

# Frederick Kiesler: From Life to Architecture —to Life

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**Abstract:** This paper argues there is a correlation between the architect Frederick Kiesler and the biosemiotic project. In so doing it proposes this coupling establishes a framework leading to an architectural-biosemiotic paradigm that puts biosemiotic theory at the heart of cognising the built environment, and offers an approach to shaping the built environment that supports ( and benefits ) human, and organismic, spatial intelligence. Uexküll’s understanding of the organism-in-its-environment is, perhaps, the keystone to the inside-outside problematic. Peirce’s sign model and semiotic theory emphasises how cognising, and the inside-outside synthesis, is a condition of sign interpretation. The principle of a difference, underpinning Bateson’s ecological standpoint brings these two positions together to distinguish what has become the biosemiotic project. In this paper I distinguish another individual, Frederick Kiesler (1890—1965), an Austrian-American architect, theoretician, theatre designer, artist and sculptor whose lifelong project was the unification of the sciences with art, through architecture. I suggest Kiesler provides a theoretical and practical precedent delineating a concrete bridge from the humanities to the biosemiotic project. Kiesler’s central idea was “continuity”, through which he formulated the notion of “endless space”; in contradiction to his contemporaries whose formulation of infinite space underpinned the modernist ideal. Kiesler’s Manifesto of Correalism is the bridge, which I propose provides a concrete means for applying biosemiotic thinking in the humanities, most significantly in architectural design and theory.

**Keywords:** Frederick Kiesler, Jacob von Uexküll, architecture, biosemiotics

## 弗雷德里克·基斯勒：从生活到建筑学——再到生活

蒂莫西·爱尔兰

**摘要：**本文认为建筑学家弗雷德里克·基斯勒和生物符号学课题相互关联，二者共同奠定了导向建筑—生物符号学的范式框架。该范式用生物符号学理论来认知建成环境，提供了一种形塑建成环境的方法，支撑（并有利于）人类以及有机体的空间智能。于克斯库尔的环境中的机体，可能是解决内—外问题的基石。皮尔斯的符号模式和符号理论则强调为什么认知和内—外的综合是符号阐释的条件。差异原则，即贝特森生态立场的基础，将两者相连，形成生物符号学课题。本文重点讨论奥地利裔美籍建筑师、理论家、剧院设计师、艺术家和雕塑家弗雷德里克基斯勒（1890—1965），他毕生的事业是通过建筑来统一各门科学和艺术。无论是在理论上还是在实践上，他都率先具体描绘出了沟通人文科学与生物符号学的桥梁。他的中心观点是“延续性”，从这一观点他提出了“无尽的空间”这个概念。他的观念不同于与他同时代的那些人，那些人对无限空间的看法代表着当时现代主义的理念。“联系”是基斯勒的关联主义宣言，它提供了一个在人文科学，尤其是在建筑设计和建筑理论中具体应用生物符号学思想的具体方法。

**关键词：**弗雷德里克·基斯勒，雅克·冯·于克斯库尔，建筑学，生物符号学

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### I . Introduction

Biosemiotics understands organisms not only as sign-acting, sign-manipulating and sign-creating systems, but also as products of sign-action. If organisms are both products and manipulators of signs, then they are also intrinsically products and manipulators of space as well, because signs usually involve some spatial dimension. Consequently, the biosemiotic outlook offers a unique platform by which to examine “space” as intrinsic to being. Whilst

