suffered from an overabundance of writing at the sake of the understanding of the relationship between intent and expression, or, as he terms them: Function and Form. The “accretion of words”62 Sullivan bemoans may also be a swipe at academic architecture and academia as a whole, the former that had done so much damage to the movement toward his vision, and the latter from which he had claimed so little benefit. Sullivan’s friend Claude Bragdon would see organic architecture as one “...following the law of natural organisms,” as opposed to what he termed “arranged” architecture, exemplified by Renaissance design “wherein predetermined canons of abstract beauty are imposed.”63 Bragdon further explains the origin and nature of the two:

In arranged architecture, the various parts and details are assembled and combined by the sovereign good taste of the architect; in organic, they are melted and fused by the creative heat, the eagerness for self-expression. In whatever form it appears, organic architecture seems to spring up without effort, almost of its own volition, a natural outcropping of national and racial vitality. Men do not have to learn to understand it; they recognize themselves in it because they carry the clue to its meaning in their hearts. Arranged architecture, on the other hand, is the self-conscious embodiment of the pomp and the pride of life...In order to determine to which hemisphere of expression a given building belongs, it is necessary only to apply the acid test of Mr. Sullivan’s formula and ask, “Does the form follow the function, or is the function made subservient to the form? Did the spirit build the house, or does the house confine the spirit?”64

The issue of ornamentation is central to organic design, as Rykwert traces the influences of John Ruskin and Owen Jones and their theory that all ornamentation is imitative of nature’s forms, primarily vegetative and capable of expressing the values of its maker. This would find its way into Sullivan’s ornamental designs (where plant forms, combined with sacred geometries, would metaphorically express the vital forces of life) as well as the short-lived Art Nouveau. And while Expressionists such as Erich Mendelsohn drew from the Art Nouveau, they, as well as Wright, would see the organic in a light quite different from Sullivan. Rykwert relates Mendelsohn’s story of the opening of his Einsteinturm, where its namesake declared it to be “Organic.” Mendelsohn took this to mean that all the parts are inextricably tied to the whole, which Rykwert suggests is related to Alberti’s similar statement in his Ten Books of Architecture, and is therefore “classical,” “inorganic,” and “antigrowth.”65 Similarly, Wright was drawn to the Gesamtkunstwerk as evidenced in his quest for total integration of form, structure and systems, but could not sympathize with his Liebermeister’s more metaphysical vision of ornamented structure.

My eyes and ears are revolted by any neglect of the physical facts, the limitations of man. And yet one who conceives the true order of nature, and beholds the visible as proceeding from the invisible, cannot state his thought, without seeming to those who study the physical laws, to do them some injustice. There is an intrinsic defect in the organ. Language overspeaks. Statements of the infinite are usually felt to be unjust to the finite, and blasphemous. Empedocles undoubtedly spoke a truth of thought, when he said, “I am God;” but the moment it was out of his mouth, it became a lie to the ear; and the world revenged itself for the seeming arrogance, by the good story about his shoe. How can I hope for better hap in my attempts to enunciate spiritual facts? Yet let us hope, that as far as we receive the truth, so far shall we be felt by every true person to say what is just.

Ralph Waldo Emerson, The Method of Nature: An Oration delivered before the Society of the Adelphi Waterville College. Maine, August 11, 1841

Is there any clear way of distinguishing organic pattern from mechanical and linear pattern, between nature and artifact, growing and making? Obviously, no animal or plant is made in the same way that a table is made of wood. A living creature is not an assemblage of parts, nailed, screwed, or glued together. Its members and organs are not assembled from distant sources and gathered to a center. A tree is not made of wood; it is wood. A mountain is not made of rock; it is rock. The seed grows into the plant by an expression from within, and its parts or distinguishable organs develop simultaneously as it expands.


61 Sullivan, Kindergarten Chats p.49.
62 op cit.
63 In Mumford, Roots p.360.
64 In Mumford. Roots p.363.
65 Rykwert, p.18.
Unfortunately, Rykwert seems to throw up his hands, indicating that "(t)here is, therefore, no identifiable organic theory of architecture...that can be usefully summarized..." though he admits the "...notion of the organism, particularly as it relates to the body image in architecture, seems to be an important recurring theme in speculation about building." It may be that Rykwert sees the Organic/Mechanical as an either/or proposition, for many of the current practitioners of organic design, it is a proposition of "and." Buildings need not be seen as merely static structures, nor merely expressions of life forces, nor merely resultants of their unique situations, but rather, in being all of those and more, buildings may be made and experienced as living things in their own right. However, our understanding of this may evolve, the path we must follow, for our purposes, begins in France.

The Roots of Modern Design in America

Modern design in the United States is generally accepted to have begun in the mid-1800s as the first Americans graduated from the French schools of architecture. It is important to note that architecture had not yet been professionalized and that the Ecole des Beaux-Arts was the only such facility in the world. There is a long history of French influence in American architecture as described by Noftsinger; he also relates an historical preference for French architecture among Americans, as "(t)here had been two wars with Great Britain and powerful men like Jefferson and Franklin were always more in sympathy with the Gallic tradition of cultural excellence." However, Pevsner places responsibility for the temporary stoppage of historicism at the hands of Britons Morris, Webb, and Shaw, as well as the Americans of the period—Charles McKim, William LeBaron Jenney, and H. H. Richardson—the three of whom had trained in France. While this essay is not intended to delve into the history and techniques of the Ecole, there may have been particular attributes of the training regimen that may have been conducive to the formulation of a design process that relied on intuition and deep understanding of the building problem.

As shown above, the Transcendentalists, with their Romantic philosophical contemporaries, had paved the way for the seeking of artistic routes for the expression of the connection between the Individual, Nature, and the Cosmic. This deep interconnection is fundamentally Romantic (and eastern) in its outlook—the relationship between the three is highly interactive; therefore, one's surroundings and environment directly influence behavior and outlook. Early American expressions of these ideas may be found in the paintings of the Hudson River School (fig. 1), in which the static repose and realistic modeling of the Neoclassical (fig. 2) is replaced by an almost surreal composite of images typically studied in the field and painted in the studio. Saturated color, implied motion, imperfect forms of rotting trees and craggy stone outcroppings are all selected and composed to make apparent the active and motive forces of life in nature. Similar techniques would be used by the Ecole-trained Americans and their successors in the search for an American architecture.

Richard Morris Hunt was, in 1835, the first United States citizen to graduate

66 op cit.
68 Noftsinger, p.6.
from the Ecole des Beaux-Arts, and by 1857 had established an informal school of architecture in New York, which he directed in an atelier manner. Noffinger lists his more famous students—George Browne Post, William Robert Ware, Frank Furness, and Henry Van Brunt. The presence of Hunt's studio in New York and his activities did much to professionalize architecture in the United States and also inspired others to apply for admission to the Ecole. Henry Hobson Richardson (fig. 3) entered the French school on his second attempt in 1860 and left without graduating, working in several ateliers in France before returning to the States, where his efforts would displace the Greek Revival for twenty years, only to be bested by his former employee Charles McKim. Richardson's work featured Roman arches, polychromatic rockface masonry, and balanced but asymmetrical massings; the rhythmic qualities and sometimes exaggerated linearity of his fenestration patterns were an indication of what was to come later (fig. 4).

The active, colorful design of Richardson and Furness is indicative of the rebellion that had swept through the Ecole shortly before Hunt's attendance. Along with the rise of Romanticism came archeological studies in the 1820s that suggested the great temples of antiquity, long the prototypes for all Ecole design, were not stone left in its natural state, but brightly painted and possibly stuccoed. Kruft documents the evolution of this debate as it affected the Ecole, leading to the apostasy of Henri Lebrouste, whose 1828-29 watercolors of hypothetical reconstructions of the structures at Paestum began a feud between he and the Ecole directors and won him a place as somewhat a romantic hero. More importantly, his studies led him to develop the theory that these structures were not an early universal architecture, but were actually "...regional responses to the presence of local building materials and to the effects of given functional, historical and cultural conditions."

Lebrouste came to see architecture as capable of responding to relationships inherent in the program, rather than as order imposed from without. This is quite in keeping with the position of the Romantics of the period, who in their alignment with the Transcendentalists, found possible a more synchronous existence with nature. The great English gentleman architect and historian James Fergusson, in the second edition of his classic standard history of 1865-74 argues the case further in strictly western terms by classifying all arts into three categories: the Phonetie, the Technic, and the Aesthetic. "(Painting and Sculpture) rank among what are called the Phonetie Arts. Their business is to express by color or form ideas that could be—generally have been—expressed by words. Technic arts...(are) all those which minister to the primary wants of mankind...food, clothing, and shelter....Aesthetic arts...(represent) a flux between the Technic and Phonetie." Fergusson goes on to identify the application of ornament as the distinguishing characteristic of architecture as opposed to mere shelter, and then observes that "...two wholly different systems of architecture have been followed at different periods in the world's history."

In the first period the art of architecture consisted in designing a building so as to be most suitable and convenient for the purposes required, in arranging the parts so as to produce the

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70 Noffinger, pp.12-13. Noffinger's study is quite valuable for the establishment of the context for the training of the Americans.

71 Noffinger, p.13, relates that Hunt once sued a client for non-payment, thereby raising the perceived status of architecture. It might have been the first of very few times that an architect sued and won!


73 Kruft, p.279.


75 Fergusson, p.4.

76 Fergusson, p.11.
most stately and ornamental effect consistent with its uses, and in applying to it such ornament as should express and harmonize with the construction, and be appropriate to the purposes of the building. 77

Under such a system, Fergusson insists, "...it is almost impossible to indicate one single building in any part of the world... which was not thought beautiful, not alone by those who erected it, but which does not remain a permanent object of admiration and of study even for strangers in all future ages." 78 He takes the position that in the other system, "...introduced with the revival of classic literature...," 79 and in spite of the incredible increase of technical and formal knowledge, no contemporary building is found to be completely adequate. "(T)hey soon become antiquated and out of date, and men wonder how such a style could ever have been thought beautiful..." 80 These notions of architectural appropriateness to purpose, ornamentation, and textual analogy, combined with what he learned at the Ecole, may have been very important to Louis Sullivan in the formulation of his theories of organic architecture. A partial inventory of his belongings as listed in the catalog of a 1909 auction show that Sullivan owned a copy of Fergusson's history. 81 This and other possible literary inspirations will be discussed below.

Fergusson merely suggested that a building's beauty might arise from its appropriateness to purpose, but firmly insists that ornamentation differentiates the practical building from the higher architecture. The link between a creation's functional aspects, external manifestation, and the resulting beauty was passionately argued by Horatio Greenough in his "Form and Function." 82

Observe a ship at sea! Mark the majestic form of her hull as she rushes through the water, observe the graceful bend of her body, the gentle transition from round to flat, the grasp of her keel, the leap of her bows, the symmetry and rich tracery of her spars and rigging, and those grand wind muscles, her sails. Behold an organization second only to that of an animal, obedient as the horse, swift as the stag, and bearing the burden of a thousand camels from pole to pole! What academy of design, what research of connoisseurship, what imitation of the Greeks produced this marvel of construction? Here is the result of the study of man upon the great deep, where Nature spake the laws of building, not in the feather and the flower, but in winds and waves, and he bent all his mind to hear and to obey.

Greenough describes a process of design based on an enlightened idea of function that goes beyond the merely utilitarian; in fact, it goes beyond what he himself wrote only a paragraph before, suggesting there are two faces of the function coin: "Instead of forcing the functions of every sort of building into one general form, adopting an outward shape for the sake of the eye or of association, without reference to the inner distribution, let us begin from the heart as the nucleus, and work outward... The connection and order of parts... cannot fail to speak of their relation and uses." 83 He was speaking to the Neoclassicists of the time, but he could

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77 Fergusson, p.11.
78 Fergusson, p.12.
79 Fergusson, p.11.
80 Fergusson, p.12.
81 "Catalogue At Auction At Our Salesrooms" Williams, Barker and Severn Company, Chicago. Burnham-Ryerson Libraries, Art Institute of Chicago. Stack 724.81 595W. Lot number 106, lists five volumes of Fergusson, including "Architecture in All Countries...."
83 Mumford, Roots p.37.
well have been lecturing a Deconstructionist. Greenough goes on to summarize his principle of intention and purpose, stating "...in art, as in nature, the purpose of a work will never fail to be proclaimed in that work in proportion to the subordination of the parts to the whole, of the whole to the function." Here, Greenough is making the circular connection essential to the creation of a unique building culture; function is synonymous to purpose and thereby soul. All creation driven by unique sets of conditions, rather than the imposition of some outside standard, will be a proper and particular expression of those conditions. Greenough also expresses a theme Gerald Stanley Lee would later expound upon in the *Voice of the Machines*, technology, even then, was becoming an inseparable part of modern life, and the pure expression of function in machinery serve itself an art form. He goes so far as to suggest that the art of machinery serve as a spiritual model for architecture.85

The new sense of social awareness was borne of the strife caused by the Industrial Revolution; Greenough would recognize the importance of the social aspect of art, yet Mumford suggests it was William Morris and his followers who would articulate the attendant responsibilities of such a social art as architecture: "that the individual building must be related to its site, to its landscape, to the neighborhood and city of which it is part."86 It becomes increasingly clear that there was, at the time of Sullivan’s formative years, a movement away from the dictates of strictly European culture as represented in the Neoclassical, and toward a more suitable regional response. He would eventually meld these themes into a new way of thinking of architecture.

