Birgit Richard
I-Biology and Fake Life Construction

Communication Fragments from the LifeSciences Internet Symposium

Preliminary remarks

As in the past, an Internet symposium focusing on this year's festival theme has been held as a lead-in to Ars Electronica 99. My aim here is the difficult task of summarizing this discussion which has been going on since April 20th. This will consist of a mixture of opening statements together with a recapitulation of and commentary on the most important, most interesting and most provocative postings from the mailing list.

Intro

Genetic engineering and biotechnology are designing plants and animals–the living environment of human beings–on an ever-increasing scale and are thus creating structures of life that are inescapable and artificial. This common, everyday construction and production of nature provokes intense opposition, although this is, in essence, a process which mankind has been engaged in since the very dawn of civilization. But when it comes to employing genetic engineering in the service of medicine to wipe out diseases one by one and thus ultimately to improve the lot of mortal men and women, there is widespread approval of this technology.

An argument in favor of the production of medicines and foodstuffs using biotech processes is the capability of serving each and every person individually and taking his/her unique characteristics into account. The actual standardization of exceptional traits is being covered up. Since this is a matter of an industrially motivated form of production, standards are required. Even genetically engineered products that are being produced for a wide variety of market segments in a highly individualized society are a part of an effort to establish biological standards and norms.

In some cases and particular points, there are also certain linkages between art and science in the field of life sciences. The system-theoretical question regarding attribution to a particular system constitutes a permanent backdrop to this discussion. The conservative argument that art must wait before finally assessing the development of technology and making use of that technology itself prevents the elaboration of utopian designs. Heightening awareness of the potential and the dangers of a new technology before it confronts society with a *fait accompli* is one essential task of art. Technical as well as interpretational standards are quickly accepted as established facts. With the projection of future genetic worlds, art stimulates communication.

Take 1–Delineation of the Field

Eugene Thacker undertakes a structuring and clarification of the theoretical field, and differentiates among the following categories:

• **Biotech, Biotechnologies:** technologically-based research such as the DNA chip, research in the area of biomaterials capable of regrowth, stem cells, regenerative organs and the structure of the administrative, economic and scientific complex.

• **Cloning & Genetic Engineering:** cloned animals, cloning of human embryos, transgenic organisms.

• **Genomics:** the Human Genome Project and other commercially-propagated undertakings contributing to the cartography and interpretation of genes, the genome of animal species, automation of genetic technologies, and bio-computer science.

• **Artificial Intelligence & Artificial Life:** self-emergent systems, neuronal networks.

• **Biopiracy:** the Human Genome Diversity project, new approaches in sociobiology and eugenics, bio-colonialism as the appropriation and exploitation of biological material from "other" cultures, hereditary diseases and the genetic constitution of ethnic groups, patenting of biological materials and the question of property rights.

• **Ag-Bio & Pharming:** transgenic foodstuffs and plants, novel food, medical cultivation of materials for xenotransplantation and bioremediation.

• **Medical Genetics and Immunology:** genetic therapy and new reproduction technologies.

Take 2–Society and Military

Gerfried Stocker describes the life sciences as new key technologies and as heralds of a biological revolution that implies the promise of healing all illnesses and bringing about life that is healthy, beautiful and eternal. Failure to pursue the advance of biotechnology and genetic engineering would violate an unspoken moral imperative of Western societies. In light of hunger and disease, every technological means must be brought to bear in order to bring about solutions to these problems–thus runs the line of argumentation favoring across-the-board implementation.

Genetic engineering reaches its consummation within the framework of global capitalism, and can, as Eduardo Kac has remarked, bring on the emergence of a new genetic colonialism. Indications of this become evident above all in the biotech industry's patenting procedures. The rights and living conditions of the donor or of the newly-engendered creature are completely excluded from this process.

New tools of information technology demarcate the boundaries and taboos of Western cultures when they are put to use in art as well. With this intervention into its basic constituent elements, life itself is being redefined. Genetic interventions into the "pre-human," cellular stage pre-form human life. These modifications go far beyond the visible, morphological level of the body.

