

# **‘Praxis of Inquiry’ in architectural design**

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## **Abstract**

The formal break in our ‘connection’ to the natural world, by virtue of the barriers we construct to enclose space and control our environment, and the constant effort to embody that connection back into the built environment while accommodating the essential needs of the inhabitant, is rationalized through the rigorous integration of art and technology in architecture. This is an ongoing dialogue of inquiry, encompassing exploration and experimentation of and between the disciplines of science –the pragmatic real of technology– and culture –the emergent real of the idea– and takes place throughout the entire process of the architectural ‘event’: inspiration, technology and process, acting on or reacting to what exists or what has come before and what it now aspires to be, as matter fuses in time and space as an ‘event’ or a ‘series of events’ of architecture. Successful design examples of sustainable technology, as a portion of the process of inquiry that is architecture, are best in those examples in which art and technology come to embody the other without detrimental affects to the surrounding eco-system and, as such, reveal a promise for new adaptations, topological modulations and emergent potentialities of progress to those who follow. Architects must address the issue of ‘sustainable architecture’ as a ‘holistic’ approach to the integration of sustainable technologies into meaningful forms. The architecture of American Frank Lloyd Wright and Canadian James W. Strutt are offered as examples of the ‘Praxis of Inquiry’.

*Keywords: sustainable, adaptability, modulation, emergence, technology, culture, design, potentialities, James W. Strutt, Frank Lloyd Wright.*

## **1 Introduction**

The theories in this paper are drawn from three primary sources. First, Snow’s ‘*The Two Cultures*’ [1], where he takes a close look at the philosophical divide between the Literary and Scientific communities. A seminal work of the 1950s



and 1960s, Snow, a scientist and author was intimately involved in both fields and brings a keen perspective on the differences between the two “cultures”. He calls upon the educational system to implement more interdisciplinary studies as the most appropriate method of encouraging the most beneficial advancements of science and the arts. He feels that the best minds of the past have been those that not only are aware of the ‘other’ culture but who have actively followed a dialectic inquiry between the two. It is in the fusion of art and science that the evolution of mankind is at its most progressive. Secondly, in Andrew Feenberg’s book, *Questioning Technology* [2] he explores similar issues relevant to this discourse from the critical theories of technology, philosophy and politics. Starting with the student revolt in Paris of May 1968, he presents this as the start of the ‘modern’ technological critique. However, rather than the educational system Feenberg foresees the ‘needs and wants of the many’ being tactically enforced on the networks of today, by the users of the ‘system’ to bring about technological and systemic transformations which, in their turn, will be modified to suit new ideals just being imagined to better our political, social cultural and environmental potential. Thirdly, in Sanford Kwinter’s *Architectures of Time* [3] he proposes that all things ‘change and arrive in time’. However, the moment we reflect on what has just come about, the ‘thing’ as opposed to the ‘event’, we abstract and spatialize time, time becomes an instrument of measurement, a point independent of ‘real’ time, from which to look at discrete instances of events from a specific perspective. ‘Real’ time is more like the duration of the event coming into being, or expressed as the process of becoming. Kwinter suggests five areas of interrogation: ‘*novelty, the object, time, movement, and event.*’ The potentiality, or emergent properties, in the existing world around us will influence what and how we design, what and how we will integrate technology, and, what and how materials will be manipulated to best realize the ‘ideal’ as a ‘novelty’.

The architectural work of American Frank Lloyd Wright and Canadian James W. Strutt are offered as examples of visionary sustainable philosophies where the environment is the primary concern in the ‘Praxis of Inquiry’ as a process of design, in the production of Architecture as an ‘event of influence in discrete space and time’.

## 2 Background

During the energy crisis of the late 1970’s, primarily due to the fear of depleting stocks of fossil fuels, there were concerted efforts to develop ‘alternative resources’. This included some moves to new, sustainable, or minimally renewable, energy sources/resources. A great deal of money was vested in passive and active solar energy research, and this research was conducted, for the most part, by the industrial bureaucracies of the engineering and scientific communities. New political alliances and ‘finds’ of traditional energy sources relieved the sense of urgency that accompanied these first technological advances, and the bulk of the advancements were never developed to the point of economic feasibility.



