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The Relevance of the Organic Tradition in Architecture in the Digital Age

Explaining the "organic disruption" of international modernism. Exemplified by Jørn Utzon's work.

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Abstract

The Digital Age introduced a new wave of sculptural, organic curved architecture – often placed as iconic landmarks in the city. These buildings represent a new kind of aesthetics in contrast to the rectangular Euclidian rationalistic architecture, which has been the hallmark of the modernist architecture since Bauhaus– but they also represent a revival of the organic sculptural architecture of the middle of the twentieth century. The paper proposes that as digital technology evolves, enabling us to increasingly emulate the forms of nature within our built environment, as we see within the parametric design, it will be ever more important to know and understand our "roots" or historical cultural background in relation to organic architecture.

In order to understand the nature of this new "digital organic" language of form, we propose a study of the short but significant "analogue organic" period of architecture after the Second World War - exemplified by the work of Charles and Ray Eames, Eero Saarinen, Finn Juhl and Jørn Utzon. Even though Utzon throughout his career was always deeply focused on the humanistic aspect of functionalism, he also was, one of the architects that remained committed to industrialization and mass production; and actually developed a prefabricated system for double curved form. The same prefab-methods used in much of recent "digital organic" architecture. This paper articulates how Utzon's major work gathers the threads from the past and actually achieves the goals at an architectural scale for a new organic form – as defined by Noyes in 1941.

This paper presents some of the factors, behind and involved in, creating his version of "new organic architecture" in the fifties – in order to make it possible to compare this with later studies of "digital organic" architecture of the twenty-first century. The relevance of returning to Mumford's criticism of the consequences of industrialization and mass production must be seen in the perspective of today's digitalization, prefabrication and mass production of nearly every aspect of the modern architecture and society. This research is hermeneutic in nature and its central arguments based on contemporary sources.

Keywords: Parametric design, Organic Design, Organic Tradition in Architecture, Alvar Aalto, Louis Mumford, Eliot Noyes, Frank Lloyd Wright, Finn Juhl, Charles Eames, Jørn Utzon.

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1. **Introduction and background**

The digital and generic development in the realm of architecture of the modern city has a parallel in the past. The period of the 1930's and 40's, when the machine age for about two decades had offered a whole new mind-set on the factory and production - and inspired a new functionalist architecture and city planning. This was a mostly a result of the ideas and concepts borrowed from Henry Ford's use of mass production and the introduction of the assembly line, changing the principles of handcrafted personalized production into anonymous mass production.

The stock market crash in 1929 created an atmosphere of uncertainty and distrust in the development of industrialisation. In Europe this resulted in a change of focus in architecture from the international to the regional, from modernity to the traditional. In Germany, the new Nazi government abandoned functionalism. In England and France, the decorative and luxurious Art Deco of the mid-twenties became fused with functionalism. While, in Denmark, a unique and more modest interpretation of functionalism evolved, called "the Functional Tradition" by Kay Fisker.

In the United States, where the international style white functionalism had never taken hold, architects and designers turned to Art Deco and expressions of Streamline form. The crisis had set focus on major problems in capitalism and large scale finance and production exemplified by the assembly line production; as Charles Chaplin so tellingly evoked in the movie Modern Times 1936. The monotony of work, the stressful speed and the unchallenged domination of the machine that had taken over work and society, as Mumford described it in his book Technics and Civilization: *"*Thanks to capitalism the machine has been over-worked, over-enlarged, over-exploited because of the possibility of making money out of it. And the problem of integrating the machine in society is not merely a matter … of making the social institutions keep up with the machine: the problem is equally on of altering the nature and rhythm of the machine to fit the actual needs of the community." (Mumford, Louis. 1934:367)

Lewis Mumford made however, the following conclusion with regards this paradox in relation to the machine age, "Our capacity to go beyond the machine rests in our power to assimilate the machine. Until we have absorbed the lessons of objectivity, impersonality, neutrality, the lessons of the mechanical realm, we cannot go further in our development toward the more richly organic, the more profoundly human." (Mumford, Louis. 1934:363)

Today, it might seem surprising Mumford presents this criticism of the machine and suggests a solution with his outstanding interest in the organic - only 10 years after the functionalist movement in architecture and city planning emerged – and 20 years after Ford opened the assembly lines in Highland Park. The modernist movement in Europe focused on the possibility of changing architecture and housing projects the same way as Henry Ford: from being based on a "subjective", style oriented, and handcrafted process to an "objective", geometric oriented, mass produced. With the noteable exeption of Johannes Itten everybody at the Bauhaus School admired the machine.