In his opening statement, Gerfried Stocker stresses the immense importance of artistic designs. Particularly the experiences and methods of media art could prove to be helpful in dealing with the highly controversial issue of life sciences. Objects of artistic communication ought to neither exacerbate nor diminish the legitimate fears of a biological Armageddon, but rather introduce them into the social consciousness–and legitimate fears they are in the face of Bhopal, Tschernobyl, and BSE.

Aside from the use of biometric processes like the "genetic fingerprint" or genetic diagnostics, Georg Schöfbänker [see his essay in this volume] identifies the greatest danger in the deployment of biological weapons, "the poor man's atom bombs." With the innovative

deployment of genetically-engineered biological weapons, the military hopes to add to its arsenal a type of biological Cruise missile that only targets other ethnic groups. These genetic bio-weapons are designed to terminate losses to "friendly fire" once and for all. These conceptions are no less utopian than the assumption that the fungus developed by US scientists would only be deadly for drugs being cultivated in South America but would have no consequences for vegetation and human beings.

Take 3–Artists as Bioterrorists?

"Where collective fallacy holds sway, perhaps it is high time for creative bacteria to assume control." (Trevor Batten)

Could a new role for artists be that of the friendly bioterrorist who claims only fictional victims? Or can things go as far as Trevor Batten imagines: can we look forward to paying a great deal of money for the pleasure of being the first victim of a new strain of lethal infectious art?

For the Internet symposium, Trevor Batten has been inventing news reports on the commercial production of clones–for example, the item about the firm B-Gen-Tech Inc. that has come up with new organisms and creatures like the living Sphinx clone that can be produced as a souvenir for tourists. The Sphinx for Egypt; Pegasus for Greece; for Italy, the Virgin Mary. A controversy has arisen surrounding the model of a Frankenstein clone: should Boris Karloff's portrayal or Mary Shelley's description be copied? Furthermore, the fictional bio-artist Frankie Steyn has infected German Chancellor Schröder's cat with the Y2K bug.

The absurdity of cloning and the visual indifferentiability of clone and original has been elaborated by means of the fictional action of the clone Birgit Richard #2, who drives a flock of sheep onto a downtown square. Birgit Richard #2 is the author/creator of this flock; she maintains that she cloned it by herself, and no one present is capable of proving otherwise because all the sheep look alike.

Early this century in his work *Trois Stoppage Etalon,* Marcel Duchamp made it clear that human beings determine the measure of all things, and that these are not, for instance, God-given constants or derivatives of "natural laws." Works of art produced or motivated by genetic engineering ought to raise questions regarding social concepts–for example, the definition of deviation from the norm. The aim of genetic tests, improvement of genetic material, and genetic therapy is standardization of the body. With the conception of perfected and standardized bodies, the issue of eugenics once again rears its head. An all-encompassing "colonial" process of appropriation of life is revealed by the numerous registered patents for animals and plants, for transgenic organisms, and for the microstructures of the human body in which genes are embedded. In the wake of the external shaping of the body by means of cosmetic surgery, workouts and chemistry, there now occurs the occupation of the human body from within.

In light of genetic engineering, art can make it clear by means of its concepts that human beings are at work here and that there is no inevitable course of development–that is to say, everything is subject to modification. If art wishes to do more than supply the art market with inventory, then it must give expression to and provide commentary on the procedures of visualization, cartography and interpretation of the actually invisible procedures of biotechnology. Bio-artist Eduardo Kac has come to the conclusion that biological processes are becoming increasingly important for art. His approach as an artist is to collaborate with genetic technicians to create genetic works.

Transgenic Morality

As Kac has correctly pointed out, social issues, moral parameters and historical context play no role in this economically-defined field. Kac's central theme is the creation of transgenic animals and their integration in a home and social environment. He undertakes an investigation of the cultural consequences of new technologies using artistic means. Transgenic art is a new art form which transfers artificial genes into an organism, or natural genetic material from one species to another. By means of molecular genetics, plant and animal genes can be mixed. Thus, unique new creatures are the result.

