

The Road of Bio-Art

Zhang Pingjie / Art Critic

In the middle of the 20th century, with the discovery of the X-ray analysis of protein structure and of DNA double helix, science has moved into a new era of molecular biology. As opposed to the unilateral and single-subject scientific experiments before, cross-subject and interdisciplinary international cooperation has become dominant method in the study and experimentation of new subjects. As a result, some inter-disciplines have come into being such as biochemistry, biophysics, biomechanics, bioinformatics, etc. The rapid development of these bio-sciences finally led to the completion of the Human Genome Project.

The Twenty-first Century Is the Century of Biology

While the interdisciplinary combination in science was still booming, a new form of art, “bio-art,” also emerged at the dawn of a new millennium. Available documentation shows that the year 1998 marked the beginning of bio-art, although bio-art with real life came into being two years later.¹ In that year, Li Shan presented a bio-art proposal, called *Reading, No. 98-1*, and demonstrated by simulating “The Story of Fish and Butterfly” (*Tendency*, 2000, No. 13). Brazilian American artist Eduardo Kac, meanwhile, began his digital bio-art. However, Li Shan's proposal was the first bio-art proposal in the history of bio-art, and its importance lay in its idea of transgene and genetic recombination, and its construction by means of genetic engineering. The proposal stated that “all that is needed is to set a little obstacle for ribosome in reading mRNA, and place necessary amino acid into codons not corresponding to mRNA, forcing the information to be invalid... Since their genetic code is rendered invalid, it becomes possible to connect the codons of fish by even number, and those of butterfly by odd numbers, while ribosome moves as usual alongside mRNA; a protein with human cultural intent is thus synthesized.”

In this proposal, Li Shan pointed out for the first time with the bio-art concept, “I try to discard materials, dismantle language structure, and thereby create life directly. Audience can directly understand it without consulting any art guide.”

These thoughts originated from his attendance of La Biennale di Venezia in June 1993, during

which an orc-like piece by Matthew Barney prompted him to think deeply and recall his college days when he discussed the creation of humans with his classmates, leading Li Shan to reflect on bio-art.

In 1995, Li Shan went to New York, where we discussed the art of future every day, with bio-art the focus. This visit to New York set him on the road of bio-art. During the next two years, Li Shan read a large number of biology books, including university textbooks such as *Proteins and Proteomics: A Laboratory Manual*, etc., and took voluminous notes. All these resulted in his subsequent visit to New York in 1998, and the aforementioned bio-art proposal *Reading* and “The Story of Fish and Butterfly” we have read.²

What is bio-art? According to Li Shan, it is “to construct life itself with life as material. Current interest in biology studies lies in intervention in genes and making artificial genomes. Artists make art projects based on transgene theories and principles of gene fabrication, and make works of art with phenotypic traits using genetic engineering, hence the bio-art.”

In 2000, Kac created the glowing rabbit Alba, which was the first bio-artwork with life. Not unexpectedly, Kac's glowing rabbit was created with the help of a French university laboratory. In 2007, Li Shan and Zhang Pingjie, in cooperation with Shanghai scientists, achieved their first success with plants. The *Pumpkin Project* was a pumpkin series made up of pumpkins completely new in form and color. It was a great breakthrough in terms of the original state of plants, making them an artificial ecology.

Although science has long driven, directly as well as indirectly, the development of the history of art, new science and new art have never before been integrated in such a close manner (New Media Art, Nano-Art, etc.). In the practice of bio-art, works with life would be impossible without scientific achievements and the participation of scientists. Commission and cooperation have become inevitable in bio-art.

Nevertheless, bio-art, like scientific experiments, must be feasible, and supported by science and technology. Therefore, it has two categories: bio-art proposal and bio-art practice. Since most proposals are subject to objective conditions and are unfeasible, at present they can only be demonstrated through concept and visual image.

Although these works are mostly proposals, Li Shan's reflections on bio-art has reached far beyond the usual scope of art: bio-art “focuses on the entire world of life and on all species of

creatures. It is a test of the minds and attitudes of human, rather than a mere new approach to understanding art.” “It has changed the nature of life, and has broken the order of species. And there lies its difference with biotechnology.” (Li Shan.)

Bio-art has extended the focal point of art to existence and life itself. Art has become more than just a concept or visual form, and can also create life. In 2008, Li Shan and Zhang Pingjie drafted the “Declaration of Bio-Art,” and read it at the exhibition *History in the Making Shanghai 1979-2009: Artists Interviews & Work Archives* in 2009.

New Vision and New Species

The visual form of bio-art seems to move away from the history of art. It is an original art under the guidance and restriction of biotechnology and bioengineering, not a continuation or development of a certain school or style. It is not free imagination, but a new form of life, a new life whose generic trait has been altered. As works of art, the proposals of artists might be different from the results of the practice of bioengineering. It is accidental to some extent, and that's also where its charm resides. But one thing is certain: it must be a new visual form.

During the visualization of an art proposals, knowledge of biology and biotechnology has become crucial: one is feasible conceptual proposal, one is feasible practical proposal. They met and bore a new field of visual art. Amongst Li Shan's digital synthesis proposals there are some that are yet not feasible (such as the synthesis of human and insects, or of human and plants), and thus are demonstrated through digital previews, however they still generate strong visual impact today.