The development of pure geometric abstraction went hand in hand with the forward progress of technology and industrialisation. Having made a definitive break with the classical tradition and the romantic organic imagery of the preceding Art Nouveau and Jugendstil approaches, the Modern Movement also broke with an attachment to seeking inspiration in nature and focussed on the machine and the factory as the inspirational emblem of the modern world. A fascination with technology and its envisioned potential for realising an ideal society became the basis for the Modern Movement's enthusiasm for industrialisation. As the Modern Movement, as led by the likes of Walter Gropius and Mies van der Rohe, evolved into the International Style, a ubiquitous curtain-wall architecture devoid of reference to nature came to dominate the built environment of every major city.

2. The rise of New Organic design. Aalto and Wright.

Even though the answer to Mumford's search for a new conception for the organic first became visible in the organic movement in architecture and design in the 1950's, this started much earlier. Looking back, the photographer Carl Blossfeldt in 1926 made an exhibition in Berlin of his unique enlarged close-up photos of plants and later with great success published his books Urformen der Kunst (1928) and Wundergarten der Natur (1932) in Berlin, Paris, London and New York.[i] The books were popular among architects and Jørn Utzon later referred to one of the illustrations as an inspiration for his competition project for a new pavilion at Langelinie 1953.

Aalto was among the first to introduce an organic dimension in form and material in his modernistic architecture, with the undulating wooden ceiling in his library in Viipuri 1927, but to the Americans this was introduced 12 years later in his Finnish exhibition pavilion at the world fair in New York 1939. The pavilion had a sweeping curved wooden interior and exhibiting Artek furniture in bended and laminated wood by Aalto. No steel tubes and chrome, no speed inspired Streamline, no flamboyant art-deco style. The simplicity of the Bauhaus vocabulary translated into nature and wood. "The interior finish was of wood with different profiles so formed as to create a harmonic rhythm of materials and photographic presentations. The materials used in the construction of the wall surfaces were also treated as objects on exhibit." - "The roof, too, was used as exhibit area: aeroplane propellers of pressed wood, a Finnish specialty, churned the air both as objects on display and as a source of ventilation." (Fleig, Karl. 1963:124-130). The Finnish pavilion demonstrated both architecture and furniture, and it was in the design of furniture that the next important step was taken in developing the "organic tradition". Notably Frank Ll. Wright recognized in Aalto much of his own veneration for nature and called the pavilion a *"work of a Genius"*. (McCarter, Robert. 2006:143)[ii]

3. From Aalto's interpretation of functionalism to new organic furniture

In 1940 this interest for a new organic form resulted in a competition for new furniture design, announced by the director of MoMa's department of industrial design. A year later in 1941 Eliot F. Noyes published the winners of the competition with the following definition of term "organic": "A design may be called organic when there is a harmonious organization of the parts within the whole, according to structure, material, and purpose. Within this definition there can be no vain ornamentation or superfluity, but the part of beauty is none the less great — in ideal choice of material, in visual refinement, and in the rational elegance of things intended for use*".* (Noyes, E.F. 1941:Introduction)

Noyes referred in the catalogue to the modern Bauhaus furniture by Breuer and Mies van der Rohe in tubular steel and also laminated wooden furniture by Alvar Aalto, Marcel Breuer and Bruno Mattson. His description of Aalto's furniture reveals much about this new interest in a more profoundly human organic form: "Four of these chairs, sensitively and beautifully designed, are shown in the photographs at the center and lower right. In the case of the armchair (lower right), the single sheet of plywood, which daringly and dramatically forms the seat and back, varies in thickness according to the structural requirements. At the seat, where the weight of the body exerts more strain on the plywood span, additional interior plies are added, thickening the sheet at this point to give more strength. This results in a sensitive refinement of proportion such as may be observed in flamboyant Gothic vaulting or in the relations in thickness of the trunk, branches and twigs of a tree." (Noyes, E.F. (1941: 7-8)

4. Eames, Saarinen and Juhl – the birth of new organic design

Eames and Saarinen won the competition with a laminated heat-formed plywood shell-construction of an armchair. Their design was new on material, technology and form and fully achieved the aim of the competition: "no vain ornamentation or superfluity, but the part of beauty is none the less great — in ideal choice of material,

in visual refinement, and in the rational elegance of things intended for use".