The artist presents himself here as a sort of inverted Noah who is out to heal the earth's wounds by countering species that have become extinct with new forms of life created without any specific purpose. To expand the world's diversity of species in a real–and not just simulated–fashion, and to monitor and control all stages of their development in fact presupposes tremendous determination and commitment, and a solid sense of responsibility for the new forms of life created in this way. Bio-artists like Eduardo Kac are confronted by questions similar to those faced by scientists in the genetic laboratory: they do not know how a life form develops and what happens in the case of interferences involving other creatures, either natural or artificial.

The contribution to the Internet symposium made by the "Discussion Group of the Virtual Self" (Donatella Bigoni, Margherita Cattera, Piero Gilardi, Pier Luigi Gregori, Bruna Piras, Federica Russo, Elisabetta Tolosano) investigates a possible ideology of biogenetic art. In their view, transgenic art proceeds in accordance with a biotechnological model which implements the etymological significance of the prefix "bio" as narrative elaborating on life, and implicit in which is social responsibility. It is not oriented upon the concept of zoology understood as the collection and multiplication of exotic living things, which rather represents the guiding principle of modern genetic engineering and biotechnology.

Green fluorescent proteins by Eduardo Kac and *Genochoice* by Elizabeth Preatner illustrate a paradoxical situation: transgenic art seems to close the gap between virtuality and reality. But to do so, it must make use of the means made available by the techno-genetic complex, and thereby takes leave of the realm of its own genuinely artistic means. The Discussion Group calls upon artists to oppose the life sciences' ongoing market-oriented development with the subjective perspective. The emphasis upon an artistic, non-linear subjectivity makes clear the demand that the products of the life sciences must integrate themselves into an ecology of existing living systems. Human needs within biological contexts which are not taken into consideration by economic interests should be worked out.

A traditional assessment of art has also been formulated over the course of the Internet symposium: artists, it is said, ought to remain within their field; genetic art conceals risks that are too great and would be connected with too much responsibility. Lubica Lacinova calls the actions of scientists examples from which artists should take heed. Genetic engineers are attempting to comprehend genetic microstructures as the building blocks of life. They do whatever is possible without being able to consider all of the consequences. Up to the point of utilizing genetic engineering in art, according to Lacinova, the observer can either accept or reject an artistic interpretation of the world. The world does not change as the result of a work of art. Never before has there been the possibility to intervene in the biological microstructure of life and to perform modifications that are permanently and invisibly inscribed in life itself. With Kac's transgenic art, a boundary is crossed such that artists would be permitted to revise

the forms of the living world in accordance with aesthetic rules. For Lacinova, this step from interpretational artist to creator of life is a giant leap into the unknown.

Eduardo Kac maintains that the use of biotechnologies in art imbues these with the social and moral perspectives that they lack. Art, however, can never directly intervene in political or economic affairs. It is not a moral institution, even if many of the artists who have participated in the Internet symposium do indeed assess their heroic role as such. Art poses its own questions and pursues hypothetical possibilities. The questions of biotechnology–for example, the patent issue or the sale of the genes of other peoples–cannot be answered by art. Nevertheless, attention can be called to them in the artistic system in order to then stimulate the discussion in another forum–the political system, for instance.

Surrealistic and Narrative Bodies

Artists concentrate on particular aspects of a topic which seem to them to be especially beautiful, bizarre, repulsive, dangerous, etc. Lacinova offers no examples, but one might well imagine that future life-science-artists might take particular pleasure in freaks, and might themselves attempt to produce the most bizarre mutants. They could adopt the mutations of science and declare them to be works of art. The oncomouse would be an appropriate object in this regard. Would this sort of art turn into an exhibit of freaks like a carnival sideshow, or become a new art form to be taken seriously?

Adam Zaretzky ascribes to human beings the special capacity of imagining monsters, Chimeras and mutations. Now, geneticists are able to take the nightmares of the surrealists and horror film directors and really bring them to life here and now. The life sciences make products of the artistic and literary imagination into realistic options. The body is transformed into a work of art and a text. It is translated from its biological mass into a digital binary format–the human genome–and, in its elaboration and interpretation, transformed into a literary textual phenomenon and a visual graphic manifestation. The vision of the legible man replaces that of the visible, transparent one.