*Sullivan: The Spirit of the Transcendentalists*

Louis Sullivan entered, in October of 1872, the then four-year-old architecture program at the Massachusetts Institute of Technology, which was headed by William Robert Ware (who had studied under Hunt) and Eugene Letang, who had recently graduated from the Ecole.87 After a year of study, during which Sullivan could relate little of value beyond drawing and library study, he left M.I.T. for Philadelphia and the office of Frank Furness (fig.5). Laid off there, he journeyed to Chicago and worked for William LeBaron Jenney before leaving the States for Paris and the Ecole. Twombly’s documentary of Sullivan’s Ecole experiences indicate he performed well, though it is apparently not known what Sullivan’s major atelier project entailed. Twombly’s description of the esquisse practice88 is indicative of the rigor required—the initial sketch solution, made in one brief period, guided the entire design process that might entail several months of increasingly detailed study. The sketch was referred to throughout by the studio critic during the project, and then pinned up with the final juried presentation. Success was determined on how well the final solution followed the conceptual idea laid down in the sketch. To quickly and concisely arrive at a solution to a design problem using only one’s innate understanding of the situation is fundamental to organic architecture; the solution is purely a process of creation and intuition, rather than one of applying an outside standard. For Richardson, Furness and Sullivan, the method resulted in truly unique architecture and ornament befitting their place and time in America; for others it resulted in merely a more facile Neoclassicism.

84 Mumford, *Roots* p.53.
85 Mumford, *Roots* p.56.
88 Twombly, p.67.
Sullivan owned copies of James Fergusson's standard histories, the introduction of which speaks so well of earlier, more indigenous architectures that were deemed to be beautiful and timeless due to their appropriateness. This theme is rampant in any source to which Sullivan is connected, and in Kindergarten Chats, it is used to explain how duplication of the architecture of other times and cultures is a denial of its true nature and purpose, "the need and power to build," which is expressed in response to the ever-changing human condition, as well as those of technology, climate, etc. In the Autobiography of an Idea, Sullivan writes of reading a building of Frank Furness' as he might a person's character through physiognomy, finding "...something fresh and fair to him, a human note, as though someone were talking." This suggests a similarity with Fergusson's concept of a "phonetic" phase of architecture, discussed above, where an art form expresses ideas that might also be expressed textually. The written word was vitally important to Sullivan; many would say more so than his architectural design, which, apart from the applied ornament, would not stand on its own as the voice of his philosophy. That distinction would be reserved for his successors of the Prairie School. Be that as it may, Sullivan seemed to understand that his contribution to architectural theory proper, and the American culture, was the most important of his work.

Sherman Paul places Sullivan within the intellectual tradition of Emerson, John Dewey, William James and Thorstein Veblen, the primary link, however, is seen by Paul to be to Walt Whitman, to whom Sullivan wrote in 1887 in appreciation of the ideas bound within Whitman's verse. Narciso Menocal's analysis credits Whitman for providing the bulk of the raw material from which Sullivan would glean his philosophy: "Leaves of Grass had reinforced his belief in the romantic truism that an artist is a creature of instinct rather than reason." This concept is the core belief of organic architecture to this day—design is an act of creation, and as we are natural beings, our creations are acts of nature differing only in kind from those of other living beings. Once again, Menocal beautifully summarizes:

His architectural style was a reflection of what he considered to be his intuition of nature's processes of creation. He thought of a pattern of stylized stars on a simple cubic tomb as an organic emblem, like blossoms on a branch. Vertical elements on his skyscraper facades were to evoke tall trees growing in a forest, as well as represent architecturally an anthropomorphic rhythm of muscular movement. The browns, golds, and greens of his banks were to serve as reminders of an autumnal landscape. Such symbolism would not only make buildings a counterpart of nature but would also evoke in man the sense of his own dignity as a work of nature.

Fascinated with biology in general and botany more particularly as an expression of natural power, he owned and referred to Asa Gray's School and Field Book of Botany. George Elmslie recalled, in a letter to William Purcell, that Sullivan apparently memorized Beecher Wilson's Cell in Development and Inheritance, and was able to 'make drawings from memory, marvelously, of the various stages of the cell's evolution...'

89 Sullivan, in Mumford, Roots op cit., p.79.


92 The letter is cited in Paul, pp.1-3.


94 Menocal, p.3.

95 A copy of this book, with others on horticulture and gardening, as well as general subjects, remained at his Ocean Springs, Mississippi winter home after he sold it in 1910. The books are listed in a 1955 letter from the then owner of the property (W G. Nichols) to the Burnham Library in the Art Institute of Chicago.

William Jordy equates Sullivan’s “function” with energy or intent, and the concept of “suppressed functions,” in plants expressed in their anatomy and growth, is seen as pervasive in Sullivan’s universe.

Sullivan was also influenced by the writings of Hippolyte Taine and Herbert Spencer. Taine’s questions of art and national culture would have been important to the young Sullivan studying at the Ecole98, and Spencer’s work on the rhythms of nature (fig. 6) would evolve into Sullivan’s “Growth and Decay” as the “law that would allow no exception”—what does not grow, must decay. A truly living art must be one that grows, evolves and die if need be. Menocal shows evidence that Sullivan’s German Transcendentalist influences must have been acquired through his Chicago friend and Lotos Club fellow John Edelmann, as Sullivan apparently knew no German, and English translations of Fichte, Schiller or Schelling, from whom Menocal shows Sullivan to have borrowed, were not readily available at that time.

David Andrew99 attempts to discredit Sullivan’s philosophy by pointing out the numerous contradictions between his writings and his buildings, in particular Sullivan’s curiously apolitical sense of democracy and his apparent inability to reconcile the forces of commerce and nature. What Andrew unfortunately missed was the simple notion every American transcendentalist felt was clear enough to not need explanation; that is, the American experience is fundamentally dualistic and in tension. As shown below, this dualism lay behind and informed much of what Sullivan was attempting to accomplish in both ink and terra cotta.

The metaphysical force behind Sullivan’s work was at least somewhat that of Emmanuel Swedenborg, a European mystic whose teachings were generally highly regarded among Progressives, including, as Menocal shows, Sullivan’s mother, and Sullivan’s architect-friends John Root and Daniel Burnham.100 Of course, Sullivan was also a disciple of Emerson, and it would be reasonable to assume he would have read Emerson’s Representative Men: Seven Lectures, in which Swedenborg was honored. In this, there are several passages that read as though from Sullivan’s own pen, especially with the analogy of plant life:

...nature iterates her means perpetually on successive planes. In the old aphorism, nature is always self-similar. In the plant, the eye or germinative point opens to a leaf, then to another leaf, with a power of transforming the leaf into radicle, stamen, pistil, petal, bract, sepal or seed. The whole art of the plant is still to repeat leaf on leaf without end, the more or less of heat, light, moisture, and food, determining the form it shall assume.101

In Swedenborg can be found the dualistic principles Sullivan would draw upon: the universe is dependent on the actions of two sets of forces, the male-rational, and female-emotional. These concepts are similar to the dictates of Taoism and other Asian traditions, though these sources are not mentioned by Sullivan. He obviously was sympathetic with Swedenborg’s teachings, however, as he referred to them explicitly in at least one speech; furthermore, this dualistic theme is the primary concept

Fig. 6. "Lotuses as symbols of unfolding energies," Madhu Khanna, Yantra: The Cosmic Symbol of Unity (London: Thames and Hudson, 1979). p.32

97 Menocal, pp.11-12.
98 See Menocal pp.73-82 for a discussion of Sullivan’s nationalism, which was informed by Taine and Whitman’s call for a uniquely American culture unbound from its European past.
100 Menocal, pp.24-5.
behind his *A System of Architectural Ornament*, in which geometric constructions are given definite attributes. Lauren Weingarden’s analysis of Sullivan’s process as developed in *A System* clearly shows that Sullivan was investigating the infinite possibilities inherent in three-dimensional representation of the non-Euclidean (four-dimensional) geometries being studied at the time (fig. 7). Weingarden concludes that “this process again demonstrates how Sullivan’s artistic method corresponds with nature’s process of infinite regeneration.”

Claude Bragdon wrote extensively on four-dimensional space and the importance of geometry as being symbolic of the universal order in his many works on architectural ornament, attaching historic and mystical meanings to various arrangements, and following Swedenborg in the assignment of sexual qualities to physical form.

The gender-specific nature of the attributes of Sullivan’s architecture was no accident—there has been much speculation about the sexual nature of Sullivan’s design, as well as Sullivan’s sexual orientation, and how it might have informed his esthetic. Additionally, Sullivan’s poetic mentor Walt Whitman’s verse was often deeply sensual and rather specifically sexual—the similarity between his *Autobiography* passages describing male forms and Whitman’s “Children of Adam” is striking. There can be no question as to the ornament itself, however, especially seen in contrast to the structures to which it was applied, with Swedenborg’s male-rational aspect being the building expressed “in the nude” of column and lintel (with the column dominating and providing the male vertical thrust), and the ornament the female-emotional. Seeing Sullivan’s buildings in this light is quite appropriate for their time; anthropomorphism was the expression of the idea that humans are very much a part of the greater universe, and not necessarily dominant, but very much with an active role in its creation. Leopold Eidlitz, and later Sullivan, wrote much about art’s ability to express human values through the work’s human-ness. Sullivan writes in *Kindergarten Chats*:

> The architecture we seek shall be as a man active, alert, supple, strong, sane. A generative man. A man having five senses all awake; eyes that fully see, ears that are attuned to every sound; a man living in his present, knowing and feeling the vibrancy of that ever-moving moment, with heart to draw it in and mind to put it out: that incessant, that portentous birth, that fertile moment which we call Today!

Here we see the summary of Sullivan’s *modus*: “a generative man,” continually in the act of creation; “a man living in his present...the ever-moving moment,” where the past and future have no meaning of their own except as an extension of the now; “with heart to draw it in and mind to put it out,” once again the duality of the Cosmos; “that fertile moment which we call Today!” as the Universe is re-created at every moment. It is clear here that Sullivan is not speaking of architecture as the building, *but as the act of its creation*. This is a vitally important distinction that separates organic design from all other modes. Architecture is not form or theory or even building—it is the capturing, the “taking-in,” and re-expression, “putting out,” of life itself.

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103 Claude Bragdon was Sullivan’s staunchest supporter after George Elmslie. This author has not seen evidence of Bragdon and Sullivan having met extensively, other than when Bragdon once spoke at the Art Institute of Chicago, with Sullivan in attendance. Bragdon was an architect and mystic who wrote extensively on the spiritual aspects of design, focusing on number-patterns and sacred geometry. See his *Four Dimensional Vistas* (New York: Knopf, 1923), and *A Primer of Higher Space: The Fourth Dimension* (Tucson: Omen, 1972).


105 Twombly, pp. 399-402. Twombly examines the question of Sullivan’s sexuality in relation to his design work in significant depth, going so far as to equate Sullivan’s fall from popularity, in part, with his increasingly florid design sensibility, using the Guaranty and Gage buildings as primary evidence.

Wright: Evolution

For better or worse, no architect has received more attention, scholarly or otherwise, than Frank Lloyd Wright (fig. 8). The sheer volume of published work, and its highly variable quality and orientation, make firm conclusions about Wright's design and philosophy nearly impossible to deduce. However, the distinctions between Wright and his mentor are illustrative of the changes taking place in modern architecture at the turn of the century.

Wright worked under Sullivan for seven years before his dismissal in 1893; during this period, Wright studied (and executed in his master's mode) Sullivan's ornament for various commissions. Wright recalled at some length in his Autobiography that he and Sullivan spent many hours after work discussing philosophy, which it must be assumed Sullivan predominated, and Wright, having absorbed it, made his own. Though he was capable of duplicating Sullivan's freehand drawing style and ornament (fig. 9), Wright later turned to using drafting instruments in the creation of his art glass windows and sawn wood panels. Wright claimed to merely prefer it, but there may have been underlying justifications. The most obvious might be that Wright merely sought to distinguish himself, but this is illogical in light of the great efforts Wright made to emulate Sullivan; he copied his dense (even by Victorian standards) writing style, and assumed his demeanor to the point of recklessly fabricating certain facts. It is more likely that Wright, having worked at Sullivan's side for seven years, came to understand the limitations of Sullivan's methodology of juxtaposing ornament upon the structure. Thomas Beeby traces the evolution of ornament theory from Owen Jones' The Grammar of Ornament (where ornament is seen as something beyond historic styles) to the application of Jones' principles as an organizational regime in Modern architecture. In grouping Sullivan with the Art Nouveau, Beeby sets the stage for Wright to make the evolutionary move away from applied ornamentation (fig. 10). Wright, having also studied Jones, was well aware of the organizational methods that lay at the heart of Sullivan's work, and sensed the possibilities inherent in the application of the same principles at the scale of the entire building. This lead Wright to correct Greenough's and Sullivan's dictum from 'form follows function' to 'form and function are one.'

