Biophilia

Biophilia is the notion that human beings require intimate exposure to the structure of biological forms, as essential for human health, both physiological and psychological. Biophilia is grounded in human evolutionary development occurring in a natural environment, and opposes the notion that “modern” human beings can ignore their own genetic make-up and detach themselves from natural settings without consequences. Biophilia helps to explain why human beings gain improved mental and physical health by being close to nature. The greatest of traditional architectures were achieved by instinctively following the operating mechanisms of design based on both intelligence and biophilia.

Biophilia is defined as the emotional and sensory attraction that people have toward complex things in the natural world: habitats and living objects in their immediate surroundings. It is now believed that human preferences toward things or conditions in nature, while refined through experience and culture, are the hard-wired product of biological evolution and thus inextricably human. Biophilia presents the real science behind a phenomenon that is critical to the natural human sense of wellbeing. Biophilia explains, for the first time in a scientific manner, how the mathematical structure of the environment influences us as human beings on the most basic biological level. Many of our innate responses to our environment can now be more effectively described and more readily understood.

Appreciating biophilia requires us to recognize our basic sense of wellbeing. The combined physiological and psychological state of our own body can be either sick/anxious/oppressed, or healthy/comfortable/elevated. A person’s wellbeing is negative or positive according to multiple factors. One of those factors is feedback from our environment; others include internal health, influence from external events, etc. The important point of biophilia is that our internal state of health is affected by the external natural environment, and not only by the presence or
absence of invading pathogens. The inner world is connected to the external world more than our modern society is willing to admit, even though this relationship is a basic focus of traditional philosophies.

Research has uncovered undisputed clinical advantages (pain relief, faster hospital healing) of natural environments, and artificial environments mimicking geometrical qualities of natural environments. Our neurological mechanism reacts positively to the information field generated by the specific geometry of natural forms, detail, hierarchical subdivisions, color, etc. The mechanism relies on a connection established via external information: visual, aural, tactile, olfactory, etc. We engage emotionally with the built environment when we encounter appropriate forms, spaces, surfaces, and details. Engagement induces a physiological reaction in the state of our body. Thus, we experience our built surroundings no differently than we experience natural environments, other living creatures, our pets, or other human beings.

Biophilic design merges artificial structures with natural structures, but not in any superficial manner. The design method involves a variety of natural processes such as: using natural materials and surfaces, allowing natural light, and incorporating plants inside a building. Honest use of natural materials as structural components is best; veneers are only better than having nothing natural at all. Brutalist and industrial materials turn out to be the opposite of biophilic. This also means more fully incorporating a building within a natural environment instead of purposefully erasing nature beforehand, as is too often seen in the reigning authority of the tabula rasa.

**Design through intelligence**

Psychologists utilize physiological sensors such as skin conductivity gauges, blood pressure monitors, etc. to measure the level of stress in an observer when exposed to good and bad examples of architecture. We see firsthand the immediate implications of the physical environment on human wellbeing. Physical and virtual modeling, as well as image-sequenced processes can be tested to determine their effectiveness on the large scale. Practitioners can easily develop a detailed knowledge of physiological processes through which evidence-based results can be interpreted and later applied. We can establish intelligent criteria and a classification system for forms and surfaces that give either a negative or positive physiological response. Designers can develop methods of documenting and evaluating this experiential dimension of architecture.

Biological intelligence has evolved to adapt our bodies and actions to the natural environment, enabling our survival through appropriate responses. This deep notion of INTELLIGENCE AS ADAPTIVITY extends to adaptive design (and includes the rapidly-growing movement of sustainable design). Design in nature is driven by adaptation, but not all human design is adaptive. We argue further that architects and urbanists throughout history sought and achieved adaptivity through their intuition. Traditional architectural training was aimed primarily at developing this
intuition. It is only recently that we have been able to use scientific knowledge to explain successful design processes that were until now somewhat mysterious, and thus vulnerable to subversion.