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biosemiotics provides a unique perspective on the issue of space, and how it is consequential to living beings, I propose the biosemiotic frame is not sufficient in itself to define a concrete definition of space that accounts for the spatial intelligence of organisms, and how certain organisms adapt their environment to facilitate their physiological and social well-being. In general, Biosemiotics is founded on three key thinkers: The Estonian proto-semiotic biologist Jakob von Uexküll (1864 – 1944), the bio-cybernetic thinking of Gregory Bateson (1904 – 1980) and the semiotic logic of Charles Sanders Peirce (1839 – 1914). This triad forms the backbone of biosemiotics. Uexküll’s understanding of the organism-in-its-environment is, perhaps, the keystone to the inside-outside problematic. Peirce’s sign model and semiotic theory emphasises how cognising, and the inside-outside synthesis, is a condition of sign interpretation, and the principle of a difference, underpinning Bateson’s ecological standpoint, brings these two positions together to distinguish what has become the biosemiotic project. In this paper I would like to distinguish another individual, Frederick Kiesler (1890—1965), an Austrian-American architect, theoretician, theatre designer, artist and sculptor whose lifelong project was the unification of the sciences with art, through architecture. I suggest Kiesler provides a theoretical and practical precedent delineating a concrete bridge from the humanities to the biosemiotic project. Kiesler’s central idea was “continuity”, through which he formulated his notion of “endless space”; in contradiction to his contemporaries whose formulation of infinite space underpinned the modernist ideal. Kiesler’s *Manifesto of Correalism* is the bridge, which I propose provides a concrete means for applying biosemiotic thinking in the humanities; most significantly in architectural design and theory. In this paper I seek to illustrate the correlation between Kiesler and the biosemiotic project, and suggest how this coupling establishes a framework leading to an architectural-biosemiotic paradigm that puts biosemiotic theory at the heart of cognising the built environment, and offers an approach to understanding and shaping the built environment that supports (and benefits) human, and organismic, spatial intelligence. In so doing, the essential criterion of the built environment, as claimed by Kiesler, is health. Consequently, a

biological viewpoint is fundamental to architectural design.

In what is to come we will consider the biosemiotic undertones of Kiesler's design theory. In so doing we will review the significance of biology and semiotics to Kiesler's thinking. The underlying impact of Uexküll on Kiesler's thinking, with note to the coupling of organism and environment, are reviewed first. By looking at the influence of biologicistic thinking on key architectural thinkers of Kiesler's day the effect of Uexküll on Kiesler's design theory will be exposed, particularly with regard to his notion of space. The significance of Uexküll's sign oriented notion of space is considered relative to how signs may be understood as forces, which inform and direct an organism's engagement with its environment. Consequently, architectural design, as Kiesler claims, is the moulding of "forces" to direct life in a desired direction. The biosemiotic significance of Kiesler is ascertained in this first section to establish the significance of architecture to wellbeing. On this basis, understanding architecture to be a significant influence on health, a biological notion of space is argued to be fundamental to the design of buildings. In the second section Kiesler's scientific approach to architectural design is reviewed and his seminal project, the Endless House, introduced. The Endless House is the physical manifestation of his bio-technical design thinking, to establish an architecture that protects inhabitants from fatigue and stimulates wellbeing. Kiesler never built the Endless House and so the Bioscleave House, by Madeline Gins and Arakawa is introduced in the final section, as an extreme example of Kiesler's design theory, which it is suggested is a biosemiotic-oriented design theory informed by life processes, to promote wellbeing.

## II . Was Kiesler a Proto-biosemiotician?

Looking through the archives of the Kiesler Foundation in Vienna (where I have had the pleasure to leaf through and examine original drawings and texts of Kiesler), I have been left with the sentiment that Kiesler's design theory and philosophical outlook was informed by key figures and forms of thought pivotal to the biosemiotic project. In particular, Uexküll's concept of Umwelt and the pragmatic evolutionary semiotic logic of Charles Peirce—or

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perhaps more concisely the semiotic project of Charles Morris: who claimed the development of semiotics may “be most profitably carried on by a biological orientation which places signs within the context of behavior” (Morris, 1946/1971, p. 82). Whilst not widely accepted to be a key figure of biosemiotics Morris described semiotics a “science of behaviour”, consolidating the relation between biology, behaviourism and semiotics (Cobley, 2010). He promoted the need for semiotics to take a biological direction, and attempted to establish a science of biosemiotics in the 1940s and 1950s (Favareau 2010). Kiesler does not cite these figures; neither does he refer to their work. There is no direct correlation. Therefore, what I propose is an impression stemming from hand written notes, scribbles and comments to the side of drawings, sketches and texts. There is of course the danger that, having got such an impression, what I read into Kiesler’s work is driven by my desire to form an actual link rather than a result of concrete evidence. As an architect, I have been interested in Kiesler’s design thinking for many years because his work has served as a base to my own conceptual approach to the generation of architectural shape and form (See Ireland, 2015). I was never seeking to form a link between Kiesler and biosemiotics, but as a biosemiotician I cannot ignore what I see as biosemiotic undertones in Kiesler’s work.