As the impact that we, as a collective, are having on our planet becomes clearer, the ramifications of the ‘western status quo’ is revealing itself to be unsustainable and detrimental to the whole planet. The ‘environmental movement’ of the last two decades, infiltrating the public psyche through the participation and endorsements of popular culture celebrities, has created a new interest in all things ‘sustainable’ and have caused the re-evaluation, and additional development of a great deal of the product research that had been dormant for almost twenty years. However, there still exists a resistance to the implementation of ‘alternatives’ because of the perceived negative economic benefits, unreliable performance, and the technology driven ‘packaging’ of these older, or first iteration, technologies. The lack of appeal to the masses, and the accompanying low public demand for these ‘technological marvels’ is evidence that simply addressing the issue of sustainable technologies is not enough for most consumers.

Exceptions to the above can be found in some of the work that precedes –and some that follow– these ‘waves’ of socio-political awareness, by architects who manage to incorporate technology without subjugating their conceptual ideal. Having produced a legacy of aesthetically diverse integrations of sustainable technologies and the design ‘ideal’, their works remain today as testament to a process of design that relies not only on the technical requirements of sustainability, but also to inquiry, exploration and experimentation, to modify, innovate, or design, the appropriate tools and materials to accommodate their vision. Those who follow must learn from these Architects, to address the issue of ‘sustainable architecture’ as a ‘holistic’ approach to the integration of sustainable technologies into meaningful forms, which can adapt, modulate and re-emerge, as functional and *inspiring spaces* for the inhabitants.

### 3 Nature: not always the ‘natural’ world

There is a deep-rooted connection between humankind and nature. Lifelong dwellers of the city still have a compelling connection to nature. We come to understand ‘naturally’ that there is a world much larger than us, and our own temporal projection through it. Even in the depths of the ‘concrete jungle’, nature is cultivated and/or invades at will. From the rectangles of turf nurtured on small parcels of suburban frontage, to foliage filled planters that line up as sentinels in front of urban edifices, and little shoots of green that creep up through the joints in our layered paths of concrete and asphalt, nature defiantly asserts itself in the phenomena of growth, reinforced by wind, sun and ‘weather’.

As the environment is the ‘environs and conditions’ in which we function, be it to work, play, eat, sleep, or socialize, and the human body has the same basic needs regardless to local, then the technological requirement of the internal environment is comparable whether it is an urban or rural site. Yet, even when much of the technological and operational considerations are the same, and there may be similarities in the methods of application and degree of active versus passive technology, the design is specific to the known functional requirements and conceptual vision of the ‘designer’. An isolated site where ‘nature



permeates' all around, or an urban infill site surrounded by concrete, glass, and steel, is addressed specifically in response to the local terrain (context), available material resources, and the climate. (While considered at a micro and macro scale climate is addressed locally even if 'thinking globally'.) However, in addition to the technologies employed, another common factor, is our attempt to reconnect to our surrounding environment, be it a grassy glade, a wooded slope, a suburban streetscape, or an urban view.

The formal break in our 'connection' to the 'natural world', by virtue of the barriers we construct to enclose space and control or suspend the external environment, and the constant effort to embody that connection back into the built environment –while accommodating the essential needs (both physical and spiritual) of the inhabitant– must be rationalized through the rigorous integration of art and technology.

