POLITECNICO DI TORINO
SECOND SCHOOL OF ARCHITECTURE
Master of Science in Architecture
Honors theses

Biomimicry, from technology to innovation for architecture
by Giacomo Chiesa
Tutor: Roberto Pagani

“Biomimicry is an approach to technological innovation that draws its ideas from nature to solve the greatest environmental challenges of our time.” J. Benyus, Biomimicry Institute
Innovation means to win the laxity of the traditional system in order to get over classical rules, everyday paths and fixed diagrams. The new waves of change are created by innovation. Presently, the architectural wave of innovation is based on the sustainable development. Biomimicry (from the Greek bios, life, and mimesis, imitation) is a new possible way of innovation. In the bio-inspired vision innovation is also linked to sustainability but in a new way. If at the moment the human being acts in order to dominate and modify environment and nature, probably, in the future, the human species will see in nature and environment a model and a measure (J. Benyus). After four billions of years of evolution we can imitate species, solutions, structures, that follow the categories of what works, what is suitable and what is durable. Biomimicry is a new science that innovates from nature and uses an ecological standard to judge innovation (Pagani, 2006).

The waves of innovation

So the biomimetic method consists in imitating the natural world and its efficiency (Bologna, 2006) to study and reproduce in an artificial way structures, forms and materials (Molinari, 2006). For example an engineering team is studying a painless endoscope (Stefanini, 2006). These robotic instruments can go along the gastro enteric stretch thanks to their auto-locomotion ability. That specific capacity come from particular species, for example the earthworm that can go along pipes. There are many possible fields for bio-inspired research: from economy to biology, from architecture to medical engineering, from sociology to mathematics. Multidisciplinary character is an essential feature. Biomimicry enables to obtain good efficiency, sustainability and integration with the environment because bio-inspired technologies start from nature itself.

The “bioshelter”, a New Alchemy Institute idea

Janine Benyus says (1997): “The conscious emulation of life's genius is a survival strategy for the human race, a path to a sustainable future. The more our world functions like the natural world, the more likely we are to endure on this home that is ours, but not ours alone”. Biomimetic provides several approaches. Some objects are only formal bio-inspired, while other artefacts imitate natural methods in an artificial way.

With regard to these, Thomas Herzog divides biomimetic in two different meanings:

biomimetic as formal imitation (biomimetic)

biomimetic as the imitation of natural process (bionic)

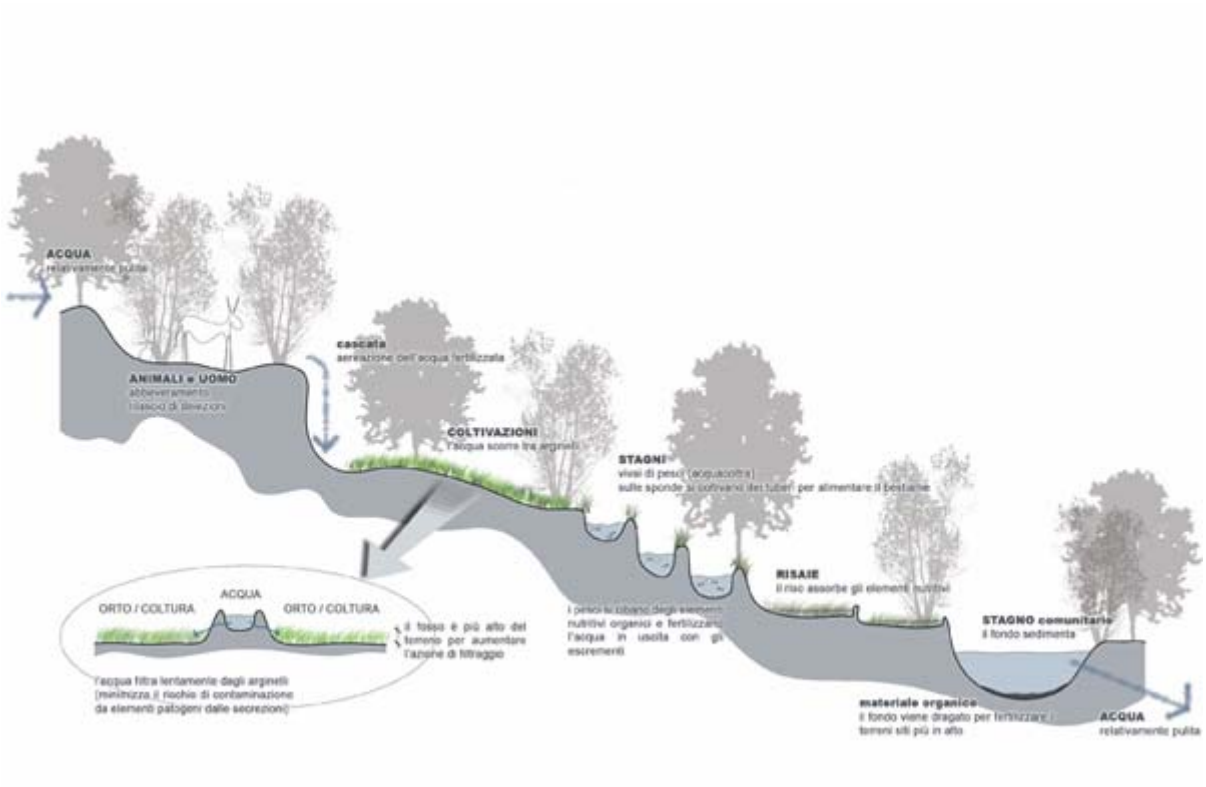
Also Janine Benyus (Biomimicry Institute) identifies three different approaches:

formal imitation (shallow biomimicry)

process imitation

ecosystem imitation (deep biomimicry).

As we can see the bigger difference is between formal imitation and the imitation of the process. The third meaning is another step in order to enlarge the scale of biomimicry's study: from the bio-inspired artefact to the biomimetic thought.



The cycle of water in a traditional Giava's farm – project and ecosystem

For further information, e-mail:
Giacomo Chiesa: Montagnino_it@yahoo.it