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1 INTRODUCTION

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11 This special issue on the theme of “agency and (the built) environment”, explores correlations
12 between living systems and their environment. It therefore considers how built environments are
13 formed, the correlations between environment and builder/inhabitant and how, as designers, we
14 might rethink humans’ and other organisms’ relation to environment and, in so doing, reapproach
15 how humans define and form our built environments.

16 The coupling of organism and environment as theorised by the Estonian proto-semiotic biologist
17 Jakob von Uexküll (1864–1944) is a keystone. Uexküll influenced key architectural thinkers of the
18 twentieth century (Botar 2001 and Detlef 2007). His sign-oriented and functional notion of space
19 (Uexküll 1926) is crucial in any biosemiotic consideration of ‘environment’. In particular, he
20 foregrounds the way in which signs may be understood as forces which inform and direct an
21 organism’s engagement with its environment. This is a conception in which architecture, or the
22 forming of a built environment is, at base, the moulding of “forces” to direct life in a desired
23 direction (Kiesler 1939). A sign *informs*. Whether signs announce anything directly or indirectly, they
24 nevertheless orient their interpreter; in this sense, signs may be compared to “force”. Given that all
25 organisms persist to satisfy their physiological and social well-being, perception correlates to
26 activity: i.e. observation of some quality in the world leads to some effect, which affects some
27 action. The context in which X is interpreted defines Y, which leads to a response Z, being the
28 synthesis of X and Y in a particular context. The events and relations affecting an agent become
29 genuinely meaningful to the agent as a result of their placement in a larger system of communicative
30 interactions, understanding the effect on the percipient as denoting merely a situated response
31 (Favareau 2007).

32 The manner in which something holds significance for some other, such as to effect a force, is
33 intrinsic to agency. That there is some effect, between one thing and another, means that the
34 perceiving organism and the “object” of attention enter into a relationship and have some form of
35 commonality. The fact that it is the property of significance that brings this relation into being
36 distinguishes this kind of semiotic causation from mere brute force causation (see Hoffmeyer 2007)
37 and forms the hallmark of relationships established by living beings - with one another and their
38 environment. We might consider that the effect has some value or that it is self-reinforcing, such
39 that it causes habit – or an inclination to respond in some way. These *vectors of significance*
40 constitute the organism’s environment, establishing a form of force field within which organisms live
41 their lives (See Lewin 1935 and *cf.*, Lotman 2005). Agency thus infers some effect generated by
42 mutually constitutive intersecting vectors of significance and that this effect is reinforcing.

43 Living systems are embedded in their environment, which, from the organism’s perspective, is a
44 matter of relations and forms established through vectors of significance. These vectors of

45 significance constitute environmental pressures and form an organism's "life space" or, as it is
46 sometimes called, an organism's niche. Hoffmeyer's work, in particular, has been important to
47 establishing what constitutes a *niche*, especially the "semiotic niche" (2008: 169-211 1996: 59-60).
48 Tracing the idea from its origins in the early to mid-twentieth century, through Grinnell's, Elton's and
49 Hutchinson's definitions, Hoffmeyer shows that biological conceptions of 'niche' have tended to
50 harbour the idea that there is inevitable "*competitive exclusion*" (2008: 184; italics in original)
51 through natural selection which determines the nature of the niche for the species inhabiting it. Yet,
52 as Hoffmeyer (2008: 184) points out, the ecological niche is "n-dimensional", so it is difficult to work
53 out whether a niche fits two species in exactly the same way. What is needed, in light of this, is a
54 sense of how the species apprehends and inhabits a niche; or, put another way, what the species
55 discerns in the niche. Hence, the semiotic niche:

56 The idea behind the concept of the semiotic niche was to construct a term that would
57 embrace the totality of signs or cues in the surroundings of an organism – signs that it must
58 be able to meaningfully interpret to ensure its survival and welfare. The semiotic niche
59 contains all of the traditional ecological niche factors, but now the semiotic dimension of
60 these factors is also strongly emphasized. The organism must *distinguish* relevant from
61 irrelevant food items and threats, for example, and it must *identify* the necessary markers of
62 the biotic and abiotic resources it needs: water, shelter, nest-building materials, mating
63 partners, etc. The semiotic niche thus comprises all the *interpretive challenges* that the
64 ecological niche forces upon a species (Hoffmeyer 2008: 184; italics in original).

65 What the semiotic niche entails, then, is agency – in the "interpretive challenges" in which species
66 engage. Even as a species is 'forced' by signs in its environment, it is engaged in succumbing to the
67 force of some signs available for interpretation according to its sensorium and not others available
68 for interpretation according to its sensorium (as well as, sometimes being subject to signs that are
69 *not* available for interpretation according to its sensorium, such as those associated with non-
70 customary predators).