When we are able to enter a world in which the nightmares of prophets, philosophers, writers and artists become real life, the genetic engineer will involuntarily become the model of a new type of artist, even if the surrealistic implications of his activities are completely unintentional. Seemingly surrealistic is the utopian proposal to patent and test out a "humanzee," a cross between a chimpanzee and a human being. Genetic engineering projects which attract attention due to their surrealistic character include, for example, the regrowing finger, which is produced from three different types of cow cells bonded together with polymers. The production process seems absurd: biological materials are implanted in mice, where they grow. The result is a "composite tissue" composed of building blocks from various different species. In and of themselves, regrowing organs are by no means unusual in nature. In the case of reptiles and amphibians, they have the function of rectifying physical damage or enabling a creature to escape a threat.

The redesign and mixture of human and animal appendages, skin and organs give rise to fantastic forms which do not just endure in the artistic imagination, but rather become real. The products of genetic engineering are a threatening "realness" in the Lacanian sense of something that cannot be made to just go away.

In the case of the revival of the extinct Tasmanian tiger–a project regarded as a moral imperative in Australia where British colonial overlords wiped that creature out–the path

leads directly into popular culture, which has long since anticipated this procedure in the form of images from Jurassic Park. The tiger fetuses which have been preserved by the Australian Museum are to be collected along with other genetic material into a genetic pool from which a clone can be produced. Commercial exploitation will follow immediately–including plans to market the creature as a pet.

The Genetic Construction of Gender

Melinda Rackham has introduced into the discussion procedures and structural components of bodily modification which could attain significance for artistic work and for the new construction of gender: cross-breedings, hybridizations and shifts of gene sets would thus become artistic and gender strategies. Eugene Thacker characterizes this with the term "flexible body." This is a body which–if its data sets permit manipulation–can be flexibly designed by means of data exchange of genes prior to an actual physical figuration taking shape. Multiple propagation of knowledge will be possible by means of the dissemination of gene sets to several different bodies, whereby the self-limitations of a body dissolve through the utilization of new, genetically implemented capabilities.

An additional point in this discussion is the influence of new biotechnologies upon the construction of genders. Faith Wilding refers to works of cyberfeminism (e.g. Donna Haraway, Evelyn Fox Keller, VNS Matrix, Old Boys' Network) which repeatedly raise the question of the representation of gender and sexuality in the technological sciences. Reproductive technologies in particular call for a process of repositioning with respect to the investigation of artificial and natural modes of reproduction, and their cultural and patriarchic superstructure.

Genetically-supported reproduction technologies can be regarded by both sexes as an opportunity or as a damnation: on one hand, the realization of the "bachelor machine," the effort to achieve independent male reproduction which can get along without the nurturing, generative female body, or, on the other hand, the realization of autonomous female reproduction which requires the male element only as an ingredient and brings about the control of female reproductivity by means of freezing fertilized egg cells and subsequently implanting them in accordance with a woman's own agenda.

Will gender by construed differently if there exist female and male components that can be planned or identified as such, and which can also be precisely located on a genetic map? Would it be possible to construct a third gender, like the geneticists at the University of Hawaii who produced androgynous clones from the cloning of female mice. Speer also reports on the discovery of hermaphroditic mice in the American Northwest which came about without direct genetic intervention. With the help of mankind's chemical pollution, nature brings forth a third sex which demolishes the binary gender system. In a completely Platonic sense, Speer nurtures the hope of eliminating male-female dualism and giving rise to a third form.

Take 4–Popular Culture

Popular culture narratively and visually propagates the prospects and defects of genetic engineering. It announces in a manner as trivial as it is candid the problems that are in store. For example, implemented genetic engineering plays a central role in the US cartoon series Southpark which will be running in Europe this summer [see Birgit Richard's essay in this volume].

Popular culture also contradicts the erroneous opinion that once a man's DNA is decoded, he can be read like a book, since popular culture emphasizes the important connection of the development of genetic information in social contexts. A film like "Gattaca" dismisses the widespread opinion that the gene is almighty–the significance of the "right" genetic fingerprint is called into question. The human being's genetic complex remains a construct and an abstract simulacrum if it does not coincide with a corporeal being existing in a social context.

