

ECOLOGY, HEALTH AND CYBERNETIC VISIONS: MCHARG'S X-RAYS OF THE ENVIRONMENTAL BODY (1956-1969)

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INTRODUCTION

On December 24, 1968, in what would become the most watched television broadcast at the time, the crew of Apollo 8 took turns in reading from the Book of Genesis as they orbited the moon. Chapter 1:22 reads (New American Standard Bible, 1969):

'God blessed them, saying, Be fruitful and multiply, and fill the waters in the seas, and let birds multiply on the earth.'

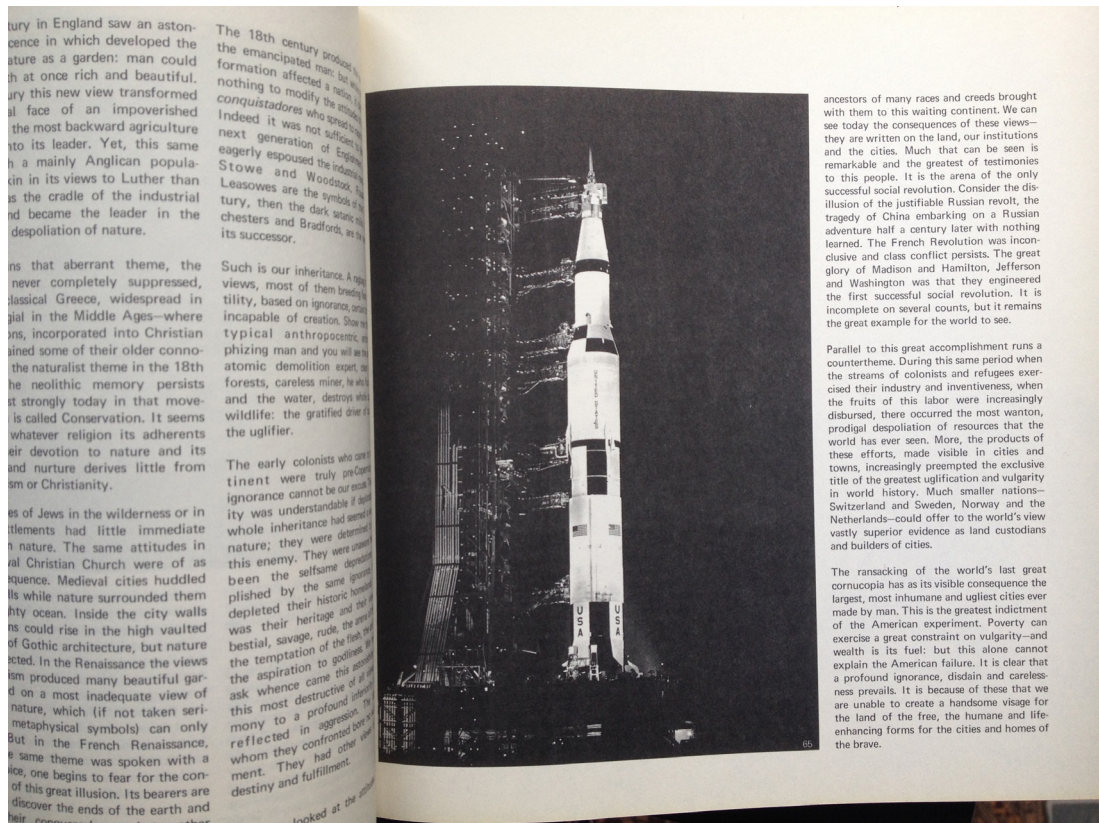


FIGURE 1: Reference to the NASA Apollo space missions in Ian McHarg's Design with Nature (1969, 76)

The reading from space became a spectacle that symbolized and added leverage to a new mindset that viewed life on earth as one large interconnected ecosystem. (Figure 1)

One year later, this very passage of the Book of Genesis is referenced in the title of Ian McHarg's 1969 film entitled "Multiply and Subdue the Earth" (PBL). My argument, as will be more clear in what follows, is that the reasons for choosing the title had to do with cohesive message of the Bible, though not necessarily in a religious sense, and with the Apollo mission, to the same degree. The image of the astronauts acutely confined to the space vessel, reflecting on the omnipresent force of a spiritual calling for life on earth, was too powerful and political an image for McHarg to resist.