In 1939 Kiesler formulated his theory for understanding the relationship between art and space, which he called *Correalism*, referring to the dynamic correlations between objects, environment, and human experiences; which he argued should be analysed in design because these relationships form a part of an ongoing transcendent process that lends meaning to existence. Accordingly, architecture is deemed the crystallisation of environmental energies, harnessed and directed into forms by a scientist-architect, whom Kiesler claims deals with “forces”, not objects. Design, therefore, is not the circumscription of a solid but a deliberate polarisation of natural forces towards a specific human purpose, influencing life in a desired direction. There are two aspects fundamental to the proposed correlation between Kiesler and biosemiotics: biology and semiotics. The natural world was an inspiration for Kiesler, and so he was highly influenced by biological

phenomena. More of this is the following section. The semiotic aspect is not so easy to clarify, and so is open to speculation, but a fundamental aspect of his work, or ambition of his, was to establish a science that deals with the laws governing man as a nucleus of forces—or as he stipulates in a hand-written note to establish “a science of relationships”. This deserves unpacking. As noted, Morris overtly claimed semiotics to be a science of signs and sign systems (Morris, 1946/1971). A sign informs. Whether a sign announces directly or indirectly it orients its interpreter, and in this sense a sign may be compared to “force”. The manner in which something holds significance for some other, such as to affect a force, is intrinsic to the behaviour of organisms. That there is some effect, between one thing and another, means that the perceiving organism and the “object” of attention enter into a relationship, and have some form of commonality. The fact that it is the property of significance that brings this relation into being distinguishes this kind of semiotic causation from mere brute force causation (see Hoffmeyer, 2007), and forms the hallmark of relationships established by living beings, with one another and their environment. We might consider that the effect has some value or that it is self-reinforcing, such that it causes habit—or an inclination to respond in some way. These vectors of significance constitute the organism’s environment, establishing a form of force field, within which organisms live their lives (See Lewin, 1935 and *cf.*, Lotman; see Clark, 2005). In this sense, we can see the correlation with Kiesler, who perceives man “a nucleus of forces”, with semiotics, and the biosemiotic notion that organisms are a product and producer of signs. From this position, Kiesler perceives that a designer deals with “forces” not objects, and thus design is not the circumscription of a solid but a deliberate polarisation of natural forces towards a specific human purpose. This process he called “bio-technique”, referring to the influence of life in a desired direction.

Consequently, for Kiesler, architecture should be at the service of the body, acquiring its value in its capacity to provide humans with a space that protects them from fatigue. He perceives human and environment as one, influencing one another. This is the key aspect informing us of Uexküll’s

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influence on Kiesler: organisms have a direct relationship with their environment through their sensorial capacities to detect differences, which in turn informs action. Having found no direct evidence of Uexküll in Kiesler's writings, I turned to the holdings of his personal library to find a well-worn copy of Uexküll's *Stroll through the Worlds of Animals and Men*. What is perhaps more telling though are Kiesler's drawings, which tell of his ardent diagrammatical exploration of the interdependence of body and environment, and how this coupling leads to a process of aesthetic appreciation (see figure 1).

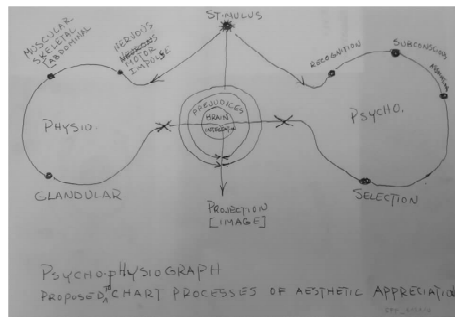


Figure 1 Kiesler's Diagrammatical Exploration of the Interdependence of Body and Environment<sup>①</sup>

Now, the natural world has been an inspiration for architecture and design since antiquity, with biology becoming a key influence on design thinking since the turn of the 19th century. (Space does not allow a full description of this topic here so for explanation of this point see Detlef 2007). A transition occurred at this time whereby key architectural thinkers were influenced by key biologicistic thinkers, such as Raoul Heinrich Francé and Jakob von Uexküll, to perceive the world, and biotic beings, as becoming, as opposed to being. This opened up a new way of thinking about function and the generation of form and structure, leading key architectural thinkers (such as El Lissitzky, Moholy-Nagy, Theo van Doesburg and Mies van der Rohe), to shift away from imitating nature to exploring its active processes of

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<sup>①</sup> Kiesler's diagrammatical exploration of the interdependence of body and environment, leading to a process of aesthetic appreciation, informed by feedback between perception and action reminiscent of Uexküll's "Functional Cycle". © 2015 Austrian Frederick and Lillian Kiesler Private Foundation, Vienna.