#### 4 Inquiry and influence

The integration of art and technology takes place through an ongoing dialogue of inquiry, encompassing exploration and experimentation, of and between the disciplines of science –the pragmatic real of technology– and, culture –the emergent real of the idea. It is in this process that each comes to embody the other, and as such, reveals a promise for new adaptations, topological modulations and emergent potentialities. The existing world, built or imaginary, influences architects, be it positively or negatively, and one could argue unconsciously, consciously, or even subliminally, in their process of conceptualising a future form. That is not to say that they draw on the past or present, but on the properties of potential that have been reconciled in memory, through a process of development that evolves through consideration, acceptance and dismissal of ideas, and the impacts on the applicability, modification and/or selection of the technology (ies) used. Here technology and art are constantly modulated by intellectual inquiry. The development of the form is modulated by both tool and concept, through an ongoing dialogue, or loop of input and feedback, used simultaneously, and alternately, to resolve each given problematic. The process of design is constantly in a virtual state of flux, a state of pending emergence. Throughout the process, art and technology evolve as the 'image' of the original concept through a series of infinitesimal displacements that is this fluctuating process of emergence. It is in the lessons of, or success, partial or implied, in the existing, from which the evolution in the next iteration is propagated, and it is in the potentialities to change, improve or innovate what has come before that serves as an influence on what is to follow.

The architectural object can be a monument, a building or any combination of these up to and including a complete urban centre. Each of these iterations, as novel events evolves through a series of processes and practices of physical and metaphysical theory. It is in the process of becoming, more than in being, that time is embedded in the artifact. The architectural object is therefore a compilation of matter, concentrated, assembled, and impacted on by an ideal, other objects, technology and/or material practices –a series of quantitative



particles assembled in a qualitative process. This qualitative process results in innovation and invention on, and to, existing quantitative matter, and it is in the passage of time that the new, or novel, becomes possible. The artifact is subject to a process of variant morphogenesis, a reality of endless creative variables, which compound themselves at every successive step in the process of their coming into being. From the conceptualisation of the idea to the actual physical emergence of the object, it is qualified by discontinuities, innovation, invention, and even if minutely, the upheavals that take place in the world around them. Architecture, therefore, forms a series of discrete events that can be seen as a 'style' only when regarded with a backward glance from the future.

## 5 Adaptability modulation emergence

Frank Lloyd Wright, perhaps the most famous American Architect, wrote, over a forty-two year period, a great deal about his theories of 'organic' and 'modern' architecture in a series of articles called *In the Cause of Architecture* [4] for *Architectural Record*. He produced a phenomenal body of built work, and it is in these that he has demonstrated its most profound meanings. He wrote that combined with a thorough understanding of the environment architects must rigorously explore the possibilities of what technology can do to assist in the manifestation of their concept. Never to 'compromise' the site or their aesthetic, but to adapt, innovate or invent where necessary, to overcome technology's limitations and never become slave to the machine. Wright's organic architecture and his sensitivity to site and environment acted as an incentive for his technological exploration, experimentation, innovation and invention—especially as it applied to materials, methods and structure—and is exemplary of a synthesis of the idea and technology. His life's work demonstrates his reverence for nature, the evolution of his facility with technology and the refinement of his aesthetic style.

Canadian architect James W. Strutt is a prime example of an architect who has looked to the master architects of his time and studied what has come before to create a synthesis with, and of, his own understanding of the world around him. Drawing on the organic architecture principles of Wright, the 'systems integration' and 'weight efficiency ratios' of Buckminster Fuller, and explorations in geometries inspired by Eduardo Catalano's experiments with 'Hypars', Strutt, began a lifelong inquiry. He has judiciously extracted elements from each as he developed his own sense of what architecture should be—always attaining a sense of a holistic integration of technology and environmental sensitivity—as is indicative in his works.

Both these architects are offered as practitioners of visionary sustainable philosophies where the environment is of primary concern in the 'Praxis of Inquiry' as their process of design. Their meaningful forms are derived from memories of the past, knowledge of the present and visions of the future, all as intellectual integration of program, function, local environment and materials according to a concept: Nature as an 'Ideal' worth savouring/saving.



## 5.1 Frank Lloyd Wright

Frank Lloyd Wright, who started his career in the offices of Louis Sullivan as an apprentice, acknowledges Sullivan's influence and initial cultivation of what was to become his 'organic architecture' theory. Wright's opinions, always strongly presented, still resonate with meaning that may be even truer today than when he first wrote them. His disagreement with much of what he was seeing from the European Modernists, stemmed as much from his 'organic' philosophy as from his wish that America would grow out from under the shadow of a 'euro-centric arts influence' and start to recognize her own indigenous artistic merit, specifically the reflection of the 'individual', versus the 'universal'. His writing consistently refers to the following areas of influence and consideration in the formation of the 'architecture': the available technologies (the process, materials, tools and 'machines'); applied to the principles of organic architecture (using nature as a guide); to achieve, as closely as possible, the 'ideal' of the architect, and ultimately, the advancement of civilization.