The point made in this paper is not that there are links between McHarg and the mid-20th century science known as cybernetics – as we will see shortly there is plenty of evidence of that (Anker 2005; Herrington 2010; Lystra 2014)¹ – but rather what these links imply, and in what way the implications may be productive and relevant for us to ponder. My thesis can be summarized in three points. First, I show that McHarg communicates his agenda, and proposed methods for action, in a rhetoric that mirrors that of systems theory and cybernetics. His use of terms such as regulation, fitting, creativity, stability, adaptation, and health explicitly implies an approach concerned with flow management, control and feedback. Second, if we look beyond textual or semantic correlations, I have found that the actual model McHarg proposes implies an interesting and unusual setup between what he calls "the body" and the "environment", which I think deserves to be revisited. Finally, I will show how McHarg in this rhetoric uses techniques of representation that closely emulate those of system scientists and cyberneticians a decade earlier. I will end the article by briefly speculating around what this revisit of McHarg could potentially imply for contemporary landscape urbanism.

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As historian Andrew Pickering points out, cybernetics is a different kind of science that belongs to a strange and unfamiliar paradigm (2013, 90). Its point of origin was MIT in the late 1940s, and the work of mathematician Norbert Wiener. His 1948 book, *Cybernetics or Control and Communication in the Animal and the Machine*, was inspired by questions concerning how animals and humans maintain equilibrium, and how they respond appropriately to their ever-changing environment. Over the next decade Wiener's ideas would develop into a science that couples ideas of feedback and control with information theory and electronic computing. The most salient aspect of the new science was that it embraced the unknowable by substituting older ideas of scientific certainty with a new cybernetic ontology that invites for processes of adaptation and becoming (Pickering 1995). Unlike other sciences, cybernetics begins with the view that the world ultimately is *unknowable*, it is 'an unpredictable place of emergence and becoming' as Pickering notes in his text *Cybernetics and the Politics of the Dark Universe* (2013, 90).

McHarg's *Multiply and Subdue the Earth*, was a 120-minute film co-produced, written and presented by McHarg and American journalist Austin Hoyt for the Public Broadcast Laboratory of National Educational Television (now PBS). The film begins with a scene from the US national institute of health, where behavior scientist Dr. John Calhoun is attending to an experiment (Figure 2). Directly influenced by Heinz von Foerster, the originator of so called second order cybernetics, the pictured mouse maze study is a form of biological computing, here concerned with urban pathology. The focus of the ongoing experiment is the social behavior changes that accompany increases in density, overcrowding and social competition. In other words, the goal of the gerbil experiment is to understand what Calhoun calls "pathological togetherness" – the antithesis of the Genesis message. At the beginning of the film, Dr. Calhoun explains the most recent finding of the study:

As the population increased in size, as there was more interactions between individuals, the change that took place was not so in the character of the deviance of behavior, but in the fact



FIGURE 2: Psychologist John Calhoun's mice maze: a tool of behavioral psychology research, as featured in *Multiply and Subdue the Earth* (PBL 1969, film)

that a larger and larger percentage of the population exhibited deviance behavior that was not of survival value to the group. (Multiply and Subdue the Earth, 1969)

The scene of the mouse maze brings to mind other experiments in environmental psychology and behavioral studies such as those conducted by Edward Tolman, but also studies on intelligence, machine learning and AI. Claude Shannon's maze solving mouse "Theseus" from 1952 springs to mind, or from a context closer to design the subsequent "SEEK" experiment by Nicholas Negroponte and the Architecture Machine Group from 1970. All these experiments deal with intelligence and with furthering understanding of man/environment interactions. However, there is a particular point that Calhoun is making, and that interests McHarg. The research suggests that individuals in dense and overcrowded settings often develop deviant behavior, which imply collaboration and a sense of a shared purpose is absent.