becoming. Consequently, the shift prompted the idea of the renewal of art, and architecture, on a biological basis. Van Doesburg was perhaps the most prescient, publishing his artistic ideology of Neo-Plasticism as a book in 1925, and noting Uexküll as one of his key influences. In it, he states, “Reality for each individual is only his relationship with his environment”, and this notion of environmental perception lies at the core of neo-plasticism, underscoring the importance of Uexküll to the development of his aesthetic system. (See Botar 2001). Kiesler’s 1939 article “On Correalism and Biotechnique: Definition and Test of a New Approach to Building Design” is in essence an architectural manifesto for approaching architectural design from a biological basis. Inspired by van Doesburg, who Kiesler was lifelong friends with, Kiesler encourages design a process based on man as part of a holistic system. A dynamic process which Kiesler termed “law of transmutation”, whereby perceived opportunities lead to actions that inform or direct new effects, which then lead to new opportunities, repeatedly; and which I suggest correlates with Peirce’s Pragmatic Maxim: to be discussed later. (See figure 2). Therefore, whilst Kiesler does not reference Uexküll there is a lineage of thought through his friend and colleague: van Doesburg.

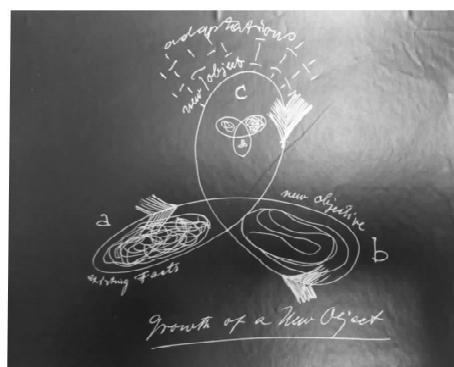


Figure 2 Kiesler’s “Law of Creative Transmutation”<sup>①</sup>

① This diagram illustrating Kiesler’s “law of creative transmutation”. An evolutionary process whereby existing facts flow into a new objective resulting in a new object. A process of design whereby an idea/object is produced, and reproduced (or refined), over time. Photograph by the author, reproduced by kind permission of the Frederick Kiesler Foundation. © 2015 Austrian Frederick and Lillian Kiesler Private Foundation, Vienna.



Kiesler's big idea was space, which he considered continuous, or endless. Not in sense of the void but in terms of a line for which both ends meet. Now this theme of continuity in his work refers to continuous interaction between human beings and their environment, and this principle of interaction between things and people leads to two avenues of investigation: (1) how people act and (2) how materials and structures act. He thus talks about a "science of relationships" and strives to articulate man's integration with space, as opposed to the conception of man in his environment, and thus distinct from. Space, by Kiesler's account, is a set of relations (or forces), modelled by the body—and it is these forces, which are the designer's medium, being vectors of significance, which a designer needs to mould to inform "new life" or "new function". This view of space correlates with Uexküll, who dedicated the first chapter of his 1926 book *Theoretical Biology* to the issue, and which he later consolidates to the version found on Kiesler's bookshelf (Uexküll, 1957). The forces Kiesler refers to, which a designer needs to mould to inform life in a desired direction, may be positive or negative, and thus influence wellbeing. A fundamental issue for Kiesler was therefore an architecture that provides humans with a space that protects them from fatigue—because space, environment, human and technology (the tools and things we use to facilitate our existence) are interrelated and inform one another, so designers need to mould these forces to facilitate and inform wellbeing.

### III . From Life to Architecture

Uexküll establishes space a fundamental property of organisms, stating "if we recognise in what-lies-outside-ourselves the possibility of movement, then space as the connection of this possibility with the planes of direction, will be true 'form',—namely, possibility and law" (Uexküll, 1926, p. 9). Space is thus not a geometrical or extensive enclosure but a mediating mechanism between exteroceptive and interoceptive occurrences. As it were, a scaffold assimilating external and internal conditions constituted of differences (i. e., signs, variances and ideas), by which organisms mediate their environments. "Without a living subject [he states], there can be

neither space nor time. With this, biology has ultimately established its connection with the doctrine of Kant, which it intends to exploit in the Umwelt theory by stressing the decisive role of the subject.” (Uexküll, 1957, p. 13) In other words, space is a structuring parameter of experience, which, coupled with time, is the means by which organisms distinguish differences and perceive patterns and order within and between a world of differences. Uexküll’s notion of space is thus particularly important to the built environment, because it provides architectural thought a means to consider the significance of design on inhabitants. A matter we can see Kiesler recognised, through his prescription of Endless Space as influential to wellbeing. The importance of Kant is that he devised a notion of space that amalgamated nativist’s (Newton, Leibniz) and empiricist’s (Berkeley) views on the subject, by focusing on “bodily perception” that allowed others (such as Jacob von Uexküll) to pursue a “biological model” combining cognition and body composition. Uexküll presents a visceral conception of (Kantian) space, whereby the skin is as important as the mind. He termed this the Umwelt, which he describes, analogically, to be a soap bubble.