This new way of organizing building elements, informed by Jones and supposedly by the Froebel gifts, and the unacknowledged synthesis of every possible source, would result in new relationships of structure, form, space, and environment. The argument for Wright's adoption of a systematic approach to design is convincingly made by Paul Laseau and James Tice, who group Wright's work typologically, revealing the consistency of organization between externally different buildings that allowed Wright to develop a wide variety of expression. At first, it may be suggested that Wright might have merely been copying from one commission to the next, but the system reveals Wright's design as the result of the application of his architectural principles as a process. Laseau and Tice identify the themes behind the process as "type, order, space, and experience." These themes respond to Wright's philosophical tenets: Type (shown as hearth, atrium and tower) allowed Wright to
“embody the idea of dwelling, community, and place;” Order leads to the inextricable link among all the building elements across all scales; Space, more specifically the idea of space that “flows” through the structure rather than is enclosed by it, is closely related to Experience. Articulation of circulation is essentially experiential; the twisting paths and partial screening of view and vista, as well as the compression/release event have significant psychological impact. Unfortunately, Laseau and Tice tend to discount the highly spiritual nature of this process, as though they might be considered separately. As noted above, the heart of organic design is the idea that generates it, not the form itself. Sullivan’s “function” is the creative impulse, the “form” merely its externalization. As Mark Hammons wrote: “Nothing organic to be found in (typological studies)...the form is the last possible indicator of what has created the building, only a shadow...the informing idea has been conceived before the shape, and the shape is a secondary effect, not a cause.” Much more than Sullivan, whose ornament may be seen as projective of higher levels of dimensionality (as his buildings, with the exception of the later banks, were wholly structure-based), Wright realized his new organizational methods would allow him to deal with space directly as a higher order of experience. As shown above, Wright’s palette of arrangements—the spiral, concealment, compression and release—represent a new conception of architecture as being motion-based: the user is influenced by movement through the building space. Interestingly enough, it appears that Wright did not consciously approach the idea of architectural space until the 1920s; Joseph Siry indicates that Wright first wrote of the subject in a 1925 essay for Wendigen. Wright was keenly aware of the European movements, and there is much to suggest he was strongly influenced, not only by the oft-cited Lao-Tse, but more so by similar Dutch theories. The major difference, according to Siry, lies in the nature of Dutch. De Stijl saw space as dynamic and associated with movement, which is similar to Wright’s notion of the “outdoors coming in.” In contrast, Lao-Tse “wrote of space as a still or static volume, as would be found in the empty vessel of a water pitcher.” Neil Levine suggests this particular idea of space as a more enclosed static entity, in a vessel-form, was explored by Wright throughout his career in various commissions and projects. Levine proposes that underlying all his work was Wright’s desire for an architecture that would be an imitation of nature, and that, after the mid 1920s, Wright saw the earthen vessel as a “natural” architecture. Throughout his seventy-year career, Wright’s philosophies were altered only somewhat by the introductions and popularity of various theoretical positions. To his death, he saw his mission as continuing what Louis Sullivan had started: The creation of an American architecture that stood clearly apart from its European ancestry. In doing so, Wright could never acknowledge his wide range of influence as having any significant effect on his work; in fact, he would expend much energy in denying such influences, preserving his deference only for former masters long dead. He remained fundamentally an Emersonian romantic long after what that meant was no longer part of the popular culture, i.e., to be connected to nature was to be in touch with the highest power.

Fig. 10. Frank Lloyd Wright, Fallingwater, Bull Run, PA (1936). Tieback to hillside serves as trellis over drive.

112 ibid.
113 It is important to clarify here a personal bias of the author regarding the concept of space. He sees architectural space as merely a convenience used within the profession to describe enclosures that cannot qualify as rooms. It is conceived to think of space as something that can be “created,” as architects tend to use the term. Space exists apart from, yet part of, every other part of the universe. When seen in this light, space becomes a much more powerful tool for the shaping of experience.
114 Personal e-mail, September 9, 1994.
116 op cit., p.236.
118 op cit., p.21.
Wright was the *de facto* founder and leader of what came to be known as the Prairie School. Though he denied the existence of such a school, he was quick to claim himself as the leader of the movement, and equally quick to denounce his former compatriots when they began to achieve a level of independent success. There can be no doubt as to his influence upon the other practitioners, especially in their early careers. Walter Burley Griffin and Marion Mahony Griffin (fig. 11), William Drummond, and Barry Berne went far in establishing themselves independently as designers of an organic architecture and are slowly coming to be recognized for their efforts. However, the greatest contribution to the development of the theory of organic architecture, apart from Wright, was made by two former Oak Park collaborators, one of whom also studied, much longer than had Wright, at the side of Louis Sullivan.

**Purcell and Elmslie: An Overtly Spiritual Architecture**

There could not have been two men more dissimilar than George Grant Elmslie (fig. 12) and Frank Lloyd Wright. Whereas Wright was brash, arrogant and aristocratic, Elmslie was reserved, modest, and considerate. A client compared them: "...Many of Wright's houses and buildings I liked. Some I continue to dislike. His highly demanding ego and studied gaucherie were in absolute contrast to the modesty and artistic skill of Elmslie (in my estimation)." Larry Millet describes Elmslie as a, "shy, self-effacing man given to terrible bouts of melancholy," and "an impractical dreamer who often seemed to be overwhelmed by life." Both men worked for J.L. Silsbee and Adler and Sullivan. Wright absorbed what he could from Sullivan and left (most likely forcibly after executing several commissions outside the Adler and Sullivan office) after seven years; Elmslie assumed Wright's role as chief draftsman and remained long after, for a total of twenty years, during which he experienced the decline of Sullivan's faculties and practice. Elmslie continued to work, out of love and respect, toward the furthering of their cause though his master could be abusive and inconsiderate. Millet and Mark Hammons have shown Elmslie to be responsible for almost all of the actual design work of the National Farmer's Bank of Owatonna, Minnesota, and Joseph Siry provides evidence that Elmslie designed all the ornament for the Schlesinger and Mayer store in Chicago, though Sullivan never acknowledged Elmslie's contribution at a time when Sullivan was increasingly incapacitated by alcoholism.

Elmslie only now is beginning to receive the credit he is due for his contributions, and it is proposed here that it is he and William Gray Purcell, and not Frank Lloyd Wright, who should be seen as the proper inheritors of Sullivan's legacy.

William Gray Purcell opened his office in 1907 with friend George Feick, Jr. (1880-1947) in Minneapolis and practiced together until 1909, when George Grant Elmslie, having left Sullivan for economic reasons, joined the firm. Feick left the firm in 1912, and the firm continued operations in a variety of formats until its closing in 1921. The two partners worked separately until their deaths in 1965 and 1952 respectively.

Mark Hammons has published the only comprehensive study to date of the work of the firm of Purcell and Elmslie; he takes the position that the

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121 It would be normal that Elmslie, as subordinate, do the actual drafting of the construction drawings; however, Sullivan and Elmslie's ornament, while similar in effect, was substantially unique. Sullivan's ornament strongly revealed its geometric foundations, while Elmslie tended to suppress it. Compare photos in Millet, pp. 79 and 84. Sullivan's unwillingness to credit Elmslie's abilities long remained a source of bitterness for Elmslie, who would bring it up in his letters to friends. See Millet, pp. 56-60.


123 There is evidence to indicate Sullivan had intended to grant the office to Elmslie, but Elmslie's poor financial state, caused by Sullivan's inability to pay him adequately, ruled out his waiting.
fundamental and defining difference between their work and that of Wright was in its orientation. Wright’s innovations were primarily structural and formal in nature as experimentation in a new expression of artistic values. Purcell and Elmslie, on the other hand, were seeking architecture as an expression of deeply moral, practical values in individuals. For Purcell and Elmslie, the idea of democracy in architecture was not the abstract ideal as approached by Sullivan and Wright. The notion of communitas was carried into every aspect of their practice, as the client and site served as the beginning point for each design and every designer and drafter in the office (known collectively as the Team) was expected to contribute to the project solution. Harold Bradley (fig. 13) summed up the openness of the relationship, writing, "... (Elmslie) was highly perceptive, and would come back later with what we thought were ideal solutions and arrangements. Also our general philosophy of a home for rearing quite a sizable family had become well established, and he seemed to agree and approve and proceeded to fit the shell to the family life inside, in a sensitive and imaginative way. We became three friends in the process—something we obviously could not achieve with Sullivan, though we greatly admired his genius of the past."  

David Gebhard was an early Purcell and Elmslie scholar and friend of William Purcell. In 1953, his introduction to reprints of The Western Architect, in which Purcell and Elmslie’s work had been covered extensively for several years, grouped them, in very general terms, with the Secessionists battling the revival styles of the time. 126 The January, 1913 issue of The Western Architect features an overview of their work, and opens with the article “The Statics and Dynamics of Architecture,” which picks up the Swedenborgian/Taoist model of a dualistic universe and renders it in architectural terms (fig. 14). The Static is, “all pervasive, is universal, is eternal, and does not change,” while the Dynamic, though also universal and eternal, is, “cojoined with creative spirit, it changes with every process of nature.” They operate together, inseparable, to form the totality of life itself. For the most part, the article is a restatement of Sullivan’s romantic transcendentalist philosophy; however, Purcell and Elmslie have refined the argument, taking great pains to explain the universal nature of the Static and Dynamic forces across time and culture and location:  

Amongst our human kind we shall consider that the mind is the common denominator of us all; and that the will, the soul, the heart, is the common differentiator of us all which develops the personality of races, nations, tribes, communities, through every conceivable variety of circumstance and environment, into our Chinese, our Hindoo (sic), our Hottentot, our Red man, our Malay, our White man with his burden.” 128  

Many references are made to antiquity and events in history, and specific architectural examples are mentioned—the Doge’s Palace, Stonehenge, the classical orders—by way of showing the operation of the Static and Dynamic forces. A building element, such as a column or a dome, has universal characteristics that are unique to itself; this is the Static phase that makes a column operate as a column regardless of time or location. The Dynamic forces that complete the expression are highly specific to

125 Bradley, op cit.  
126 David Gebhard, The Work of Purcell and Elmslie, Architects, Reissue of January 1913, January 1915, and July 1915 issues of The Western Architect (Park Forest: Prairie School, 1965.), p.1. Gebhard shows that Elmslie wrote “The Statics and Dynamics of Architecture,” which Purcell revised for publication. Purcell founded his firm with George Feick, Jr. in 1908, and Elmslie joined them in 1909 after being laid off by Sullivan. Feick left the firm in 1913, and his contribution to the development of the firm’s philosophy was probably minimal.  
128 ibid.
the time and place; the evolution of the orders from Doric to Corinthian span the growth of Greece, and the differences between Hindu and Roman domes across place. Also, they explicitly tie Sullivan’s broader meaning of “function” to the idea of relationships and complementaries, something Sullivan struggled with in most of his building designs. Purcell and Elmslie write, “...the Doric column, in itself, is not vital, any more than a telegraph pole is vital. Strung with wire, the telegraph pole is an organic part of Life, and, therefore, complete. In the same way the Doric column is not vital until directly associated with its lintel.”

Here we can see the advances made in the statement of organic philosophy. Purcell and Elmslie write with nearly scientific precision; careful to show evidence and close the argument, they avoid the pitfalls of Sullivan’s emotionalism and western bias, not to mention his writing style. This apparently was not adequate to spare them some criticism, as the two architects felt compelled to answer for their decisions made in the designing of the Merchant’s Bank of Winona, Minnesota. Long after the dissolution of the firm, Purcell began recording an ex post facto journal of its activities, which he called “Parabiographies.” In the document covering 1912, written in 1951, Purcell recounts the written exchange of 1938-45 between he and Elmslie regarding the treatment of materials, specifically the terra cotta encapsulation of the connection between the main front girder and its brick piers, relative to their placement and utilitarian function. This exchange is notable for its depth of detail and frankness; even allowing that it was probably never intended for publication, it would have been easy to gloss over the numerous factors weighing on Elmslie’s choices and chalk it up to genius. However, Purcell and Elmslie genuinely argue the fine points, Purcell sympathetically challenging his friend’s position, pointing out possible contradictions that Elmslie answers in a way that Sullivan or Wright never could.