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That same December in 1969, NASA's Apollo 8 also sent back photographs of the earth as seen from space. The sociopolitical impact of this *looking back* at what became known as *the blue marble* has been written about extensively (Lovell 1979; Poole 2008). Relevant for this article is that a modified version of the image reappeared on the cover of Ian McHarg's manifesto: *Design with Nature*, the same year *Multiply and Subdue* was broadcast. While the selection of the cover art may have been a strategic move to capture the attention of a wide audience -- this was after all a period in which the American public was spellbound by the Apollo programme -- I would argue that McHarg's intention was more profound. Similarities to the cover of Stewart Brand's counterculture magazine *Whole Earth Catalog*, published a year earlier, are striking. While Brand's publication was intended to equip back-to-the-landers with practical and intellectual tools useful for self-sustained living, McHarg's book presented a vision of symbiotic collaboration and their resulting in human environments designed in concert with the natural world. The explicit parallels between the closed environment of the Apollo spacecraft, and the biosphere of the earth are striking and unusual. He writes: 'If one can view the biosphere as a single superorganism, then the Naturalist considers that man is an enzyme capable of its regulation, and conscious of it. He is of the system and dependent upon it, but has responsibility for management, derived from his appreciation. This is his role -- steward of the biosphere and its consciousness' (1969, 124). References to space appear, as Peder Anker (2005) points out, in many places in McHarg's work. For instance, in a few of the chapters in *Design with Nature*, an astronaut serves as McHarg's narrative protagonist. For example, in a chapter entitled "The World is a Capsule", McHarg writes that 'We can use the astronaut as our instructor', as his struggle for survival within an essentially closed system is in principle the same as that of mankind in the biosphere of the Earth (1969, 95). However, while the functionality of a spacecraft is monitored by sensors fitted to electronic signals, the question McHarg faces concerned how to measure that the earth evolves in a sustainable manner?

Continuing a tradition of overlay mapping, McHarg proposes a survey method that integrates information from a cross-disciplinary set of sources (1967). The output from the prescribed critical diagnostic analysis, performatively constructed with the help of graphic transparency, is referred to as “X-rays” (1969, 35). In short, McHarg approaches an expert in each field of science and asks where, from their point of view, a geographic site or region would be most harmed if developed. For each scientific field a transparent overlay is developed that via the means of grayscale encoding communicates the areas are most and least negatively impacted if developed. On the example of the route selection for the Bronx River Parkway, McHarg notes that at the outset, ‘The method was known but the evidence was not. It was necessary to await its compilation, make the transparent maps, superimpose them over a light table and scrutinize them for their conclusion. One after another they were laid down, layer after layer of social values, an elaborate representation of the Island, like a complex X-ray photograph with dark and light tones. Yet in the increasing opacity there were always lighter areas and we can see their conclusion’ (1969, 35). (Figure 3)

In essence, McHarg’s ecological method (1997; 1969) constitutes a greatest-social-value-at-minimum-environmental-cost model, in which creativity constitutes the driving factor. The notion of creativity is borrowed from thermodynamics, where it is defined as the process of raising matter and energy to ‘higher levels of order,’ (McHarg and Steiner 2006, 54). This change, according to McHarg, is a process of inherent directionality - a phenomena he finds applies to both living and non-living systems. Thus, McHarg argues that if one can observe the directionality of the process, then it can also be determined whether or not it is creative. The criterion used to judge whether or not a process is creative McHarg calls ‘to fit’ (McHarg 2006, 25). He writes, ‘The ability to find of all environments the most fit, and to adapt that environment and oneself, is in fact a creative process’ (Ibid., 24). But in order to determine whether or not a situation is exhibiting “creative fitting”, a holistic attribute is needed: ‘health’ (Ibid., 25). However, the medium McHarg chooses to express the holistic attribute is to become the most criticized feature of his work– the static cartographic map (Herrington 2010, 11).