71 The spatial constraints on species that are characteristic of a niche amount to a fundamental feature
72 of living systems in their development and unfolding engagement with the world. The "interpretive
73 challenges" species face and the subsequent configurations that arise from enactment of specific
74 options precipitate specific engagement with, and even a shaping of, the species' environment.
75 Evident in reaction-diffusion systems and birds flocking, the components spanning systems and
76 scales from living system to social system have relevance and their interactions are deictic, effecting
77 meaning and direction to form structure and patterning because the relations constrain one
78 another. This is evident, for example, in the building of self-ventilating mounds in termites: the rules
79 that govern construction can be seen as productive constraints, because they are sensed by the
80 organism that responds to them, giving them what we will call, for want of a better word, a
81 'meaning', and ultimately creating a functional pattern (the mound and its passive ventilation) that
82 improves the colony's fitness. It is a fundamental character of natural systems that spans scales from
83 abiotic to social systems and does so with an emphasis on *system* and collective action.

84 Developing this last idea, two lesser known papers of Hoffmeyer also form provocations for this
85 special issue: (1) his 1995 paper, 'The swarming cyberspace of the body' and (2) 'The Swarming
86 Body' (1994). Both consider endosemiosis as undermining unitary, self-identical theories of
87 organisms, all the way up to humans, as repositories of moored consciousness or stable cogitos.
88 Both present a collective/social conception of organisation effected through semiotic interactions, to
89 inform a notion of space and (built) environment as self-organising. This semiotic perspective unifies
90 the (built) environment and biology and is the basis of this special issue in which the contributing

91 authors offer an interdisciplinary perspective on agency in the (built) environment and on how space
92 is a scaffold through which organisms form correspondence with what they perceive.

93 **Overview of Articles Included in this Special Issue**

94 This special issue includes a diverse range of invited papers by authors predominantly fresh to the
95 biosemiotics fold. The purpose, as such, is to incorporate new insights and contemporaneous
96 dialogue, opening debate on the issue of agency in the (built) environment and extending
97 biosemiotic notions of agency (viz. Tønnessen 2015) and pragmatically to notions of how we inhabit
98 and shape environments, as well as the impact all of the foregoing have beyond the human sphere.

99 The first paper, by Bellentani and Arhipova, appraises a biosemiotic approach, emphasising how
100 social media impacts the use and representation of built environment. In so doing, the paper
101 proposes semiotic dimensions of agency. Bellentani and Arhipova suggest that human beings, like
102 any meaning-making system, actively communicate experience and that the ubiquitous impact of
103 digital media on contemporary urban living provides a means of insight into the recording and
104 amplification of built environment interactions. Biosemiotics, they claim, can prove a useful
105 perspective for interrogating the axiological dimensions people harbour with respect to their
106 environments. Biosemiotics, importantly, provides a lens through which to scrutinise the agential
107 occupant-environment relationship because of its treatment of natural and built environments as
108 equal, helping urban managers to move beyond the archaic divide between nature and human built
109 forms to provide a means to reconsider human/non-human relations for a more ecologically
110 oriented built environment. In so doing they propose how digital media becomes built environment,
111 extending human *Umwelten* as opposed to merely allowing contemporary representations of it.
112 They clinch the point that social media practices around nature and the built environment do not
113 just amount to some further representations which furnish the *Umwelt* but, instead, add up to a
114 furthering of the *Umwelt* in some way – perhaps by changing users’ relation or conception to the
115 (built) environment. The idea leads to consideration as to how digital social media emphasis and
116 augment social space(s). Henri Lefebvre emphasised the role of social space, and prompted a
117 revision of how space is perceived with regards to the built environment and the modern
118 architecture movement (Lefebvre 1995). He exposed a juxtaposition between the idea of abstract
119 space (which is at once, homogenous and fragmented, geometric, visual and phallic) and space as an
120 extension of the body, sensorial and imaginative. As Stanek says “Lefebvre formulated a concept of
121 space as socially produced and productive: proposed by and made productive in a variety of
122 practices and by various agents that cooperate, compete and struggle” (Stanek 2012:50). Lefebvre
123 concluded that space is a once produced and productive. Extending the idea digitally presents the
124 idea that digital space (if we can claim such a thing) influences and is revising social space, and that
125 digital social media is the “glue” driving this shift. Lefebvre was dead against semiotics (he only knew
126 Saussure’s semiology). Observing social media practices through a biosemiotics lens, Bellentani and
127 Arhipova provide a commentary on social space prompting augmentation of the *Umwelten* theory
128 and how digital multi-media practices are reinventing our relationship with built environments.