This interest in the science permeated the work of the firm throughout its existence. It found expression through their optimism in technology and its ability to “improve the human condition.” Much as did Wright, Purcell and Elmslie embraced machine processes in the production of their designs, inspired, as noted above, by Gerald Stanley Lee’s The Voice of the Machines, in which the poetry of technology is seen as part of the poetry of life. The pure sciences were not ignored either, and Purcell and Elmslie came to see Sullivan’s interest in non-Euclidean, four-dimensional geometries in the new light of the work of Einstein and Minkowski (fig. 15). Time as a dimension related to the other three, more familiar physical dimensions, was the object of much theorizing and speculation around the turn of the century; however, the idea is an ancient part of the eastern world view, in which time, space and consciousness are inseparable. As Sullivan, Purcell and Elmslie saw the act of creation as an act of consciousness, the essential cosmic unity is expressed in design.

Purcell, having worked for Sullivan for only a short period, struggled to integrate organic principles into his design. Hammons recounts the difficulty he had in developing the design for his own house, which eventually led to the consultation with and eventual hiring of his friend Elmslie. As the workload increased, they hired associates resulting in the creation of “The Team.” In this novel mode of practice, there was no

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Fig. 15. Claude Bragdon’s four-dimensional projection (t) and George Elmslie’s ornament. From Bragdon, Architecture and Democracy, p.14.

129 Purcell and Elmslie, p.9.
hierarchy of position, and individual effort was recognized in the final product. This soon extended to include the numerous artisans and contractors with whom Purcell and Elmslie would collaborate through the years. These included Kristian Schneider, a sculptor and modeler with whom Elmslie had created the ornament for a number of Sullivan’s buildings, and George Niedecken, a cabinetmaker who produced custom furnishings for Elmslie and Wright.\textsuperscript{132}

Where most of Wright’s clients were well-to-do industrialists, those of Purcell and Elmslie tended to be middle managers or professionals, with the exception of the wealthy Crane family and Carl Bennett, the banker who had commissioned Sullivan and Elmslie for the Owatonna bank. The humanity of the Purcell and Elmslie working method becomes more clear when their sensitivity and desire for expression comes into conflict with their client’s budget: Hammond relates an instance when such a project was shelved; Purcell admitted the imperfect nature of humans and discounted the "paper project that could not have any reality in that world which the client had to face...It deserved not to be built."\textsuperscript{133}

The largest part of the commissions completed by Purcell and Elmslie were for residences, followed by eleven banks of varying sizes. The Merchant’s Bank of Winona, Minnesota is considered their finest bank and by Hammons to be the equivalent of Sullivan’s and Elmslie’s earlier Farmer’s National Bank. Their largest commission by far was the Woodbury County Courthouse in Sioux City, Iowa (1916), for which Elmslie served as design architect under a local associate (fig. 16).\textsuperscript{134} In this building, Elmslie was allowed free rein to fully exercise his organic sensibility, and the structure exists as a singular statement of American democracy.

Sadly, the object lesson of Sullivan’s decline could not save the partnership of Purcell and Elmslie. Devastated by the loss of his wife Bonnie in 1912 after a failed elective surgery, Elmslie slowly drowned in grief, and experienced difficulty pursuing and executing work for the firm. He elected to remain in Chicago while Purcell attempted to manage the Minneapolis office. As the men were dependent on each other for design input and project management, the long distance arrangement became unwieldy and unproductive. With the general decline in commissions for all of the Prairie School architects, Purcell and Elmslie were especially impacted. The firm was disbanded, “and by 1920, (Elmslie) found himself in a situation very similar to Sullivan’s. He was alone, in Chicago, with little work and less money, facing a dismal future.”\textsuperscript{135}

\textit{The Legacy of the Prairie School}

H. Allen Brooks argues that the Prairie School, as a style, had begun to fall out of favor by the beginning of World War One.\textsuperscript{136} Based upon the writings of the various Prairie School architects at that time, much of the reason seemed due not to the design itself, but to a significant change in the nature of the architect/client relationship: the “woman of the house” was now an \textit{active participant in the process!} It is important to note here that female participation in household management (beyond the actual operation of the household itself), especially where money was involved, was practically unheard of in the preceding period. However, the women’s

The coupled opposites which we call light and darkness, good and evil, fortune and failure, growth and decay, sound and silence, harmony and discord, love and indifference, hope and disappointment, life and death, law and chaos, and their quick engendered brood pass in crowded procession through the deepening twilight of our inclination.

\textit{from Louis Sullivan, "Essay on Inspiration," 1886.}

\textbf{Fig. 16. Purcell and Elmslie, Woodbury County Courthouse, Sioux City, IA (1916)}

132 Hammons, “Purcell and Elmslie,” p. 236.
133 Quoted in Hammons, “Purcell and Elmslie,” p. 251.
134 William Steele had worked for Sullivan and was familiar with Elmslie’s work. Receiving the commission for the courthouse on the merit of his more conservative design, Steele engaged Elmslie for the redesign.
135 Millet, p. 134.
movement was making ever greater strides leading approaching suffrage in 1920. Brooks relates the popular culture that also played a large role in the changing taste as large numbers of homemaking magazines, mostly published in the east, where Colonial and English Cottage styles prevailed, were commonly found in households throughout the nation. By this time, Gustav Stickley's *Craftsman* magazine (to which Louis Sullivan, George Elmslie and William Purcell had contributed at one time or another) and furniture works, at one time the epitome of sophistication, had already passed their prime and were suffering a fate similar to that of the architects at the hands of New York fashion. 137

Brooks also argues that a reason for the Prairie School's rise—and downfall—was due to its formal relation to historic styles. 138 The forms were easily understood and assimilated within the broader building culture, thus making them amenable to a neighbor-conscious yet individualistic clientele. There may be some merit to this, as these formal relationships are deduced easily enough, and it is accepted that many of the Prairie School, and Wright in particular, often drew on historic prototypes for formal inspiration. Of course, this is a highly complex architecture, and to break it into its components is to deprive it of the life that is in it; as Brooks does with his analysis, so did many later Prairie School clients: the designs were sometimes diluted by changes requested by the clients, typically for cost reasons. Brooks suggests this may have been due to the clients' inability to understand the spatial concepts of organic design and their intricate relationship with the exterior. This may be selling the problem short. The individual designs of the Prairie School were never intended to represent a universal style appropriate to all comers; only someone who shared the ideas inherent in organic architecture—the ideal of an individual expression of an American life—would feel comfortable in such powerful environments. The typical client of Wright through 1915 was self-made, at least upper-middle class, and independent of bearing; in short, Emerson's rugged individual. The clients of Purcell and Elmslie's residential commissions, on the other hand, represented a wider range of occupations and status, and their houses smaller and more modest, though no less unique and appropriate.

The numerous interactions of time, fashion and career moves combined to effectively bring the Prairie School, as an entity, to an end. 139 However, its various practitioners carried on for many years; they and their work evolved as they investigated new outlets for their creative energies: Purcell and Elmslie commercial and civic buildings, the Griffins urban planning and design, Byrne churches. Wright continued to focus on residences, (with the Imperial Hotel woven in from 1916-22) but as such commissions became relatively sparse during the 1920s, and stung by the backhanded praise of Philip Johnson and Henry Russell-Hitchcock, he elected to take on the International Style and began to create his myth through the writing of his autobiography.

It was always important to Wright to have his thoughts, and name, out in front of the public; much like his mentor Sullivan, Wright published numerous articles and delivered many speeches in both professional and popular venues. Fortunately, one such publication—a 1908 copy of Architectural Record, most likely—landed in the young hands of a 15

137 Barry Sanders, *A Complex Fate: Gustav Stickley and the Craftsman Movement* (New York: Wiley, 1996). Stickley, much like his contemporary Elbert Hubbard of the Roycrofters and Larkin Soap concerns, was first and foremost a ceaseless self-promoter. His Craftsman philosophy, an adoption of the English Arts and Crafts, is suggested to have been sincere early on, but grew corrupted by Stickley's need for importance and wealth.

138 Brooks, p.342. He suggests in a parenthetical that plan and ornament were the true distinguishing factors of the Prairie School.

139 Brooks sets the time as being somewhere between 1914 and 1916.
year-old Tulsa apprentice.\textsuperscript{140}

Bruce Goff (fig. 17) represents the next phase of organic architecture; he aligned himself strongly with Wright, and seems to have considered the work of the other Prairie School designers to be derivative of Wright's.\textsuperscript{141} However he viewed himself in the continuum, Goff's major contribution to architecture is freedom. Clear of direct lineage to Wright and Sullivan and out from under their more stringent politico-transcendentalist leanings, Goff was able to synthesize the most universal of the organic principles with the knowledge of the world architectural scene. Goff might have sensed the contradiction in Sullivan's philosophy; in a 1953 lecture to the University of Oklahoma School of Architecture, he noted:

Sullivan once said he was looking for a principle so broad as to admit of no exceptions. That is what you want, too. I think that the principle was right under his nose, and that there is no principle. There will always be exceptions and there should be exceptions. You can make rules and regulations and formulas and establish laws, and all of this, and still when it comes right down to it, it is a matter of judgment, isn't it, of balance, of deciding what is equitable in relation to something else?...You have to try to be sure no matter how much of that goes on that your basic principle is honest and that you are striving for truth and in the long run that you will have more truth than dishonesty.

I believe, though, that in spite of geographical boundaries and time boundaries and all that, that we do have basic ideas of what is honest as a principle...But I don't think we can define it so exactly that we could say that it's a principle that admits of no exception.\textsuperscript{142}

Goff here exhibits a certain pragmatism towards architectural solutions, suggesting that the overarching idea behind a building must take precedence over some preconceived standard of performance. His reference to geographical boundaries is telling; where Sullivan cast his philosophy in strict western terms (as shown above, most of the 19th century philosophies, while strongly influenced by emerging eastern traditions, seldom stated so explicitly), Goff went beyond Wright's obvious reverence for Japan and China. He was fascinated with the cultures of the south Pacific and especially Bali.

While he shared Wright's affinity for Japanese art, Goff was also enamored of the European scene, and especially the work of Gustav Klimt and Aubrey Beardsley. His early work may easily be classified as being in line with the Werkbund and Vienna Secession. However, he will always be known for his incredible love of music and the integration of musical ideas into architecture; Philip Welch relates Goff's incredible collection of the world's music and his habit of playing it throughout the architecture department facilities at the University of Oklahoma in Norman.\textsuperscript{140} He took Goethe's notion of architecture as frozen music literally; early in his career, he designed music compositions for player piano by hand-cutting the paper rolls.\textsuperscript{144} Goff found more success in the highly experiential nature


\textsuperscript{141} Philip B. Welch, ed. \textit{Goff on Goff: Conversations and Lectures} (Norman, U. Oklahoma, 1996), passim. George Elmslie is the only other Prairie School architect mentioned by name in this collection. Goff lauds Elmslie's capabilities, but suggests that he is merely following in Wright's shadow, going so far as to type him in the plural: he is one of many "Elmslies" with few original ideas of his own.

\textsuperscript{142} Welch, pp. 142-44.

\textsuperscript{143} Welch, pp.13-14.
of his later designs.

Musical composition is presented and perceived within a framework of
time, and every presentation can be unique dependent upon a variety of
factors. Non-organic architecture is typically time-independent; that is,
each user's experience is relatively static and predictable. Wright
experimented with experience in architecture, especially the circuitous
path and compression/release event, though they always occurred within
a rigid geometric framework. Goff, on the other hand, relied upon
arrangements of building elements, not always directed by any geometric
ordering system but by their effect on experience.

James DeLong's exhaustive study of Goff traces his ever-growing and
ever-changing influences from his Wrightian roots. Goff's work may be
seen as being informed by the Vienna Secession and Amsterdam School
through the 1930's and the International Style until his return from military
service. A series of professional and personal difficulties led him to
establish an independent practice in Chicago. After the completion of a
small number of residences adversely affected by post-war material
shortages, he moved to the west where a significant change in Goff's
personal expression occurred. The interiors of his buildings, while having
highly expressive ornament and finishes, were typically arranged in a
straightforward manner with linear or rectilinear room arrangements.
DeLong notes Goff's interest, around 1945, in Surrealist painting;
combined with his knowledge of Wright's Guggenheim proposals, Dali's
sweeping vistas may have been a powerful model for his work to follow.\footnote{DeLong, p. 82.}
Goff's floor plans became amorphous, and the visual sense of flowing
through space became literal, according to DeLong:

\quote{...direct congruence between exterior shape and interior rooms,
or room-like elements, is less obvious, for complex enclosures,
generally of indeterminate shape, contain partially hidden elements of
different geometric form. These elements often serve functions analogous to rooms, and their location within the
generalized enclosure is not always determined by predictable reference to that volume’s form.}  

This renders Goff's architecture in a fundamentally eastern light; based
in experience, it no longer responds to reductive analysis. In fact, any
such analysis diminishes, rather than enhances, understanding. DeLong's
description of the Bavinger house attempts to deal with the nature of the
house's interior, but falls short due to the limits of language. Goff's
description, quoted by DeLong, takes a more experiential approach and
comes closer:

The entire interior is a continuous flow of space wherein neither
walls nor floor and ceiling are parallel. Here, more completely
than in any other house of this time, is an architectural
expression of the way of life of the client, a sense of living in
space three-dimensionally with furniture integral as parts of
the house itself, and close integration with nature indoors and
out.\footnote{DeLong, p. 98.}

Here we see Wright's standard themes of total integration restated, down

Number is the tone to which all things move, and as it
were make music; it is in the pulses of the blood no less
than in the starred curtain of the sky. It is a necessary
concomitant alike of the sharp bargain, the chemical
experiment, and the fine frenzy of the poet. Music is
number made audible; architecture is number made
visible; nature geometrizes not alone in her crystals,
but in her most intricate arabesques.