Given the recent development of this knowledge there exist few teaching models that could be used as examples, and appropriate texts are only now beginning to be written. This new design experience is actually very close to timeless vernacular techniques. The model is established through extensive research into the phenomenon of external information processing and retrieval. It explains why emotionally-nourishing art has that effect. Those who choose to implement this new model will participate in its further development. The guidelines presented here are intended to underpin and structure a developing corpus of architectural knowledge that is authentic to human life, sponsoring sustained research toward continued advancements in adaptive design.

Teaching biophilic design studio

Students need knowledge skills about biophilia and environmental psychology to design responsive environments. Textbooks in this area of theory are very limited: people have to learn from research articles on biophilic design. The experience in biophilic design studio will resemble an experimental laboratory more than the traditional studio, because its purpose will be to build models (including some details at full scale), and then use them to measure physiological and psychological responses. The students have to learn the biophilic effects viscerally, in their own body.

It is anticipated that architecture schools will eventually establish cross-disciplinary investigations with other departments such as the psychology department and the medical school. Collaboration will enable students to borrow physiological sensors such as skin conductivity gauges and blood pressure monitors to measure the level of stress in an observer. Cross-disciplinary investigations will also facilitate discussions about the influence of the physical environment on human wellbeing. Students will measure their own reactions to their models to determine whether those reactions are negative or positive. The aim is to bring a greater awareness of human engagement with the physical and perceptual world while working to establish evidence-based criteria. The immediate goal is to classify which spaces and surfaces give either a negative (oppressive, hostile, overly-exciting) or positive (elating, peaceful, nourishing) physiological response.

The explanatory framework offered by biophilia bypasses a long-standing conceptual mismatch between stressful and healing environments, and offers principles that fundamentally align architecture and wellbeing. Healing design arises out of ARCHITECTURE AS AN EXTENSION OF BIOLOGY. This is the main idea of biophilia — the built environment is much healthier for human beings when it is compatible with biological structures in a fundamental sense. From the very beginning, buildings and cities are to be understood and studied as essential parts of living systems. Undoing the artificial split between design and natural processes —
implemented during the twentieth century — the new standards of architecture will be inherently sustainable. The notion of sustainability has always resided in living systems for over two millennia, prior to the industrial revolution and the alienating influence of technology as a replacement of nature.

Regional construction assemblies, using load-bearing walls and local materials, are typically the most sustainable buildings possible. While we look to science and technology to help in achieving sustainability, adaptive solutions have already been developed in vernacular architecture. None of that is “trendy”, because fashionable architects prefer to implement high-tech and high-cost solutions to sustainability (or to aestheticize and commodify regional forms to carry their own signature design). We study vernacular architecture for use today, as an affordable solution to the world’s building and housing crisis. More contemporary methods can help local traditional construction systems to evolve, without replacing them. A culture of sustainable building can form only if patterns loved by their users can be built easily with relatively low-skilled labor. Lest we forget, THIS IS HOW TRADITIONS ARE FORMED.

In the current design paradigm where architecture arises out of an artificially-generated worldview, notions of sustainability have to be imported from outside the discipline. There exists a basic incompatibility between formal abstract geometry and our recent understanding of the earth as made of interdependent biological and physical systems. A great deal of effort is now being made to join two incompatible approaches, inventing technological fixes for non-adaptive architecture in order to make it less damaging to the natural environment.

The animating forces of materials and forms proffer a sense of life within a structure, and establish a measurable sense of human wellbeing in the built environment. Practitioners can learn to discern degrees of human engagement with the natural world and how to make good choices towards positive human responses. They can work through full-scale models and physiological testing using their own bodies as feedback monitors. Projects should be established and evaluated on a range of different scales, and incorporate biophilic-based methods of design. Architecture will be taught and practiced as an externalization of human biology: no technology or design idea will be imposed without checking its effect on living beings.

Decision-makers in the architectural discipline include clients, critics, elected officials, planners, developers, academics, university administrators (both of the architecture program and the university as a whole), as well as directors of architecture firms who hire young graduates. All of them have different interests and evaluate design from a different perspective. We would like to see concerted effort among all of these vested interests towards a more human architecture. A wholesale revision of architectural practice requires the cooperation and participation of all these parties.