129 Toeing the line between biosemiotics and anthropology, Machtyl’s article draws parallels between
130 these seemingly disparate fields, and emphasises the juxtaposition between them to be a misnomer
131 when deliberated in terms of dwelling and living. Highlighting the significance of non-human agency
132 and design she pulls Ingold into line, explicating his antipathy to semiotics to illustrate a fresh
133 perspective on Gibsonian ecology. Reassessing Ingold’s criticism of semiotics - the assumption of
134 continuity of semiosis in the world – posing his claims as revealing an asset as opposed to a vice,
135 Machtyl emphasises the coexistence of all beings in the world. This is not only a virtue but a
136 necessary understanding in light of environmental catastrophe awaiting us should we continue

137 down the road paved by the antiquated anthropocentric view. Throwing light onto Ingold's premise
138 of living *in* the world, she explicates Ingold through a Peircean lens, pointing out convergences
139 between Ingold's perspective and the biosemiotic project. Following Maran's (2016) subject-
140 oriented perspective, Machtyl investigates *Umwelten networks* using a case study (Zoepolis) through
141 which she explores the subjectivity of cohabitating agents and how this might inform an ecological
142 design perspective. In so doing, Machtyl sets the ground for successive authors, touching on notions
143 of "intentionality" (a matter Seif tackles in his paper concerning *De-Sign*), and the contribution by
144 Benedikt, following Machtyl's, which introduces Martin Buber's concept "I/It-I/You".

145 Michael Benedikt is an architect, who makes no apology for explicating a non-biosemiotic
146 perspective, but in so doing endeavours to explicate parallels between a collection of matters of
147 convergence between architectural theory and biosemiotics. One of these is the *Isovist* theory of
148 which Benedikt is an originator. An isovist is a method of representing the spatial richness of visual
149 perception graphically. Such methods illustrate the visual structure of built environments and
150 demonstrate how buildings are composed in order to address the directionality and temporality of
151 vision: they are apprehended gradually as isovists change and shift as we navigate and move
152 through an environment (Benedikt 1979). Coupled with a Gibsonian ecological perspective of
153 dwelling and spatial perception, Benedikt presents a critique of overtly system perspectives which
154 he tempers through the lens of Martin Buber's social "I/It-I/You" theory. This latter, he suggests, is a
155 way out of the typical overt systems assessment, providing a means to describe (the meaning of)
156 objects and space phenomenologically and ecologically at once.

157 Stimulated by "The Swarming Body" (Hoffmeyer 1997), one of this SI's two provocation papers,
158 Bacigalupi explores the idea that agency is not individual or localizable but a product of interlacing
159 and overlapping patterns of inference. As a collective phenomenon, agency is identified analogically
160 as a swarm of swarms, or overlapping swarms, corresponding to body composition, whereby
161 functionality and maintenance of any "organisation" is deemed a consequence of mediation,
162 signification and collaboration between discrete yet conjugal collectives; or "parts". Exploring the
163 process of inchoate sign generation (or semiogenesis), Bacigalupi presents a heuristic lens through
164 which complex generative agential phenomena might be rigorously understood. Using the termite
165 mound as a prototypical example of collective sign action and how this manifests an artefact that is a
166 physiological extension of the colony - and thereby a semiotic component of the termite - Bacigalupi
167 demonstrates points of convergence between termites and humans. These, he claims, provide
168 greater efficacy and a means of forming a more balanced approach to co-creation in design. As such,
169 they would lead to the production of built environments that are more auspiciously situated and, so,
170 in tune with the multifarious web of agencies human incursions into the fabric of being and
171 becoming tend to evince.

172 The final paper from Seif extends the concept of "intentionality", introduced by Machtyl, to argue
173 the potential for design to promote transdisciplinary trajectories, in the same way that Bacigalupi
174 prompts through his conceptual heuristic model. The idea of *De-Sign* is at the heart of this
175 contribution. It emphasises the intrinsic correspondence design possesses, as an activity and act of
176 mentation, in common with all sign-action or, more precisely, semiosis. Design is thus a process of
177 semiosis - a fusion - that translates and transforms an environment for functional, aesthetic and
178 artistic purposes. Like the contributions that precede his, Seif illustrates how semiosis is a product of
179 agency and how this process, perceived through a (bio)semiotic lens, ought to inform an ecological
180 and more harmonic approach to (human) world-making.

181

182

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