Figure 1: Edgar J. Kaufman House, synthesis of site and organic architecture 1935 [8].

Wright's organic architecture and his sensitivity to site and environment acted as an incentive for his technological exploration, experimentation, innovation and invention especially as it applied to materials, methods and structure. His work, even today, is exemplary of a synthesis of the idea and technology. His life's work demonstrates an evolution of his growing facility with technology and the refinement of his aesthetic style. His aim was to establish a new architecture that would represent the aesthetic of the architect, the client and the surrounding environment rather than a style.

## 5.2 James W. Strutt

Through meticulous integrations and innovations of technology, and the sensitive application of materials, geometries and craft, Strutt has explored his art through the act of building. The phenomenological organic growth patterns of geometric forms and a natural empathy for site have influenced the bulk of Strutt's work.



Figure 2: Strutt House – self supporting rhombi & hyperbolic paraboloid roof 1956 [7].

His natural empathy for the environment, both interior and exterior, and to the well being of the inhabitants is articulated with a sensitivity that was, and is still today, a product of the declared requirements, and, an anticipation of the changing needs of both. Even with all the advanced technologies and materials' explorations that Strutt undertook, he never compromised the integrity of his design concept, but used his intellect and natural curiosity to mine any technology for its potential to accommodate his vision. A vast majority of the homes he designed still stand in testament to his creative genius.

*“He was constantly trying something new. There was always an exchange with Jim, a chemistry, between him and all who worked for and with him. He was a mature Architect without an ego. He had the ability to work with all involved. We always had a respect for each other, a trust...It didn't matter if it was a small house or a 10 million dollar building...there was always a back and forth...give and take...try this, or that...always looking for a new form of expression, new finishes...innovative in the application of new technology, always with good architecture and cost in mind...would always find a way to make it cost effective and work out.”*

(J Adjeleian) [5]





Figure 3: Waring House – a packing of tetrahedrons 1954 [7].

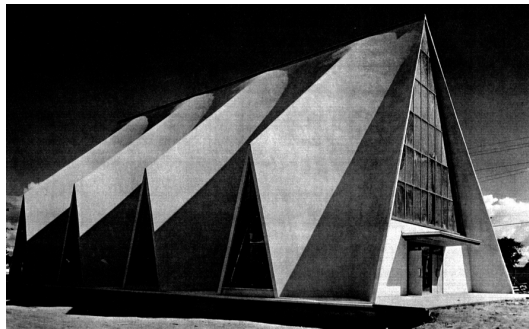


Figure 4: St Peter's Anglican - gunnite concrete hypars 1959 [7].

*“Jim approached every job with the same degree of attention and dedication to task. It was most important to him to satisfy the clients’ needs both personal and programmatic as well as doing so in the most economical and inventive fashion. He was big on structures, how forms and materials went together, traditionally, organically and geometrically.”*

(T. Griffiths)[6]

Strutt took a faculty position with the School of Architecture at Carleton University in 1971. By 1974 he was the acting Director and became the Director in 1977. While at Carleton, Strutt also developed the ‘Forms Studies’ program with Prof. Gulzar Haider. Together they authored the “Learned papers on the application of Geometry to the areas of pure research, structures and planning.”

Strutt looks back on this time as most satisfying from both a personal and professional perspective. He enjoyed the students and his enthusiasm was



inspiring to those that studied with him. His natural inquisitiveness and willingness to share his ideas and propositions were catalysts to various critical architectural explorations in the academic environment.