\cite{Bragdon}

\footnote{Pauline Saliga and Mary Woolever, eds. \textit{The
Architecture of Bruce Goff, 1904-1982: Design for
the Continuous Present} (Munich: Prestel, 1995),
pp. 35, 36. Based on the photos of the rolls, it
appears Goff designed them much as graphic works,
possibly assuming the patterns in the holes would
translate aurally. Tonality and harmony would not
necessarily have been desired, as the late 1920s and
1930s saw much work being done in experimental
music, the free-form qualities of which related to
new compositional strategies in all media of the
period. Goff quotes Gertrude Stein as a major
influence and adopted her notion of the
"continuous present."}

\footnote{DeLong, p. 82. DeLong also notes the ties to
another Catalan artist, Gaudi'.}

\footnote{DeLong, p. 109.}
to the expression of the outdoors coming in. However, Goff’s use of the spiral in three dimensions has the effect of making the building much more of a catalyst than Wright’s rectilinear mediation between the user and the exterior environment. This attribute of Goff’s designs varies in proportion to the irregularity and porosity of the building envelope—his Bruce Price studio, for instance, has relatively little by way of eye-level fenestration; consequently, the building turns inward and is highly private.

Goff was also an early recycler of building and found materials. Certain of Goff’s commissions of the post-war years utilized Quonset hut framing and Plexiglas bubbles; smaller items, such as glass ashtrays or war-surplus rope, were often incorporated. Far from being an environmentalist, his buildings were probably no better nor no less energy efficient than their contemporaries, though they did often utilize natural ventilation and radiant floor heating, by nature somewhat more efficient for space conditioning than other common systems. For Goff expression and experience were the overriding themes of architecture, “a continuous performance and only a part of a continuous performance of larger dimensions,” thereby reinforcing the other side of environmentalism—the experiential quality of the live-in environment. The next generation of organic architects would eventually bring the two to unity.

For all his inventiveness and human concern, Bruce Goff seems to have had difficulty executing his commissions. DeLong indicates only one third of all his projects were built, and most of those required several iterations to get client approval. This failure to execute was typically attributed by Goff to external problems—material shortages, bank shyness and building codes, but there can be no denying the incredibly assertive nature of Goff’s designs. These designs required an equally assertive spirit on the part of the owners which may or may not have existed.

Through his career, Bruce Goff relied on a number of students and assistants in the development of his work. Two of these assistants, Arthur Dyson and Bart Prince, would go on to continue the tradition of organic architecture into the next decades.

Arthur Dyson has the distinction of being the only architect to have worked with all three of the twentieth century’s masters of organic architecture: Frank Lloyd Wright (1958-59), Bruce Goff (1959-60) and William Gray Purcell (1960-1969). This unique chain of experience, where Dyson assimilated Wright’s formal language, Goff’s innovative approach toward materials, and Purcell’s insight into the expression of human relationships in architecture, is summed up best in Dyson’s concept of “architecture as a verb.”

The most important part of Dyson’s working process occurs, fittingly enough, with the client. Using numerous interviews typically leading to the development of a close personal relationship, Dyson comes to understand their lifestyles. More so, however, their feelings, motivations, and desires become part and parcel of the architectural program, that when combined with the practical requirements of site, budget and environmental concerns, form a highly personal expression of the client, as interpreted by the architect (fig. 18). This extroverted statement has a

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148 Welch, p.33.
150 From a lecture given at Ball State University, Muncie, Indiana, April, 1996.
151 Dyson is also trained as an environmental psychologist.
price, as "(t)he ongoing conflict between uniformity and individualism erupts into plain sight, as does the difference between what is supposed to be and what is actually happening." This echoes the nature of all organic architecture: the mirror is building-sized, and is two-way, at that. Not everyone can face such a mirror easily.

Dyson may be among the oldest of the current generation of organic architects to look to environmental considerations in architectural design. Materials are often chosen for their low-impact qualities and affordability, and can include the occasional toilet tank float as ornament. Overhangs and glazing allow adequate and comfortable daylighting while limiting solar gain or permitting passive heating. Orientation takes advantage of prevailing winds for ventilation. What is notable is that these strategies do not dictate the design concept as they do in many "green" designs. They are made to work within the overall scheme in an integrated manner to support the lives within as they protect those without.

Bart Prince was already being noticed as an undergraduate at Arizona State University in the late 1960s—he was the recipient of numerous prizes and was allowed to complete the five year design studio sequence there a year early. He was persuaded by Bruce Goff during a speaking engagement, beginning a professional relationship that would last over a decade and end with Prince completing Goff's final project.151

In addition to inheriting the final phase of his practice, Prince also inherited Goff’s sensibility. Where Dyson’s work sometimes reveals Goff’s detailing and Wright’s organizational schemes, Prince draws almost purely on Goff’s much freer expressions. Mead analyzes his manipulations:

Each design begins with the ordering geometry of the circle, square, or triangle. Because, however, that geometry is conceived three-dimensionally, in symbiosis with its space, the circle, square and triangle are forms that grow by spatial rotations, interpenetrations, and extensions.154

Mead goes on to show how this practice of manipulation has developed in Prince’s work over time, reflecting his growing confidence (fig. 19). These repeated rotations and interlockings have the effect of de-materializing the geometric elements themselves, leaving only the experience of the thus-informed space. However, this analysis makes no mention of the true beginning of Prince’s designs,

the IDEA which is something that grows from an organized thought process (the word organic is contained in the word organized). I begin each project in exactly the same way, find out all I can about the client, site, climate, program, etc., etc. (all the things that can have some affect on the building) and then begin to synthesize it all in my mind as an idea begins to develop. Again, always thinking about the scheme from the INSIDE-OUT.155

Designing from the "inside-out" is the typical method for organic architects; however, this is not only meant in the sense that the interior is thought of first. The expression, which Goff and others had used, indicates

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154 Mead, p. 28.
the orientation of the design process: the design is driven by the project's requirements rather than the imposed external influence of theory. Such a process cannot help but result in unique building solutions.

The contemporaries of Dyson and Prince can be more or less thought of as belonging to two inspirational camps; some are more closely aligned to Wright, while others feel a stronger affinity for Goff. The differences, however, may be more a matter of formal language and temperament than of philosophy, as there seems to be a degree of commonality of thought and exchange among them.

This author has had the pleasure of corresponding with a number of architects who work under the organic banner, most of whom have come to his acquaintance through the Friends of Kebyar, a very loose organization of designers and enthusiasts who are aligned with the work and philosophies of Bruce Goff, primarily, and to a lesser extent, Wright. Friends of Kebyar bills itself as "an international network of people interested in original and innovative architecture, especially organic architecture that is not 'mainstream'—architecture that defies the tyranny of imported styles."156 A perusal of the Friends of Kebyar Directory finds such names as Arthur Dyson, E. Fay Jones, Bart Prince, and Herb Greene, but there are others who are better known in the sustainable and design/build fields as well: James Hubble, Steve Badanes, John Connell, and David Sellers.

The Friends of Kebyar publications are written by members and therefore act much as a professional journal might—a means of sharing information among colleagues. But far beyond preaching to the choir, Kebyar associates seem to be truly interested in taking on the daunting task of nurturing the next generations of organic architects. At the time of this writing, there are only two schools of architecture in the United States aligned with organic design—the Frank Lloyd Wright School of Architecture at Taliesin West, and the San Francisco Institute of Architecture. Taliesin West now operates far differently than it did at the hands of the Wrights; seeking accreditation for its Master of Architecture program, it is a professional school, though it does attempt to instill the master's values. The San Francisco Institute of Architecture, like the Wright School, offers a Master of Architecture degree and is pursuing accreditation. Both schools have open enrollment policies. SFIA stresses the exploration it allows its students, "without academic barriers or the distraction of capricious judgments of others."157 This echoes what Bruce Goff supposedly once said when asked how his students were able to make their highly creative solutions: "I give them the problem, then leave them alone!"158

This is only the merest indicator of the nature of organic design. Highly intuitive and personal, the making of an organic building "would encompass all systems, materials, and construction of the building, the lives and sensitivity of the users of the building, and the surroundings of the building..."159 This concept of organic architecture as a process, rather than a style, is critical to its understanding. Many organic architects will profess to their adherence to this concept of integration; what is most interesting is that those who have shared these thoughts with me have used very different ways of describing it, suggesting it is not done

156 From Friends of Kebyar membership application.
dogmatically but as an outgrowth of their personal assimilation of the process. James Schildroth (fig. 20) writes:

The creation of organic architecture is the coming together of three major players: the Client, the Site and the Architect...the resulting creation springs from the interrelationship of all three...The Site is much more than just topography or climate. To design truly organic architecture the site must be experienced by the architect and as many times as necessary until the conception is in mind...All the senses come into play including the sixth.  

Interestingly enough, DeLong indicates Bruce Goff often designed his houses with no knowledge of the actual site, and adjusted his concept to the site conditions once known. However, many of his commissions also required significant reworking before receiving client approval, so the extent of the adjustments are difficult to determine. Though Goff insisted on spending a good deal of time with the clients, he seemed to ignore the interaction between the two and the eventual structure. It is apparent that subsequent organic designers have learned from Goff's experiences. For Wright, the relationship between a building and the natural environment was primarily a metaphorical connection—his innovations were mostly structural and formal in nature. The current generations of organic architects are only now discovering that the connections can and should be literal; energy conservation and innovative use of natural systems for space conditioning and waste management are reinforcing the already strong spiritual element in organic architecture. Natural ventilation and passive solar heating put users in touch with weather and seasonal changes, which in turn can reconnect them to the natural rhythms and cycles which all nature shares. Composting toilets and bio-aquatic wastewater systems provide fertilizer and the beauty of a wetland while eliminating the need for large, expensive and polluting sewage treatment facilities. Howard Alan calls for "a new present day architectural vocabulary," Eric Corey Freed (fig. 21) feels "the environment should not be of equal importance to expressive considerations" they should be one and the same. Paul Downton of Australia has expanded into organic and ecological city planning that emphasizes community participation.

Another defining characteristic of organic architects, thinking of design as a process, subscribe to a working method that Frank Lloyd Wright referred to as "thought-building." Not relying on the architects' typical tools of study sketches and models, an organic architect will develop a deep understanding of the client, site, program and context and then allow the design to develop from within. One recalls the oft-told story of the creation of Fallingwater: Wright developed the plans, sections and elevations of the house on Bear Run as the client made his way to Taliesin from Milwaukee, three hours away. The Taliesin apprentices on hand at that time recall never seeing Wright work on the project at any time since his last site visit nine months before. While many attribute this ability to the power of genius, almost any creative person (and every person has creative power) has this ability to understand a problem and intuitively arrive at its solution in a creative manner. Here yet again, the ties to

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161 Howard Alan, personal correspondance, February 5, 1997.

162 Eric Corey Freed, personal e-mail, March 3, 1997.
eastern philosophies and traditions are clear. It may be the Oriental nature of organic process that makes it so difficult to be understood by those who are not sympathetic—it does not fit well into a Western scientific-rational tradition that places so much emphasis on the externalization of process.

A concept among younger organic architects that seems to be somewhat unique from the Wright/Goff generation is the creation of an architecture as a living thing—the acknowledgment that the product is the trace of the act of its creation, and that creation and change are never-ending processes. As a family uses and grows within a house, its needs change, its makeup changes. The site changes, the neighborhood changes, and the house itself changes. The architect should at least be aware of the potential for this change and attempt to accommodate them in the design. Howard Alan writes that “(w)ith responsive people using the building...a kind of mellowing occurs, giving that ‘living state’ a particular definition.”163 Once again, a concept that was once applied only metaphorically is now being consistently realized for its implications in reality. For Sullivan and Wright, it was enough to surround the user with symbols of the symbiotic relationship between humans and nature. Purcell and Elmslie were the first to feel and investigate the psychological effects of design, and now, designers are now able to take full advantage of the science and technology that takes this relationship beyond metaphor, beyond psychology, and into the physical and metaphysical realm.