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While the map is static, much of McHarg’s rhetoric focuses on dynamics of landscape, and interestingly, while he is fundamentally opposed to Western anthropocentric industrialism and 20th century dominance of neo-liberalism and laissez-faire politics, which he believes is the cause of a rapid and unforeseen destruction of the environment (1969, Chapter 3: “The Plight”), McHarg proposes replacing not the philosophy of economics per se, but rather the currency of trade, from money to energy. In other words, what McHarg proposes is ‘an ecological value system in which the currency is energy’ (1969, 197). This shift, he argues, will increase ecological awareness by establishing a controlled and scientifically monitored world. Focusing on energy enables not only a dynamic survey of environments but diagnosis of their health, which in turn will allow for a better and more sustainable alignment between the purpose of natural systems and that of man-made ones. This goal of aligning purposes – or diagnosing health, according to McHarg – is arguably the key attribute that McHarg’s program shares with cybernetics. The central question, which makes the topic resonate with the contemporary moment, is that if we for the sake of reflection imagine Ian McHarg as an ecologist-cybernetician, concerned with sustainable management, we will have a difficult time determining if McHarg sees himself as belonging to what is known as First order cybernetics, where the observer is not part but located outside of the system he is observing, or if he belongs to a higher order cybernetics, where the observer is part of the system and in turn, by his presence, influences and is influenced by the system. On this very point McHarg consistently contradicts himself.

In focus, in McHarg’s writing, is the dynamic body of the environment, i.e. the interface between human activity and the natural order. In other words, the body is construed as the combined symbiotic set up of the natural world and human activity. That is, a hybrid between what might



FIGURE 2: Ian McHarg, Richmond Parkway Study. Composite overlay drawing of social values. Design with Nature (1969, 40)

in earlier periods have been called *Nature* and the manmade or superimposed. Through his writing, teaching and professional work, McHarg commands that landscape architects must strive to become experts in determining the health of this hybrid, which in turn may assist in adapting human activities and in altering the environment to achieve “creative fitting”, envisioned as a stable and harmonious equilibrium, not only on a local level but on a scale that science with capital S predicts sustainable for the entire *blue marble*, construed as one holistic system. However, if we, like cyberneticians in the 1950s accept that our mission ought not to seek positive knowledge in order to make the world knowable, but rather concern ourselves with how to productively cope with uncertainty, where would that lead? Similarly, McHarg asks: ‘Where else can we turn for an accurate model of the world and ourselves but to science?’ (McHarg 1969, 29). While this strive for accuracy has in retrospect been labeled *scientific determinism*, the greatest learning from McHarg is perhaps that science may not offer emancipation for landscape architecture, as he once claimed (McHarg 1967, 105). Stated differently, as Andrew Pickering points out, many cyberneticians’ efforts, Stafford Beer among others, revolved around the construction of management systems that could performatively adapt to environments that they could not fully control (2013). In the case of environmental landscape design, such an approach implies neither a lack of environmental concern on one extreme nor total paralysis on the other, but rather that the process of monitoring, calibration and becoming is the object on which to focus, not with aim to stabilize it into equilibrium, as McHarg envisions, but rather to continuously refine our techniques for taking stock of landscapes in motion, and to actively participate in the process of propelling such forward.

CONCLUSION

The great master narrative of McHarg is that his is too expensive and controlled a method, and that his approach is lacking a humanist dimension. He is either accused of being blinded by scientific determinism or of being too subjective. What I suggest here is that his use of cybernetic blue-marble rhetoric is not an analogy but rather a shift in scale. That is, while his method is highly representational is also performative, in a cybernetic sense as described by Pickering. This aspect of McHarg’s work I argue is often overlooked in favor of his belief in ecological determinism. As I have illustrated in this article, via the ecological method, McHarg puts image to thought by giving flesh to the immaterial conception of the dynamic environment. As such, the X-ray is a temporal ontology, a snapshot, obsolete as soon as it is assembled.

ENDNOTES

1. This paper is intended to position itself in conversation with two articles written by Peder Anker and Susan Herrington respectively, which both make the suggestion that there are close intellectual ties between Ian McHarg, systems ecology and cybernetic thought in the cold war period. I am referring specifically to Anker’s piece “The closed world of ecological architecture” (2005) and to Herrington’s “The Nature of Ian McHarg’s Science” (2010). Related to these studies is also Margot Lystra’s article, entitled “McHarg’s Entropy, Halprin’s Chance: Representations of Cybernetic Change in 1960s Landscape Architecture” (2014), which suggests parallels between the language of McHarg, Lawrence Halprin and cybernetic concepts.

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