On his return to private practice Strutt continued to explore geometries and environmentally integrated designs. His later works expand on his weight efficiency studies of materials and use of stabilizing geometries. He has designed hurricane and earthquake resistance housing solutions developed out of the weight-efficiency studies of materials, the use of stabilizing geometries, economies of industrialized production that allows for domestic or export construction [7]. Throughout his years in practice, as well as the time spent in academia, Strutt has taught by example, and encouraged the exploration of technologies, physical or virtual, as a means to enhance the ‘ideal’ of what architecture is...and can be.

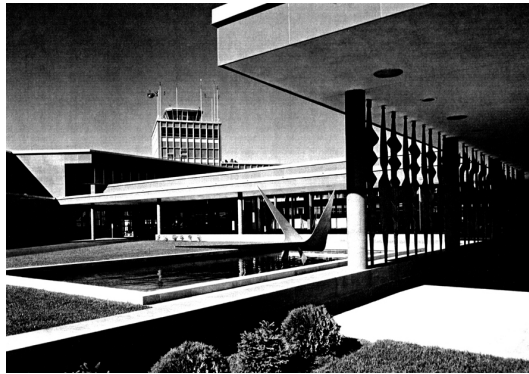


Figure 5: Uplands Air Terminal - integration of the art of Louis Archambault 1956 [7].

## 6 Conclusion

If the role of architecture is not just to shelter, but to inform, and if the concept is initiated by a ‘will’ to accommodate the needs of the users, the known program, an aesthetic desire, and the integration of progressive technologies, then all these ideals must be seamlessly incorporated. The process if successful, results in the best possible solution for the given conditions and reveals it so. From the initial concept through design, construction, habitation, upkeep, renovation, demolition and even after their demolition, Architecture, unlike a ‘building’, is never just an assemblage of materials serving a function, they affect and are effected by the world around them. They exert, and are subject to, both internal and external actions, forces, events and affects. Critical review should reveal indeterminate potentialities to formulate adaptations or modulations to improve the process of the event, whether by a progressive leap forward or by folding back into or onto



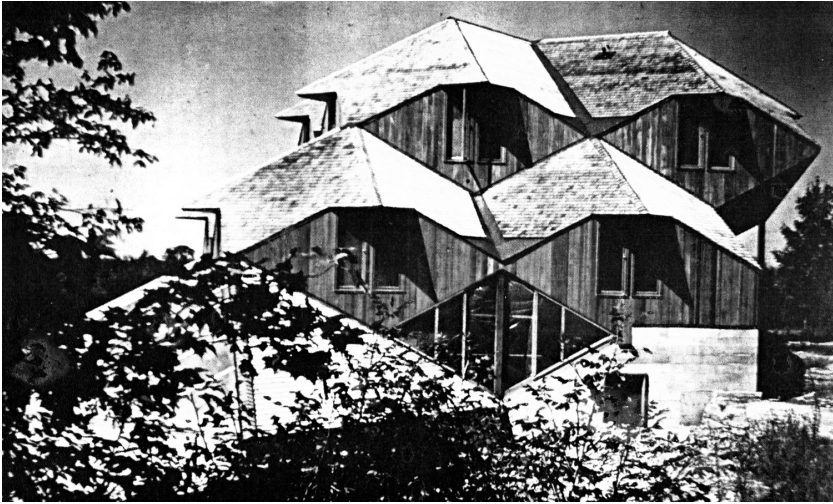


Figure 6: The Rochester House - a 12 connected network of rhombi dodecahedrons 1976 [7].



Figure 7: Canadian Nurses Association Headquarters Building 1993 [7].

itself, revealing new ways to compose (and recompose) from concept to built form, and beyond. Thought, both critical and consumer, and the technologies embodied in the design-build-and-operations processes, evolve throughout the 'life-cycle' of the built form, and affect and are affected by the users, owners, designer and the built form itself. From the moment the requirement is known until the memory of its existence ceases to be, architecture has an ongoing influence on the world we live in, 'real' or 'virtual'. Meaningful forms, those



that inform us, are derived from the integration of the program, function, local environment and materials according to a concept: Nature as an 'Ideal' worth saving.

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