Our spiritual existence cannot be separated from the other aspects of our beings. Architecture throughout history has always attempted to express spiritual values, with the possible exception of designs based upon existentialist philosophies. Organic architecture has been no different; as shown above, it has always been closely aligned, either directly or indirectly, with eastern traditions and western liberal religions (Fig. 22). Most of the designers with whom this author has corresponded claim no membership in an organized religion, but instead have a deep faith in “Humankind and Faith in Myself...”164 or “the Nature of Life.”165

163 Howard Alan, op.cit.
164 Eric Corey Freed, personal e-mail, March 3, 1997.
165 James Schildroth, op. cit.
A Personal Quest...

What we think, make and do is a trace of the energy we put into—and comes out of—consciousness, much like a particle path in a cloud chamber. As consciousness is both everything and nothing, everywhere and everywhen, design cannot be reductive but must be both inductive and deductive.

We are natural forces, differing only in perceived outward manifestation, identical to trees or birds or streams or storms, yet even our outward expression—what we call our bodies—is inseparably tied to our inner Selves. In a like manner, we are forever tied to the other sentient beings of the Universe; indeed, we are One with them. Accordingly, our relations to those other beings should be conducted with compassion and love, as their health dictates ours.

While we are of the same Consciousness, there is an aspect of each that is unique—our individual self that consists of our ego and its attendant attributes including free will and pride. The ego is the warp to the consciousness’ weft, all integral to the fabric of our being. The ego is problematic if allowed to become dominant, as often happens in highly individualistic cultures. Ego dominance leads to feelings of personal superiority, intolerance, stridency and lack of compassion. It is difficult to control the ego when one matures and lives in a culture where the individual is valued over all, but it is vital when acting for others. The tools by which we suppress our egos are Altruism, Humility and Compassion, to be applied to all relationships with all beings.

The quality of our relationships with other beings is proportional to the extent by which we suppress our egotistic tendencies. This is why Louis Sullivan and Frank Lloyd Wright had such difficulty with personal affairs, and George Elmslie and William Purcell did not—Sullivan and Wright felt destined to play the role of epiphanized zealot, and Purcell and Elmslie the missionaries, no less devout, yet content to work quietly in service with the flock. In a like manner, the quality of a building, or any other effort, is a direct expression of the quality of what went into its making.

Therefore, design—of a building, a tool, or a love affair, is best realized when based on emotion and experience rather than theory. The theoretical basis of design usually leaves little human content, as all aspects of the building act are subjugated to the support of the theoretical position. Relationships, and therefore buildings as expressions of those relationships, develop from realities rather than theories, those realities possibly being essentially opposite:

- Male to Female
- Rational to Irrational
- Material to Immaterial
- Geometric to Fluorescent
- Logical to Intuitive
- Birth to Death
- Growth to Decay
The parts relate to the whole as the whole relates to the parts; no part may be considered individually without the understanding of the whole. This applies to all relationships that exist, both within a context of building and a context of human interaction, for in all reality, they are the same.

This has broad implications for the design process itself. An architecture of relationships can only be designed from those relationships, which should serve as the benchmark of performance. It must also be realized that the designer is involved in the same relationship and becomes a stakeholder in the process. The designer’s stake is his or her creative nature, which, combined with the knowledge of technology and history, give expression to the idea inherent in the particular situation. There is no place for abstract theory in an architecture of relationships; such influences are external to the situation, and when used as design criteria, tend to detract from the human quality of building.

Advances in building technology and science, as well as in the sciences of the environment, now allow us to design structures that need not operate only as metaphors for the interrelatedness of humans and non-human realms. Buildings may now be interactive membranes operating at two levels allowing us to not only feel and experience the passage of time and season, but feel and experience the flow of consciousness that pervades life and flows through space itself. This same interaction can result in buildings that use less energy and less materials, while keeping us healthy and at the same time reinforcing the connections to the outside world. Where science and technology were once applied to conquer, to express our “dominion” over the natural world, it now allows us to reconnect, to see and feel that which we have always been a part of, yet chose not to acknowledge.
Part Three
An Environmental Learning Center
Facility Program
Summary and Abstract

This Facility Program describes additions and alterations to the Juanita Hulls Environmental Learning Center located 13 miles north of Muncie, Indiana, on State Route 167 North. Work covered herein includes master planning of new and existing structures, and architectural programmatic descriptions of a new education center and appurtenant structures.

The facility is owned by Ball State University and is administered by the University’s Department of Natural Resources and Environmental Management, which desires to enhance the center’s capabilities in the interest of supporting expanded educational and research opportunities for the university and community at large.

At the time of this writing (12/96), the new main structure will enclose approximately 5,000 square feet at a projected construction cost of somewhat over $465,000.00, subject to final programming and design decisions. It is intended for the building to be highly energy efficient with minimized levels of material toxicity and general environmental impact. While typically having higher first costs, such buildings often have lower lifecycle and operating costs due to improved occupant health and material longevity. While it is not cost effective to make the facility entirely self-sufficient, it may be possible to incorporate self-sufficiency features as demonstrations or to reduce dependency on public infrastructure. Such items currently under investigation include a solar aquatic waste treatment facility and the recommissioning of an existing small wind turbine generator.

In keeping with the theme of such a facility, new structures will incorporate as many local materials, processes, and systems as can feasibly be attained. The state of Indiana produces world-class building stone and hardwoods, as well as a growing variety of environment-friendly manmade building materials. Use of local materials and processes is highly sustainable as it reduces energy of transport and supports local economies through labor and taxes.

The general approach to user comfort and convenience taken here is to rely as much as possible on natural systems. Solar and wind orientation will allow daylighting and natural ventilation strategies to reduce dependency on electricity and machinery; selection of low-flow plumbing fixtures will reduce water system demands, as well as permit the design of the smallest possible waste treatment scheme. Specialized electrical and mechanical systems will be provided only as needed, i.e., in lab or computer spaces, to support specific requirements. Passive solar heating, possibly using a solar aquatic greenhouse as a heat sink, will be investigated. Mechanical space cooling is not envisioned except as required for lab or computer equipment; air motion and control of solar radiant gain will be the primary means of occupant cooling in the warmer months. It is an important design criterion to allow the users to “feel” seasonal changes in the interior environment. This has the added benefit of reducing thermal differential wear on building materials and systems.

Existing buildings at the facility include a recently renovated farmhouse; a timber-framed, wood-clad barn; and two outbuildings. These structures are currently being used by a tenant family; however, a room of the house, and some of the exterior spaces, are shared with the facility at large. A new master plan will be investigated with the intent of clarifying and optimizing these relationships.
Introduction

As the world approaches the millennium, the United States finds itself in much the same position as it was at the close of the nineteenth century: an economic and military power with few clearly defined missions in the world. Now, as then, the United States is able to look inward, both as a nation and as a body of individuals.

We have found that our house needs some fixing up.

Just a our late-Victorian predecessors grappled with the effects of industrialization, we are seeking ways to bring the various forces of our lives into better balance. Americans, currently locked in a cynical consumerism, are slowly becoming wary of their growing detachment from spirituality and the natural world; indeed, there is an indication that we are finally understanding that the two are inseparable. The early ecology movement of the 1970s spawned a heightened awareness of environmental issues among the general population. At one time peripheral, environmentalism is becoming mainstream thinking: most Americans at least recycle, a growing number practice all three "Rs" (Reduce, Reuse, Recycle), and our children study the environment in their schools.

With this increased interest in our natural world has come a wide variety of educational opportunities. Our growing understanding of the interactive nature of human and non-human systems is apparent in the changing nature of these opportunities. For many urbanites, a trip to a zoo (then emphasizing the spectacle of large, potentially dangerous, animals in cages) or a stay in a commercial campground was their closest direct experience with the non-human environment. The cages have now been replaced by naturalistic environments, and state and national parks offer a large number of programs by which users may gain a somewhat better understanding of the myriad intricate relationships at work within nature.

Schools, colleges, universities and private organizations, recognizing the demand for environmental learning opportunities, have responded by creating facilities that are able to focus on specific environmental themes. These themes are often constructed from the sites themselves: centers located in coastal zones may feature exhibits on sea life and ocean pollution, while those in the Midwest might highlight forest and wetlands. Other local issues may influence the centers' emphases; urban ecology, recycling, and alternative energy sources are typical exhibit themes.

The Juanita Hults Environmental Learning Center has a multi-dimensional mission that lists as its goals:

To encourage an understanding of ecological systems, the interrelatedness of all living things, and the role of people in maintaining and improving the quality of the environment.

To promote an understanding of the cultural development around the Hults Farm and its influence on human and natural resources.

To help people of all ages develop a concern for contemporary environmental problems such as accelerated soil erosion, destruction of wildlife habitat, and pollution of surface and groundwater.

To develop in visitors an environmental ethic that will help humankind achieve a sustainable environment (Department of Natural Resources and Environmental Management. Juanita Hults Environmental Learning Center. Brochure. Muncie: Ball State University, n.d.)

These goals may be considered within a wellness model in that they represent several facets of a single entity. No one element can be deleted without adversely affecting the overall condition. This interrelatedness is apparent throughout the facility as the landscape is being restored and the existing buildings maintained and sensitively used. Aided by the use of a democratic design process, low energy design and healthy building techniques, the design for the new facility buildings and master plan will emphasize interactions between all beings as well as the interaction of all of these with the buildings and the environment. This integration and interaction represents the core theme of organic architecture: All systems are bound together, supporting each other. The extent to which a building's users are lifted, both physically and spiritually, is determined by the extent to which these interactions are felt and beneficial.
Program Scope

This program includes a description of the spaces, systems, equipment and furnishings of a proposed new facility for the Juanita Hults Environmental Learning Center, as well as a master plan for the integration of the new facility with the existing structures on the Center’s property.

Participants

Ball State University, Muncie, Indiana
Department of Natural Resources and Environmental Management
Charles Mortenson, Ph.d., Chair
Timothy Lyon, Ph.d.
Regina Miller, Graduate Assistant, JHELC Manager

Department of Architecture
Marvin Rosenman, AIA, Chair
Uwe Koehler, Thesis Studio Critic
Patrick George, Ph.d., Thesis Critic
A. E. Palmer, Programming Advisor

Department of Urban and Regional Planning
J. Paul Mitchell, Ph.d., Chair
William W. Hill, Ph.d., Thesis Advisor

Fox Island County Park, Fort Wayne, Indiana
Jennifer Scherer, Office Manager

Hoch Associates, P.C., Architects, Planners, Interiors, Fort Wayne, Indiana
Dana Wanamaker, Project Architect

Merry Lea Environmental Learning Center, Goshen College, Wolf Lake, Indiana
Marian Miller, Field Office Manager
Design Criteria

The fact that our increased awareness of the importance of the natural environment comes at a time of growing interest in our spiritual lives is most likely no mere coincidence. Americans are growing weary of the cynical nature of politics and consumerism; the weight of wasteful prosperity grows greater as we feed our false desires at the expense of our real needs...

...Make a graven image With some features of your own...

Afraid to share a glance or a smile, let alone make Contact, we parade our bodies and lock up our souls. Greed and narcissism and vanity are fueled by petroleum and Wall Street...

...Stealing in and out back alleys Driven to another den of thieves...

The arrogance of the Old Way, reductive and mechanistic, bids us control nature yet we cannot abide her power, preferring instead cold comfort in glowing phosphor...

...Let's dance tonight To a virtual song...

It's a small world, after all, and Michael Eisner controls its voice; is it information, entertainment, or education? It all comes from the same corporate big box...

...Camera curves over caved-in cop cars...

We’re growing weary, and we seek affirmation, some small assurance we're not completely lost and alone...

...Test for echo...

We are slowly becoming aware that we need to find balance between our material, spiritual, and natural environments. We realize we are inextricably connected and interdependent, yet...

...The red tide kisses the shore.

When was the last time you saw the Milky Way? Birdwatched? Walked in the woods? Really UNDERSTOOD the differences between leaves of different species of trees? Listened to the rain splash its way through the canopy? Followed deer tracks? Ran your fingertips along the spine inside a turtle shell?

Blotches of sunlight, shaped by branch and leaf, play against the otherwise dark ground. Looking up, the same light shimmers in contrast against the canopies above. The air is cool and moist, sweet and musty, all together. It’s the smell of growth and decay in balance. Sometimes, I can feel a blast of warm air intrude from outside the edges of the wood. Walking along, there’s a certain rhythm to it: cool, warm, warm, cool, warm...all symbols, no, the results of physical forces at work, the constant push and pull of life.