Whether the farthest plane encloses visual space in this or another manner—it is always there. We may therefore picture all the animals around us, be they beetles, butterflies, flies, mosquitoes or dragonflies that people a meadow, enclosed within soap bubbles, which confine their visual space and contain all that is visible to them. Each soap bubble harbors different loci, and in each there exist the directional planes of operational space, which give its space a solid framework. The fluttering birds, the squirrels leaping from branch to branch, or the cows that browse in the meadows—all remain permanently surrounded by their *soap bubbles, which define their own space* (Uexküll, 1957, p. 28, my emphasis).

What this means is that the environment (i. e., the organisation of all things defining the spatial milieu of an organism) exert an influence on the organism: and this includes inert items such as surfaces and objects, as well as active items; like other organisms. Consequently, organism/people, society, space and the (built) environment are intrinsically linked. What is important about this is the connection between space and constructing. As a

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framework enabling engagement in the world space is a mechanism by which organisms interact with, shape and form their environments. The parallel between life and architecture is that they are both concerned with artefact making (*cf.* Barbieri, 2016). For example, birds build nests, as do social insects. Some species of ant use their own bodies to construct artefacts to overcome obstacles (Anderson, et al., 2002). Likewise, cells self-organise and self-assemble to form the organism they constitute. (See Barbieri, 2003; Carroll, 1995; McGinnis & Krumlauf, 1992; Sander, 1982; Nüsslein-Volhard & Wieschaus, 1980; Garcia-Bellido, et al., 1979).

Life is concerned with the generation and persistence of organisms, and the structures they create, and architecture with the design, construction and maintenance of buildings. The distinction between the manner in which natural and human structures are built is that the former is fluid (in the sense that the steps involved are intertwined) whilst the latter is static (in the sense that one stage is completed before the next discrete step commences). As Frederick Kiesler observed: “Nature builds by cell division towards continuity whilst man can only build by joining together into a unique structure without continuity” (Kiesler, 1939, p.67). The emphasis, behind Kiesler’s distinction, is that architects tend to make things through brute force (connecting parts together to form a whole) whereas nature tends to produce through a process of continuous construction whereby parts merge, overlap and conjoin one another. In a short text, “The Electric Switch or the Switch to Process Architecture”, he writes, “The floor plan is no more than a footprint of a house. From a flat impression of this sort, it is difficult to conceive the actual form and content of the building. If God had begun the creation of man from a footprint, probably a monster, all heel and toes, would have grown up from it, not man. It is as though nature cast the first ball into the arena of life, and then stood by with folded arms to see what the play of circumstances would make of it” (Kiesler, 1949). We can sense here the distinction between the typical way designers work and Kiesler’s view that a designer deals with forces. For Kiesler, manipulating these forces, to mould new objects, is a process of perception: of interpreting the immaterial transcendental potentiality pregnant in material in correlation with life needs,

and responding accordingly to bring the two together. Change and adaptation are key parameters to his design theory that inform this transformation (of space and materials) by moulding forces to influence life in a desired direction—and enforce well-being. This brings us back to Kiesler’s “law of creative transmutation” as mentioned earlier. An evolutionary design process whereby existing facts flow into a new objective resulting in a new object. In a sense he thinks in terms of evolutionary habits. Over time, the ideal process repeats, infinitely, informing new objectives that moulds new objects. Kiesler explains (to be read in conjunction with figure 2): Engendered by concrete facts (1) the idea of a new necessity (2) appears. From this new necessity there develops the new reality (3). This new object takes place among the old material realisations (1) and becomes itself the point of departure for a new cycle of transformation. [...] Through a change in the preponderance of life forces the nucleus of interest and attraction will shift from materials facts (1) to the objective (2) or from the objective to the object (3), or any other shift in the continuous flow. Thus, two of the three components always become secondary members of the total structure, and even they will vary in their potential relationships according to their correlative position. However, at no time can the strength of all three be equal, for, continuity would then end in static equilibrium (retrieved from English version of *Manifesto of Correalism*: archive of Kiesler foundation)