Charles Eames had experience with bending plywood from his work during the war but also in interest in new formable materials, like glass-fibre, 7 years later, in 1948, he and Ray designed a chair like a floating organic sculpture: Lachaise. This chair was not put into production, but the prototype was exhibited in the MoMA. Eames was not the first to push design in the direction of organic sculpture. In a Danish context, which Utzon was familiar with, Finn Juhl was in the frontline regarding this new organic design for home furniture. At the annual furniture fair for designers and cabinetmakers in Copenhagen, he showed the Pelican Chair in 1940. This was a traditional bolstered easy chair – but formed more like a modern abstract organic sculpture. His sofa the Poet from 1941 followed this trend, but in a more moderate way. These designs followed a Danish discussion in the thirties about the lack of "hygge" in the modern steel, glass and chrome Bauhaus inspired home furnishings.[iii] Finn Juhl's furniture design was deeply inspired by organic sculpture, and to make this clear he displayed abstract organic art by Erik Tommesen and Hans Arp together with his own designs in the fairs 1940/41.

Even though most of the Danish furniture was handcrafted traditionally in wood and fabric and the war made communication across the Atlantic slow and difficult, Eames' and Saarinen's design had great influence on the development of the design and a new generation of light bended plywood furniture. Especially after the war, when inspiration and ideas were able to be shared between the continents. Jørn Utzon visited Ray and Charles Eames in 1950 during a study trip but also the American interest in Scandinavian furniture was significant. Finn Juhl met the design director of Moma, Edgar Kaufmann jr. in Copenhagen 1948. In 1950 he was appointed to design the Trusteeship Council Chamber in the United Nations headquarters in New York City. In 1951 he designed the exhibition "Good Design" in Chicago in Kaufmanns Merch Mart warehouse and the same year several of his furniture designs was put into production by the American company Baker Furniture.(Hiort, Esbjørn.1990:13-16) Arne Jacobsen's designed the Ant Chair in 1952 and the Seven Chair in 1955. In these chairs he used the same mix of steel tubes legs and plywood seat as Eames' chairs. Jacobsen designed The Egg and the Swan in 1957.

5. From furniture back to architecture

It is most likely the organic sculptural furniture paved the way for a new generation of organic architecture – because at that time many designers were often architects. The conclusion that could be made, is that the organic tradition in architecture and furniture design, introduced by Aalto, was pushed forward by theorists like Mumford, established architects like Frank Ll. Wright and curators like Noyes – creating opportunities for an emerging group of talented young architects and designers, like Eames, Saarinen, Finn Juhl and Arne Jacobsen. Their work developed the single-curved organic Alto and Bauhaus design into a sculptural double-curved free organic form-universe and prepared the ground for the rise of a group of iconic and organic building in the fifties – and this new interest in the organic perhaps pawed the way for Wrights design of the Guggenheim Museum in New York 1943-56.

Aalto's attitude to nature was very much in keeping with a wider approach within Nordic architecture and design more generally. "In the North, architecture was always responding to or acting on or in nature" as the Norwegian architect, Per Olaf Fjeld, has noted. (Fjeld, Olaf. 2009:11). Aalto was not alone in developing a nature-inspired approach to architecture; he created an exemplary legacy of work that established an organic direction and identity within Nordic architecture, which Jørn Utzon followed.

6. Jørn Utzon and his relation to the new "organic tradition".

Utzon's spiritual connection with the "organic movement" in modernism can be found clearly expressed early in his career, in a manifesto-like statement from 1947: "Our entire imagination could never create

anything that lies outside the infinite wealth of nature – it is therefore first when we wholly comprehend nature, and are in contact with it, that we are at liberty to create in our own, personal style," Utzon, Jørn (1948)

Just as Frank Ll. Wright's interest for the organic aspect in architecture goes back to his early years, the unique nature of Utzon's organic design approach derives from his childhood and his background in boat-building. His fascination of the repetition of simple elements to create complex form, like the hull of a yacht, was founded here. Reading his essay on his father, the yacht designer Aage Utzon, one realizes how his father's philosophy of nature and boat design actually echo the words of Frank Lloyd Wright – but also Noyes definition of "Organic" as referred above, because yacht design is the art of curved beauty, limitation in form, material and detail with the purpose of optimizing the whole construction.

Aage Uzon was a man with a profound appreciation of nature, a keen hunter and sailor, who looked upon nature as an inspiring source for design knowledge. (Arvid Jaeger, Thomas (2014). To fully comprehend nature was for Jørn Utzon to observe nature, in order to see how nature solved a problem similar to the one he is working with (as an analogy or metaphor) - and to use inspiration nature, both metaphorically conceptually and analogously technically in his own design – but never to copy nature literally. Charles and Ray Eames worked with design uniting form, material, construction and modern production methods into an organic unity and Utzon met the Eames and visited their private house during his trip to America.