While our lifestyles may not permit such close interaction with and understanding of the natural environment on a constant basis, our longing for it may be addressed to some extent through environmental education. Such notions were once on the fringe, but are now mainstream. The facets of our life: Physical, Spiritual, Emotional, and Intellectual, may be reinforced, their interactive nature revealed, through interaction with Nature.

To this end, the main features of the design of the new facility should incorporate:

Local materials applied in a manner consistent with their natural character in a tactile, non-adulterated manner—sense memory is strong.
Daylighting strategies can remind us of the passage of time and reinforce life rhythms while reducing energy requirements. Artificial lighting should be as close to the color of sunlight as is practical, and installed in such a way as to simulate daylight.

Views should be selected for their ability to reinforce the connection to the indoors. Fenestration should be applied from "floor to ceiling," the planes passing from in to out and back evoke the flow of life.

Materials and process should be selected for non-toxicity as physical health enhances mental and spiritual health, and increases productivity.
Space Requirement

Room name: Main Hall

Users: 40-50 Guests, mixed adults/children
Staff
Naturalist

Activities: Viewing of exhibits
Viewing of wildlife window
Lecture/Media presentations
Hands-on/craft activities
Possible reception activities

Time of Use: Primarily daytime hours
All seasons
Possible night activities

Design Criteria:
Objective: Open, flexible plan
Natural, native materials
Exhibits/cases at perimeter
Tack space (between windows)
Wildlife Window
Few connections to other rooms

Subjective: Reinforce interrelationship between interior/ exterior environment.
Comfort. Tactile qualities. materials.

Environmental Conditions:
Temperature: 60-80°F to follow seasons
Humidity: 40%-50% RH year-round
Light Levels/Quality: 2-50 fc ambient (dimmable)
100 fc spot
90+ CRI daylight

Sound Transmission: 35 STC nom.
43 STC at labs/offices

Equipment Required:
Furniture: Folding chairs, tables
Waste receptacles
Fixtures: Display kiosk
Exhibit cases
Tack panels
15”D x 28”H shelves @ perimeter
Art sink w/ cabinet

Appliances: Projectors, screens, video

Special Requirements:
Electrical: 120VAC, 20A circuits
Ventilation: (Check ASHRAE for volume)
Hazards: Art/craft materials
Loose critters!
Natural allergens (wood sap, etc)

Adjacencies:
Interior: Storage
Office/Lab suite (locked door)
Toilet rooms
Aquarium alcove
Entry

Exterior: Wildlife Window
Daylight

Sq. Footage/Volume: 1500 sf

[Diagram of exhibit space with dimensions and labels]
Space Requirement

Room name: Aquarium Alcove

Users: Guests, Staff, Naturalist, Fish

Activities: Viewing of Aquarium
Aquarium maintenance

Time of Use: All hours, all seasons

Design Criteria:
Objective: Dim to prevent algae build-up
Allow comfortable viewing for children
Storage of Aquarium supplies
Subjective: Reinforce human reliance on water,
aquatic life

Environmental Conditions:
Temperature: same as Main Room
Humidity: same as Main Room
Light Levels/Quality: 5-10 fc ambient all times
90 CRI
possible UV lighting?
Sound Transmission: 39 STC

Equipment Required:
Furniture: Built-in steps
Stools
Fixtures: Aquarium, 100 gal., built-in
Accessories (filter, pump, lighting)
Storage Cabinet
Sink for maintenance w/ hose bib?

Special Requirements:
Electrical: 120VAC, 20A circuits w/GFCI
Ventilation: (check ASHRAE, adequate for RH)
Plumbing: Water supply
Floor drain
Finishes: Hi-traction flooring
Water-resistant surfaces
Hazards: Slip and fall
Electric shock
Drowning? (Yikes!)

Adjacencies:
Interior: Main Room
Exterior: None

Sq. Footage/Volume: 25 sf
Space Requirement

Room name: General Storage

Users: Staff, Naturalist

Activities: Storage of tables, chairs, presentation equipment, office supplies.

Time of Use: All times, all seasons

Design Criteria:
Objective: Adequate for current and future needs
Subjective: None

Environmental Conditions:
Temperature: 50-80 F
Humidity: 40%-50% RH
Light Levels/Quality: 20 fc only when occupied
Sound Transmission: 35 STC

Equipment Required:
Furniture: None
Fixtures: Shelves
Rolling storage of tables, chairs
Appliances: None

Special Requirements:
Electrical: Lighting only
Ventilation: Minimal
Hazards: Overreach
Materials fall from shelf

Adjacencies:
Interior: Main Room
Exterior: None

Sq. Footage/Volume: 75 sf
Space Requirement

Room name: Outdoor Storage

Users: Staff, Naturalist

Activities: Storage of sampling equipment, garden tools and supplies, etc.

Time of Use: All times, all seasons

Design Criteria:
Objective: Adequate for current and future needs
Subjective: None

Environmental Conditions:
Temperature: outdoor ambient
Humidity: outdoor ambient
Light Levels/Quality: 20 fc only when occupied
Sound Transmission: 35 STC on building side

Equipment Required:
Furniture: None
Fixtures: Shelves
Hanging hooks for tools
Appliances: None

Special Requirements:
Electrical: 120VAC, 20A w/GFCI, WP box
Ventilation: Minimal
Thermal/Moisture: Room is outside thermal envelope
Hazards: Overreach
Materials fall from shelf, hooks

Adjacencies:
Interior: Office/Lab Suite, locking insulated door
Exterior: Locking insulated door to outdoors

Sq. Footage/Volume: 25 sf
Space Requirement

Room name: Lab Storage

Users: Staff, Naturalist, Researchers

Activities: Storage of lab supplies and equipment

Time of Use: All times, all seasons

Design Criteria:
Objective: Adequate for current and future needs
Subjective: None

Environmental Conditions:
Temperature: 60-80 F
Humidity: 40%-50% RH
Light Levels/Quality: 75 fc only when occupied
Sound Transmission: 35 STC

Equipment Required:
Furniture: None
Fixtures: Shelves
   Locking hazardous chemical cabinet
   Flammables cabinet
Appliances:

Special Requirements:
Electrical: 120VAC, as needed for appliances, GFCI
Ventilation: (Check ASHRAE)
Plumbing: Floor drain
Finishes: Hi-traction floor
   Water & chemical resistant surfaces
Hazards: Overreach
   Materials fall from shelf
   Chemical spill (burn, etc)
   Slip on spill

Adjacencies:
Interior: Lab (locking door)
Exterior: None

Sq. Footage/Volume: 50 sf
Space Requirement

Room name: Male Toilet Room

Users: Males

Activities: You know...

Time of Use: Hours of center, Daylight, all seasons

Design Criteria:
Objective: ADA compliant, adequate for use
Subjective: Consistant with rest of building

Environmental Conditions:
Temperature: same as Main Room
Humidity: same as Main Room
Light Levels/Quality: 20 fc / 90+ CRI
Sound Transmission: 39 STC

Equipment Required: ALL ACCESSIBLE
Furniture: None
Finishes: Hi-traction floor
Water-resistant surfaces
Toilet partition systems
Plumbing: 2x WC, 1x urinal, 2x lav, floor drain
Fixtures: 2x TP holders, mirror, soap dispenser,
waste receptacle, grab bars
Appliances: Air drier

Special Requirements:
Electrical: 120VAC, 20A w/GFCI
Ventilation: (see ASHRAE)
Hazards: slip and fall
shock

Adjacencies:
Interior: Main Room, Entry
Exterior: Daylight, Locking door to outside

Sq. Footage/Volume: 140 sf

NOTE: A portion of this function is to be placed in an outbuilding located near the parking area—2/97
Space Requirement

Room name: Female Toilet Room

Users: Females

Activities: You know...

Time of Use: Hours of center, Daylight, all seasons

Design Criteria:
Objective: ADA compliant, adequate for use
Subjective: Consistant with rest of building

Environmental Conditions:
Temperature: same as Main Room
Humidity: same as Main Room
Light Levels/Quality: 20 fc / 90+CRI
Sound Transmission: 39 STC

Equipment Required: ALL ACCESSIBLE
Furniture: None
Finishes: Hi-traction floor
Water-resistant surfaces
Toilet partition systems
Plumbing: 4x WC, 2x lav, floor drain
Fixtures: 4x TP holders, mirror, soap dispenser,
waste receptacle, grab bars, feminine
products disposal
Appliances: Air drier

Special Requirements:
Electrical: 120VAC, 20A w/GFCI
Ventilation: (see ASHRAE)
Hazards: slip and fall

shock

Adjacencies:
Interior: Main Room, Entry
Exterior: Daylight, locking door to outside

Sq. Footage/Volume: 160 sf

NOTE: A portion of this function is to be placed in an
outbuilding located near the parking area—2/97
Space Requirement

Room name: Lab

Users: Naturalist, Researchers, Staff

Activities: Measurements etc. for Soil, Water, Wetlands, Plants, Study Teaching, demonstrations

Time of Use: Mostly M-F, 8-5, maybe anytime, any season?

Design Criteria:
Objective Bright and efficient workspace...
Subjective Strong link to "subject"---outdoors---reinforces importance of work. A visual link to the Main Room expresses idea to guests.

Environmental Conditions:
Temperature 72 F w/ minimum swings
Humidity 40%-50% RH w/ minimum swings
Light Levels/Quality 75-100 fc / 90+ CRI, dimmable
Sound Transmission 43 STC

Equipment Required:
Furniture Lab stools, writing desk, storage cabinets
Fixtures Lab benches w/ elec., gas, sinks, water
Appliances Lab equipment per direction....

Special Requirements:
Electrical As required for equipment:
120VAC 30A
220VAC 30A
Ventilation DWV for corrosives
Plumbing Emer. eyewash/shower
Finishes Chemical resistant surfaces, hi-traction flooring,
Hazards Corrosives, bases, fumes, slip and fall

Adjacencies:
Interior Locking door to office
Lab storage
Exterior Visual link only to Main Room
Window to outside w/ blinds

Sq. Footage/Volume: 400 sf
Space Requirement

Room name: Office

Users: Staff, Naturalist—3 persons total?

Activities: Correspondance, phones, filing, promotion, program development, scheduling

Time of Use: Mostly daylight hours of center, all seasons

Design Criteria:
Objective Visual control of Main Room. Link to Main Room. Visual/physical access to outdoors from office. Efficient workspace.

Subjective Nurture communal attitude between all users in the office through connections to nature outdoors. Foster awareness of interactions between humans, work, and nature.

Environmental Conditions:
Temperature 70-75 F
Humidity 40%-50% RH
Light Levels/Quality 20fc ambient, 75fc task/90+ CRI
Sound Transmission 39 STC at Main Room

Equipment Required:
Furniture 3x Desk/Chairs, 3x guest chairs, filing cabinets, work table w/ 6 chairs, waste receptacles, bookshelves, bulletin board, whiteboard
Fixtures coat closet
Appliances 3x computers, copier, 4x phones, 4x task lamps

Special Requirements:
Electrical 120V, 30A circuits, UPC for computers, power conditioner?
Ventilation ASHRAE std. for offices
Hazards

Adjacencies:
Interior Main Room
Lab
General Storage
Exterior Visual/physical link (patio?)

Sq. Footage/Volume: 425 sf
Space Requirement

Room name: Barn Classroom (in east end of existing barn)

Users: Naturalist, Staff, Guests

Activities: Class sessions, demonstrations

Time of Use: Hours of center, all seasons, primarily when sudden weather change forces shelter-seeking

Design Criteria:
Objective: Provide relatively warm/dry space to continue program
Subjective: Working barn/livery stable feeling recalls barn's past use. View to outside serves as backdrop to program

Environmental Conditions:
Temperature: "Take the chill off; get dry"
Humidity: Ambient
Light Levels/Quality: 20fc/80+CRI
Sound Transmission: NA

Equipment Required:
Furniture: Bleacher seating for 40-50 guests
Fixtures: Display of tools, implements
Appliances: Wood stove
Appliances: Chalkboard, waste receptacle, fire extinguisher

Special Requirements:
Electrical: 120VAC, 20A, GFCI, WP outlet
Ventilation: Natural
Hazards: Fire

Adjacencies:
Interior: Workroom in barn (locking door)
Exterior: Hayloft
Exterior: Big Tree Trail and thicket, big view

Sq. Footage/Volume: ~450 sf
Space Relationships
Space Summary

Main Room 1,500 sf
Aquarium Alcove 25 sf
General Storage 75 sf
Outdoor Storage 25 sf
Lab Storage 50 sf
Toilet Rooms 300 sf
Lab 400 sf
Office 425 sf
Barn Classroom 450 sf
Outhouse Toilets 500 sf
**TOTAL ASSIGNABLE** 3,600 sf
Unassignable at 30% of Gross 1,543 sf
**TOTAL GROSS AREA** 5,143 sf

Estimated Costs

<table>
<thead>
<tr>
<th>Description</th>
<th>Calculation</th>
<th>Cost</th>
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<tbody>
<tr>
<td>Building Cost</td>
<td>[5,143 sf @ $80/sf]</td>
<td>$411,440</td>
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<tr>
<td>Fixed Equipment</td>
<td>[5% of building cost]</td>
<td>$20,572</td>
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<tr>
<td>Site Development</td>
<td>[10% of building cost]</td>
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<tr>
<td><strong>Total Construction Cost</strong></td>
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<td>Site Acquisition/Demolition</td>
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<tr>
<td>Movable Equipment</td>
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<tr>
<td>Professional Fees</td>
<td>[12% of construction cost]</td>
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<tr>
<td>Contingencies</td>
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<td>Administrative Costs</td>
<td>[2% of construction cost]</td>
<td>$9,463</td>
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<tr>
<td><strong>Total Project Cost</strong></td>
<td>[sum of above + construction cost]</td>
<td>$658,430</td>
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costs are based on 1996 averages and information from Hoch Associates, P.C. for a project of similar size and type.
Site Information

The Juanita Hufts Environmental Learning Center is located on State Road 167 just north of Albany, Indiana, a small rural town located approximately 13 miles northeast of Muncie. The farm was bequeathed to the university by Mrs. Juanita Hufts, who also left a small endowment to provide for the maintenance of the facility. The working portion of the land is being farmed by a tenant. A family rents the farmhouse and outbuildings and serves as general caretakers of the property.