In a later text he explains how “the cycle informs a new idea, which having become material, the creative cycle begins anew. Thus function appears not as a finite fact or standard, but as a process of continuous transmutation” (Kiesler, 1949). The similarity with Peirce’s evolutionary semiotic logic is evident not only in the triadic form of the sign model, and how the constituents inform one another to generate new “ideas”, but also in the pragmatic sense in which Kiesler describes the generation of new objects occurring from the correlation of existing circumstances informing new objectives. This not only echoes Peirce’s concept of the *sign* relation, but also his “Pragmatic Maxim”. The former “existing and materially consequential [...] is [likewise] recursive in that the action of an agent vis-a-vis a material sign vehicle and a material sign object manifests in a relation whose product,

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the sign interpretant, itself serves as a sign vehicle for the next act of semiosis” (Favareau 2007). Peirce’s Pragmatic Maxim, which, in principle, states the more one works with something the closer one gets to it, stems from his model of a sign, and how it “informs”. Any influence of Peirce’s semiotic logic is likely via the pragmatic philosophy of William James. Various books by James are held in Kiesler’s library, as well as Dewey’s seminal work *Art as Experience*. So it’s reasonable to conclude that Kiesler’s “Law of Transmutation” is a designer’s interpretation of the Pragmatic Maxim, to describe a process of design: perceiving possibilities and creating mental products shaped through the combining of influences and constraints moulded in a particular direction to inform new potentials, which a designer fabricates into physical form.

The distinction between architecture and natural structures mentioned earlier is also geometrical. Whilst not literal, human architecture, in a general sense, is planar and compartmented whilst animal edifices tend to be rounded and endless. The planar character of human architecture is due to practicalities (see Steadman, 2006), as is the organic quality of structures built by insects and animals: formed by and to the organism’s ability, physical composition and properties of the material manipulated. Kiesler recognised comparisons between human and non-human built structures. (See figure 3), and stressed that modern architecture, informed by Euclidean geometry, detaches inhabitants from their natural surroundings as a consequence of its planarity. Specifically, the juxtapositions of planes (i. e., corners), provide points and establish coordinates by which an inhabitant can locate oneself “in space”; thereby alienating one from their natural state of being subsumed in their environment. Kiesler claims that architects should better understand the biological significance of their designs. Studies of animal behaviour in captivity (Hediger, 1955) and the psychosomatic effects of architecture on inhabitants (Heron, 1957; Solomon, et al, 1957) illustrate that boring environments, or structures ill-suited to inhabitants’ needs, tend to have negative effects on occupants. A seminal example, with regards to captive animals, and which Kiesler pinpoints in an article (1937), is the penguin pool at London Zoo designed by Tecton, an influential architectural

firm led by the pioneering modernist architect Berthold Romanovich Lubetkin (1901—1990). One of the first uses of reinforced concrete the innovative design was unusually elegant and playful. In 1970 the building was recognized as an exemplary sample of design and given Grade 1 listed building status: the UK Government scheme for protecting important buildings. However, to aid a refurbishment in 2004 the penguin colony was temporarily relocated to a nearby duck pond, during which the penguins were seemingly happier. Subsequently a new penguin pool was constructed and Lubetkin’s innovative penguin pool remains as an architectural exemplar: vacant.