Throughout his career Utzon focused on additive systems in the spirit of the industrial age – the major difference though between Utzon and most other architects of the modernist movement, was that he always maintained his commitment to the organic. This is visible in his first housing projects, like the Kingo and Fredensborg housing developments, north of Copenhagen (1953 and 1965) – where L-shaped individual courtyard houses are offset according to the contours of the landscape. The organic language became more ever more apparent in the design and realisation of the Sydney Opera House (1957-73), the Bagsværd Church (1976), Kuwait Assembly Hall 1982 – while in his own house in Can Lis he returned to the more subtle and indirect organic composition of cubes.

Unlike the "in-situ" cast concrete iconic organic buildings from the fifties and early sixties, such as Wright's Guggenheim Museum in New York, Le Corbusier's chapel in Ronchamp (1950-55) or Saarinen's TWA terminal at Kennedy Airport (1956-62) – Utzon pushed his organic projects in a direction which remained faithful to an industrial way of building: standardisation and repetition of elements and industrial production. Even in the most difficult execution of the Sydney Opera House, Utzon used the industrial method to resolve and build the double curved shells. In many ways this building embodies the idea of the "assimilation of the machine" "toward the more richly organic, the more profoundly human".

The enduring beauty of the Sydney Opera House derives from how the complexity of the composition floating roof shells, with its origins in conceptual notions of sails and clouds hovering above the horizon, that appropriately given its maritime context took the shape of boat hulls he knew from his childhood, are magnificently resolved through the application of geometry. Clad elegantly in repeated double-curved panels of matt and glossy glazed white tiles that sought to emulate the experience of freshly fallen snow and shining ice crystals; supported by an additive system of concrete ribs, that took inspiration from palm fronds, for their expression and structural integrity. What elevates Utzon's work and contributes to the enduring iconic status of the Sydney Opera House in particular, is Utzon's more geometrically disciplined and abstract realisation of an organic architecture. Certainly at the time of its creation the Sydney Opera House was, as Utzon liked to be according to his own personal credo, at "the edge of the possible" in terms of its architectural expression, both aesthetically, poetically and technically. In its design and realisation, it anticipated and pre-empted present day developments in computer-aided digital design, industrialised pre-fabrication and construction.

7. Conclusion

The organic and sculptural architecture of the fifties was something quite new and disruptive in relation to the ideals of functionalism. This short survey of the origins demonstrates the connection between an emerging search for a more “profound human” architecture (and furniture) than the functionalist movement of the machine age was offering. First, this was realised in furniture design and contributed to a more general interest in exploring the possibilities of organic form among young architects – but also paved the way for the older generation. Eames, Saarinen and Juhl were pioneers regarding introducing new organic design and Finn Juhl had significant influence bringing his organic handcrafted sculptural furniture to America just as Eames brought new industrial produced furniture designs to Scandinavia.

In architecture, some of the “organic movements” most famous works, like Wrights Guggenheim Museum, Saarinen’s TWA building and Le Corbusier’s Ronchamp Chapel, the building technique returned to handcraft in the spirit of the pre-industrial era in order to build the complex curved form. The Sydney Opera House, on the other hand, represented an answer to the functionalistic demand for standardization and mass production and to Noyes definition of the organic.

Utzon would undoubtedly have appreciated and fully utilised the benefits of digital design and fabrication tools, that are now available today, but just as more advanced tools to enable his architectural vison, rather than as a generator of the design. The core of Utzon’s approach to “the organic” was that this attitude to architecture opened for a new sensibility and poetry in form – together with tense connection between form, material, construction and mass production. The further development of this research will focus on the contemporary digital organic architecture’s relation to nature, compare it to Noyes definition of the Organic and Jørn Utzon’s way of fulfilling it and research new definitions of the need for organic form in the architecture, in the society of today and going forward.

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[i] The publisher was Ernst Wasmuth Verlag – the publisher of the architecture of Frank Ll. Wright, Herman Muthesius and an important publisher for the international modernist movement.

[ii] To fully understand Wright’s enthusiasm for Aalto, an interview in 1955 explains much. Here he referred to ancient Welsh wisdom and its definition of a genius: “A genius is a man who has an eye to see nature, a genius is a man who has a heart to feel nature, a genius is a man who has the courage to follow nature. Beat that if you can.” (Peters, John. The Oral History of Modern Architecture. Harry N Abrams 1994 p. 132.)

[iii] This critical attitude to the international modernist movement, was supported by a group of traditionalist regional inspired modern architects like Kaare Klint, CF Møller and Kay Fisker.