The farm covers approximately 99 acres of gently rolling land; most of it lies east of SR167, and a small section lies west. A stream roughly bisects the western side of the property. The property features a wide variety of land forms including slopes of up to 20% as well as bottomlands. A number of soil types are also represented on the property. A constructed wetland was established on a portion of the property with the assistance of the United States Fish and Wildlife Service. A significant portion of the land is wooded, and nature trails have been established through them. Prior to being gifted to the University, several fields had been mismanaged and their topsoils badly degraded. These fields have been replanted with alfalfa which will halt erosion and fix nitrogen, hopefully allowing these fields to eventually be returned to production.

The gift included a frame house, barn, chicken coop and machine shed. The house has been renovated and is currently occupied by a family that is responsible for the upkeep and maintenance of the house and other buildings. The Natural Resources Department desires to keep the house and barn intact as an example of an historic Indiana farmstead. The condition of the chicken coop and machine shed have not yet been adequately established to ascertain their usability in an expanded education facility. One scenario currently under investigation has the farm buildings outside the facility public boundary; the house, most of the barn, and other buildings would be considered a private zone having only visual links to guests.

The rolling terrain drains well, and soils reports (to be provided at later date) indicate that much of the farm site is capable of supporting and draining a structure. Vegetation on the site is varied but is predominantly crops, alfalfa, hardwood trees, scrub, and wetland plants.

Wildlife on the site is typical for the area; there is no organized management of wildlife on the facility.
Design Process

SCHEMATIC DESIGN

The first meetings with the Professor Lyon and Ms. Miller of the Natural Resources department, over a three month period in the fall of 1996, established the programmatic requirements for the facility. Space allocations, qualitative attributes, fixtures and finishes were determined with their input, based on existing and projected needs and facilities. The site was visited several times, and a photographic survey of the site performed. Contextual attributes were noted and the caretaker family interviewed for several hours. This interview was quite significant; the father of the family, Jim Akers, is a graduate of the Natural Resources department and has done research on the property, making him highly qualified to speak of the farm’s qualities, strengths and shortcomings. Mr. Akers pointed out the best location on the farm for the proposed facility in terms of drainage and soil quality; not coincidentally, the site is also the best possible location from a functional standpoint, due to its proximity to the parking area, fencerow trees, and existing farm buildings.

During this interview, an important programming issue came to light. Mr. Akers pointed out that the classroom that had been appended to the farmhouse during its renovation was a much less than ideal solution to the problem of providing an educational space on the property. The classroom has one exterior entrance and two interior—one to the farmhouse living room, the other to the master bedroom! Mr. Akers made it clear this was not a viable solution. He recommended, instead, that this room be reverted over to the use of the caretaker family, and the classroom space moved to the bay in the east end of the barn. This space, which has a tractor sized entrance in the east wall, looks out into the stand of trees immediately east of the barn, providing a direct visual and physical link to the outdoors environment. Mr. Akers recommended furnishing this space with bleacher seating and a wood stove to serve as a backup or fallback classroom space, or as a room in which to wait out a sudden rain shower. Mr. Akers also had several suggestions for the integration of the other farm buildings into the facility, centering around the idea that they should perhaps remain within the domain of the caretaker family and not be used by visitors.

These recommendations were related to Professor Lyon and Ms. Miller, who readily agreed that the caretaker family should be reasonably assured of their privacy; it was determined that the farm buildings, with the exception of the very east end of the barn, would be set aside as a private zone with only visual access to the center visitors.

During the several visits to the site, a very strong sense of slow, relentless energy was received—the rippled terrain of the fields near the proposed building site could easily make one feel the effects of the glacier that once covered this part of the world. This sense of pushing and reaching would drive the design decisions.

In early January, 1997, the first-pass schematic design was developed over a six hour period in one night (see process figure). The first planform was a parallelogram, but after several attempts was found not to be suitable—the acute angles would not permit the easy integration of standard fixtures, and custom fixtures would not be supported by the
assumed budget for the project. Upon reevaluating the concept premise, it was determined that a more radial arrangement would meet all the project requirements, both functional and expressive. The material palette was drawn from the existing buildings; vertical wood siding and galvanized standing-seam roofing. Limestone, though not used on the farm site, was chosen for its local supply and its expressive qualities appropriate to its agricultural setting.

The first-pass design was presented to Professor Lyon and Ms. Miller shortly afterward, to their approval of the general image and arrangement. One functional relationship was discovered to be amiss: the main exhibit/program room needed to be closer to the fencerow trees to allow the formation of a landscaped wildlife garden. It was determined that this could be corrected by “mirroring” the floor plan north to south. Another point of discussion involved the number of toilets provided. The original program called for seven to eight fixtures to allow a large group of students to quickly relieve themselves before beginning their tour. This would prove to be a point of contention for some time.

There have been three rounds of revisions to the floor plan, with attendant changes to the arrangement of the entry elements, especially the large “silo” at the vertex of the main building forms. The significant changes include: The silo now becomes a dim cavelike entry that heightens the release of entering the main room; an observation deck is added to the silo roof, accessed from a spiral stair in the entry. The number of toilets in the building has been reduced to two, with the remainder being relocated to a facility near the parking area.

The intention of the design is to make the visitor feel a sense of moving forward into the landscape: in entering the brightly daylit main room from the tight, darker entry, he or she is propelled outward by the widening main room, increasing ceiling height and glazed east wall. The numerous windows on the north wall provide more daylight and views into the trees, making the connection between the exhibits inside and the environment real. To the south, borrow lights look into—and through—the lab and office, strengthening even further the interaction between the human and non-human worlds. The experience is similar for those in the office or lab; they are visually and functionally linked to the outdoors and main room simultaneously.

The exterior experience is intended to be that of an agricultural building, but one that has been reshaped by new and at first strange forces—the forces of a new environmental culture in which dominion over the earth is no longer feasible nor desirable, and in which coexisting and caring, among all creatures, are the norm.

**DESIGN DEVELOPMENT**

The basic structure of the building involves a slab on grade concrete floor with spread footings (the drainage characteristics of the soil contraindicated a crawlspace), and a pier system to receive the gravity loads from the roof beams. The roof structure is laminated or solid timber beams on 8 foot centers with insulated stress-skin panels for an integrated deck/ceiling system. Panels are available with a wide variety of facings;
cedar plywood would be a good choice for the interior. The roof structure would be left exposed and finished out in accordance with the color scheme of the building as a whole. At first, the piers were intended to be mostly ornamental coverings for a simple column, but was modified to be reinforced concrete with Indiana limestone veneer masonry on the exterior of the thermal boundary. This allowed the piers to absorb thrust from the roof structure (reducing or eliminating the need for ties) and also simplified the wall system between the piers. Originally the exterior wall system was to be a 6" stud wall serving as a thermal break for the pier. Moving the piers to the exterior of the thermal boundary now permits the wall to pass unbroken behind the piers; this makes for a simpler, higher-performance wall system and eliminates the potential for cold spots and attendant moisture problems. The wall system was revised to be the same stress skin panel as on the roofs, with vertical wood siding inside and out. The exterior siding would be mounted on 1x nailers to provide a rainscreen effect. The exterior walls would be carefully air-sealed and moisture-retarded.

The design concept calls for unadulterated materials; all finishes are therefore intended to provide protection or enhancement only. Concrete floors will be tinted with pigments and sealed with a clear sealer. Wood will receive clear sealers inside and out. Casework and work surfaces will be sealed wood; lab work surfaces will be the standard slate. Rock face stone will be laid up in a coursed manner with random projecting stones.

The cylindrical masonry elements would utilize CMU backings and Indiana limestone veneer with rigid insulation and moisture retarder to the inside and 2" air gap and rigid insulation on the exterior.

SYSTEMS OVERVIEW AND INTEGRATION

The nature of use of the facility negates the need for full space cooling. Part of the experience of the facility is the opportunity to "reconnect" with nature. This would be undone if the main visitor spaces were mechanically cooled to a constant 72 degrees. Natural ventilation and air motion will provide the bulk of the cooling effect; aided by shading and high insulation levels, the main room should be reasonably comfortable for the length of an average visit. Ventilation is provided through the opening of the operable (motorized) skylight units and sidewall windows. The relatively high ceiling should generate stack effect adequate to provide cooling air motion. This could be enhanced through the addition of vents at floor level (to take advantage of the higher pressure differential); however, this results in the trade-off of having a thermal weak point in the envelope at an adverse location. The lab and office spaces, because of their special nature as workrooms and more constant occupancy (in addition to the presence of computers and other electronics), will require some space cooling. Small through-wall direct expansion units will prove more than adequate for this use.

Heating throughout the building will be provided by a hot water radiant floor system. Heating hot water is supplied from the same high-efficiency gas water heater as provides the domestic hot water. Piping systems are available that allow this water to be shared. Combining the domestic and heating functions allows for greater operating efficiency and ease of...
maintenance by eliminating redundancy. The only special requirements of such a system are the addition of a small circulating pump; zone valves are optional and probably not needed in a building of this small size. The main advantage of a radiant floor system lies in the fact that no energy is used to heat the air volume of the building; all the heating energy is radiated into surfaces—including bodies in the space, which in turn radiate back. Heat is carried by conduction into the feet of the people in the building; the psychological effect of having warm feet allows for cooler air temperatures than might be needed in a building heated by forced air.

Sanitary sewer service is available on the site, but water must be gotten from a well. Peak water demand would be primarily for toilet flushing. Utilizing low-consumption fixtures and the outhouse addition would reduce this demand significantly. Supply water will be demineralized to reduce scaling inside the piping, fixtures, and water heater.

Daylighting plays a significant role in the proposed facility as a means of reducing electrical demands. Skylights on the north sides of the roofs provide soft, relatively constant light for the main room, office and lab. These units are also motor-operable to provide ventilation, and are available with motorized blinds to permit room darkening. Electric lighting will be specified as electronic compact fluorescent to reduce electrical demand and "noise." General illumination will be relatively dim (20fc) with much brighter spotlighting (50-75fc) on exhibits and tasks.
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a unit of Ball State University
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a unit of Ball State University
Juanita Hults Environmental Learning Center
a unit of Ball State University
Part Four

Bibliography
Endword


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Afterword

1. Tide Pools
When the ebbing tide retreats
Along the rocky shoreline
It leaves a trail of tidal pools
In a short-lived galaxy
Each microcosmic planet
A complete society

A simple kind mirror
To reflect upon our own
All the busy little creatures
Chasing out their destinies
Living in the pools
They soon forget about the sea...

Wheels within wheels in a spiral array
A pattern so grand and complex
Time after time we lose sight or the way
Our causes can’t see their effects...

2. Hyperspace
A quantum leap forward
In time and in space
The universe learned to expand

The mess and the magic
Triumphant and tragic
A mechanized world out of hand

Computerized clinic
For superior cynics
Who dance to a synthetic band

In their own image
Their world is fashioned
No wonder they don’t understand...

3. Permanent Waves
Science like nature
Must also be tamed
With a view towards its preservation
Given the same
State of Integrity
It will surely serve us well

Art as expression
Not as market campaigns
Will still capture our imaginations
Given the same
State of Integrity
It will surely help us along

The most endangered species
The honest man
Will still survive annihilation
Forming a world
State of Integrity
Sensitive, open and strong

Wave after wave will flow with the tide
And bury the world as it does
Tide after tide will flow and recede
Leaving life to go on as it was...