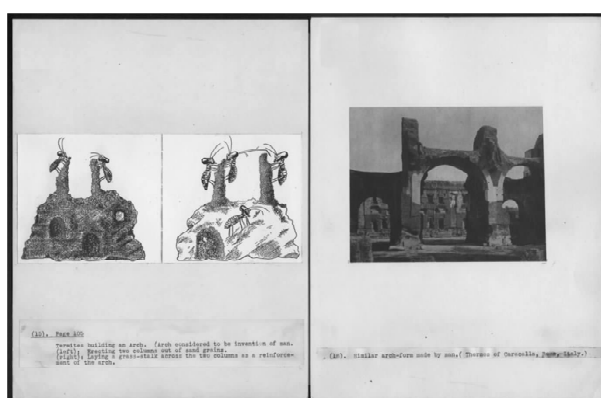


Figure 3 Study of Arches<sup>①</sup>

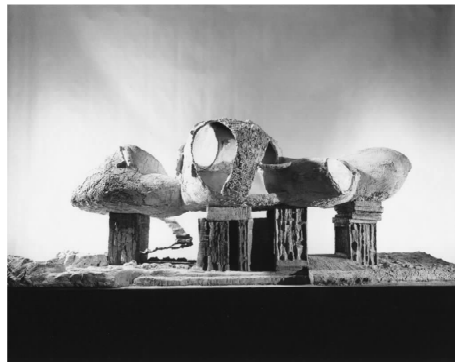
#### IV. From Architecture to Life

Architecture in the future, Kiesler predicts “will not be judged alone by its beauty of rhythm, juxtaposition of materials, contemporary style. It can only be judged by its power to maintain and enhance man’s well-being, physical and mental. Architecture thus becomes a tool for the control of man’s de-generation and re-generation” (Kiesler, 1939, p. 66). The Endless House is Kiesler’s seminal work (see figure 4). The physical manifestation of his notion of a “Correalistic Universe” (an ever-changing web of environmental forces and human life activities), articulating the intricate relationships between man, nature and technology. He paraphrased the Endless House as “a germ cell, a nucleus of new forms of life and coexistence

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with man's mental, physical and social circumstances as the variable parameters determining and shaping his living space" (Krejci in Bogner, 2003, p. 12). So, we must understand the Endless House as an enclosure that transcends discrete structural elements, that operates as a vessel to concentrate and enhance human life energies, to promote and enhance his essential criterion "health" (from Endless House book, pp. 61–62). Kiesler worked tirelessly on the project (between 1945 and 1960—though it was essentially a lifetime's work, because the Endless House stems from his early designs for projects such as the Endless Theatre and Space House), but he never built an Endless House. He was commissioned in 1958 by the Museum of Modern Art, New York, to construct an Endless House for the sculpture garden but this never materialised. He was later approached (1961) to construct an Endless House in Florida but, frustrated with the client, walked away from the commission. He died in 1965. Nevertheless, Kiesler's Endless House is regarded as one of the most visionary projects in the history of 20th century architecture, and has fascinated and influenced architects and artists more than many built 20th century buildings.



**Figure 4 Frederick Kiesler, Model for Endless House, New York 1959<sup>①</sup>**

Now Kiesler's pioneering efforts has informed many architects, artists and designers but I'd like to close with a project by Arakawa and Madeline Gins, called the bioscleave house, which is a house to defy death, to illustrate

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<sup>①</sup> Photograph by Percy Rainford. © 2018 Austrian Frederick and Lillian Kiesler Private Foundation, Vienna.

how a biological understanding of space, and the generation of shape and form, leads back to life, or the protection of life. The designers do not cite Kiesler, but the significance of the unity between inhabitant and environment is fundamental to this project and so exemplary (albeit an extreme case) of Kiesler's notion of an architecture to provide humans with a space that protects them from fatigue. Neither do they refer to Uexküll. However, it is interested to see (1) how Uexküll's model might be applied to interpret, or inform, built space and (2) of the correlation between the Bioscleave House and the Endless House I tasked architecture student "Michele Meneses de Amorim" to analyse the Bioscleave house according to Uexküll's sign-based model of space.

The project presents an irregular arrangement, in which the central area is informed by an undulating and bumpy concrete floor. Bright colours, the lack of straight lines and absence of horizon promotes a stimulating environment. (See figure 5). All the details in the house are meant to perturb the user, to cajole an unknown and unsafe experience. As you enter the house, no former memory-signs equip you for the setting, forcing the individual to pay attention to new sense—qualities that constitute the buildings reality. The unsettling nature of the project places the user in a position to constantly assimilate and accommodate sensory information. The body is the core of the space, and each individual has a different response according to their own perceptual and physical abilities. The inhabitant must be aware of each step, turn and direction. In so doing Gins and Arakawa emphasize the subject's bodily activity, and thus highlight their spatiality with the intent of getting you back to your basic generative level of existence. An inhabitant cannot resolve their view to any one horizon, and so, they claim, becomes meditative. The project stands for the couple's manifesto "Declaration of the Right not to Die". Interpreted through Uexküll's model of space as a mechanism of engaging with one's environment the continual stimulation of the senses becomes an insurance of life. The inhabitant is aware of itself because of sensory-motor perceptions, and to occupy this building is to continuously interact with the fabricated environment—whereby the individual is forced to constantly recreate his or her balance and



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movement. The buildings environment is uncompromising, acting as a formative force of space to enhance life. When asked about how an elderly person might manage to walk across the irregular ground, Arakawa replied that the age or body constraints don't matter, for even if the person had to crawl over the mounds, he or she would be positively responding at a bodily level to the environment. Such a challenge, so rare in our planned and safe cities and houses, is engineered to prompt and trigger a new awareness of body, muscles and movement (see Bernstein, 2008).