Among these projects, *Pumpkin Project* is a piece with life that has been realized from shape to color, and whose form variation has surprised artists. An organism has its innate logic, its synthesis involves a complicated system, and commonly exceeds artists' expectation and display a peculiar appearance. Bio-art challenges people's moral principles, visual experience, and cultural norms, but also focuses on the cohabitation and harmony of the biosphere.

Life Synthesis and Life Creation

After the completion of the human genome, a new discipline, “synthetic biology” was born. In 2004, MIT held the first International Meeting on Synthetic Biology. Scientists have tried to solve such problems such as the energy crisis, environmental pollution, medical treatment and

body repair with synthetic biotechnology. Synthetic biology is the most crucial theoretical basis of bio-art. In the phase of gene synthesis, bio-art can only make certain changes to original species, it cannot separate from the properties of its kind, and is at most variation of its nature. However, at the phase of life synthesis, cells are artificially synthesized in laboratories, and the cells are independent of their original species; I regard this as the start of life and, only then, are humans beginning to use the power to create life. In May 2010, American scientist Craig Venter and his team synthesized the first artificial genome through chemical synthesis in his laboratory. Venter therefore commented, “life can be designed and customized according to our necessity in the future. This provides technological support for the ultimate objective of bio-art.”

The latest proposal by Li Shan targets original bio-art, and organism without God's influence. Clearly, even when all indicators of bioengineering meet the requirement for the creation of life, there is still a long way to go to breed original life from a cell. This is more than a problem of technology, but will also meet restriction with respect to the law, as well as the level of tolerance of society, etc. At the present stage, bio-art can only utilize plants, certain animals, and fungi for life synthesis. Hence, more grand proposals by artists only exist in the form of texts or images, which makes proposal illustration a unique form of painting, independent of current aesthetics and critical context. It focuses on life forms in the future, and serves as ideological preparation for the coming of a “second nature.” An inevitable era is approaching.

Bioculture and Bioethics

With regards to the achievements in biotechnology, Li Shan says, “biological findings on a molecular level are discovery of basic life substance, and are the last hidden secret of God, the disclosure of which liberates human beings from being troubled by heredity. Individual life will hence be liberated from the restriction of the matrix. This is the most enchanting moment in the history of life.”

Since man twists the codons set by God, the culture, ethics and natural evolution that surround this system are challenged. Natural selection is the law of nature on earth, but will artificial interference or genetic recombination be inevitable for future biological evolution? If all life forms created by God (or nature) are called “first nature,” life forms created in human laboratories should be called “second nature.” Will the biosphere of the “second nature” live together with the “first nature” in harmony? Is man able to replace God? What role will God assume in the future? How should the ethics and culture of new species be established?

All these questions are shaking the existing cultural and ethical order. Li Shan explains, “in natural biological evolution, the genetic communication within and between species is ever ongoing, and this is a basic mechanism in the evolution of genomes. Genetic engineering, such as transgene, is a measure of interference, and adds to the scope and speed of such communication, while solving reproductive obstacles between different species. Artificial evolution will be the inevitable choice of biological evolution. Design and construction of new species of creatures should be routine work in the laboratories of scientists and artists.”

In the future, will artificial ecology be a supplement to natural ecology? Is artificial evolution able to repair and improve weak genes in natural ecology, making them adaptable to climate and environment changes in the future? As for human beings, the optimization and natural selection of species and the adaptation to different climate and ecological environment have always been part of nature's self-adjustment, except that its pace is now accelerated. Today, life synthesis of science or of art are both propelling biological diversity and species optimization, while bio-art has made life forms more diverse. The customization of genetic synthesis in bioengineering and the professionalization and commercialization of genetic chipsets have made the conditions for the practice of bio-art. In the future, both bio-scientists and bio-artist will be able to talk with God. God will not only be the creator, but also the founder of human ethics, law and order, the latter of which will be especially important to the new creator. In an exhibition hall, a *Bible* with bio-art content points out the difficulty we are to face in the future.

This is the crucial difference between bio-art and other forms of art. It is always in the company of science, ethics and culture. It will not and cannot be an isolated phenomenon. Therefore, bio-art is not only a form of art, but is also creating a new cultural, ecological and ethical relationship.

Bio-art breaks not only the order of art, but also ethical order. When these organisms without parents and divine influence are created in laboratories, the first challenge to meet is ethical. The birth of a “second nature” will be accompanied by a shift in the entire order and values. The *Bible* in the post-God era will not be established by one single person, but will be a renewal of the cultural system and an adaptation to new conceptions, laws and relevant social relationships, as well as existence. Li Shan says, “the only objective of biotechnology is to serve human health and life, while bio-art has nothing to do with human health and life, but instead focuses on the entire living world and on all species. Bio-art is a test of the minds and attitudes of humans, rather than a mere new approach to understanding art.”

In the early days of bio-art, artists only focused on the creation and change of life forms, they could not maintain and optimize new species; but with the development and maturation of artificial synthetic technologies, the quality, blood relations and reproduction of species in bio-art will all be important parts. The collection, breeding and taboos of bio-art will all be special subjects, penetrating into our life, becoming a part of life.

August 2012, at Studio 101

1. In 1997, Kac had one microchip implanted in his body and called this “bio-art”; in fact it was merely performance art, and was far from bio-art. Later, Kac redefined the meaning of bio-art. Therefore, it can be said that works with Bio-Art thinking first appeared in 1998.

2. Li Shan's speech at the “Bio-art Forum” held by Shanghai Art Museum, 2012.