Figure 5 Bioscleave House (Lifespan Extending Villa), Interior<sup>①</sup>

## V. Conclusion

Whilst the likelihood of Kiesler being pronounced a fundamental figure of the biosemiotic project is slim, his design theory, understood through a biosemiotics lens, has value for architectural thinking because it provides a concrete bridge between the sciences and humanities. It offers substance to unconventional and experimental design thinking and practice (*sic.* The bioscleave house) by demonstrating the worth and how scientific theory/knowledge can inform and enhance our state of being in its application to moulding the built environment. The practical application benefits science, through speculation. Importantly, the artistic articulation of scientific knowledge is typically qualitative, opening avenues improbable in the lab. This paper set out with the aim to establish the bio-technique design theory of Frederick Kiesler to be biosemiotic. The motivation was to illustrate the

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<sup>①</sup> Sourced from Reversible Destiny Foundation: <http://www.reversibledestiny.org/architecture-old/bioscleave-house-lifespan-extending-villa?view=slider>. Retrieved 24th August 2017.

relevance of his thinking to the biosemiotic project, with the ambition that the biosemiotic field might open up to receive him a compatriot and understand his work to be a practical application of biosemiotic thinking. Kiesler was influenced by the writings of Jakob von Uexküll, a key figure in biosemiotics. He owned a well-worn copy of Uexküll's *A Stroll through the Worlds of Animals and Men*. His design theory concentrates on the coupling of human and environment and he submitted to a notion of space that integrates man with his surroundings, consequential of forces that inform and affect him. These fundamental aspects of his design theory suggest that he was deeply inspired by the biological theory of Uexküll. The forces he refers to, it was argued, is compared with signs, because (like a force) signs perceived by an organism influence and direct an organism to act in some way. Kiesler's design theory has thus been shown to echo (1) Uexküll's process of feedback between perception and action, which informs a functional cycle describing how organisms interact with their environment and (2) the behaviour-centric semiotic model of Charles Morris. That Kiesler proposed architecture to be a science of relationships further intimates a semiotic underbelly—one with which comparisons may be drawn with the semiotic project of Morris. However, it is incongruous to claim Morris had any impact on Kiesler. They were both alive and active, in the States, around the same time but this is not sufficient reason to imply an influence. More likely an influence is the semiotic logic of Charles Peirce, via the pragmatic philosophy of William James (of whom various books were found in Kiesler's library). Kiesler's "Law of Transmutation" seems to be a designer's interpretation of the Pragmatic Maxim, to describe a process whereby design is the perception of possibilities, creating mental products shaped through the combining of influences and constraints in a particular direction to inform new potentials, which the designer gives physical form. This process of transmutation seems to mimic the Peircean sign model in such a way that the semiotic character of Kiesler's design theory must be recognised. Much work remains to confirm the correlations identified and to establish the significance of Kiesler to biosemiotics, and vice-versa. A project is underway at the Kent School of Architecture to realise the Endless House and in so doing to substantiate the

proposed influences and better understand how he translated his design theory into physical form.

The second upshot of this paper is the significance of biology to architecture—an issue Kiesler was all too well aware of, and advanced. The organism-environment coupling is fundamental and architects, such as Kiesler, do well to recognise the impact of architecture on wellbeing. An understanding of the processes of life are therefore fundamental to the design of buildings, which in turn has the potential to support and enhance wellbeing. Consequently, an understanding of life informs architecture, which may promote life. Kiesler strove to promote such a cycle in his Endless House. Unrealised, the Bioscleave House by Gins and Arakawa was used to serve as an exemplar of an architecture to promote life. Professing man a nucleus of forces, and that the purpose of design was to interpret and mould these forces in a particular direction Kiesler declared the purpose of architecture to support and enhance wellbeing. The biological impetus behind the correlation between inhabitant, environment, art and technology to Kiesler's design thinking coupled with the perceived semiotic undertone strongly suggests that, were Kiesler alive today, he would likely be an advocate of biosemiotics.

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