Pop Clone: Come to Daddy and Windowlicker

The musician Aphex Twin collaborates with the video artist Chris Cunningham to bring about his own duplication in the virtual space of a video clip. Totally narcissistic self-cloning and fixation upon one's own face are the central themes of their video [see Birgit Richard's essay in this volume].

In the Internet symposium, prize-winner Aphex Twin is rejected as a commercial manifestation, since his work is assigned to the category of popular culture. His extremely experimental ambience and Industrial music are considered mass-market products. His acceptance in popular culture is said to disqualify any claim on his part to artistic status. What is overlooked here is the fact that artists as well live from works of art as merchandise. This is a meticulously cultivated ideology, whereby art is said to be above the commercial nature of other sectors. In the discussion, Melinda Rackham stigmatizes the easy access to the videos, a characteristic which in her view separates popular culture from art. But even the erroneous characterization of this graphic realm as "gothic" shows that a degree of knowledge concerning the codes employed in popular culture is necessary for an understanding of it. Otherwise, artistic strategies such as parody–*Windowlicker* parodies G-funk HipHop music videos–will not be pursued and comprehended, although they are very much in evidence here.

Melinda Rackham argues on behalf of inner values hidden within a work of art, and which can be accessed and brought out only by means of contemplation. For her, this is something worth striving for and something which mass culture can never attain. Several of the artists who have participated in the Internet symposium complain about the increased competition from the "popular" sector and make the effort to set themselves apart from it, since they most certainly do see and fear the quality of these "extra-artistic" expressions.

Take 5–The Genome Project as Encyclopedia, Book of Life

Speer posted a message about a successful attempt to use a DNA strand as a cryptographic data storage medium. This constitutes an update of an espionage strategy used by the Nazis in World War II, whereby a message was inscribed on a microscopic dot. Carter Bancroft, a molecular biologist at the Mount Sinai School of Medicine in New York, has developed a procedure to conceal an encoded message in a strand of DNA. An artificial DNA strand is mixed with a strand of human DNA of the same length. This mixture is placed onto a piece of printed paper and sent off by mail. Once it is received by the addressee, the DNA is extracted, and the decisive segment is enlarged and read. DNA is also outstandingly suited as a storage medium for gigantic quantities of data. Cryptology thus shifts into microstructures.

Bio-computing turns the writing and reading of these secret messages into an activity that takes place in a biological laboratory. The process of inscribing into the body and the read-out from it no longer take place in a Kafkaesque manner which damages the body surface. A new

field of science is biosemiotics which interprets communication and characterization procedures that have been performed in living systems.

Adam Zaretsky's contribution outlines the dual process of transfer between biology and information technology. Humans become semiotic systems that can be decoded according to a certain key and used for a particular purpose. Virtual human beings will be stored online in the form of data sets in various different data banks (i.e. GDB, GSequenceDB, GENBank, EMBL, DDBJ). Perhaps, in the future, one will be able to append remarks and footnotes as commentary to one's own DNA, but it is rather more likely that the comments will be the work of economic interpreters.

In this connection, Ricardo Dominguez has posted an article by Kristen Philipkoski (http://www.wired.com/news/news/technology/story/20395.html) which also has to do with the interpretation of genetic data. Faster computers and better data storage capabilities have led to a state in which science is generating data more quickly than it can be evaluated. The problem is not access to information but rather the interpretation and integration of the data. Thus, it is no longer the scientists themselves who are interpreting the data that they produce, but rather firms such as Lion Bioscience AG in Heidelberg which utilize special software like BioScout.

I-biology is meant to establish the connection between information technology and genetic engineering. It creates a platform from which interpreted genetic data is put up for sale. The result of this is the economic pre-forming of scientific results. Software like BioScout makes it possible to use data from various different data banks. Data management is the name that has been given to this new form of marketing of genetic data. Only those who are capable of evaluating data and linking them up with other data in an fruitful way will be able to profit from abstract quantities of data.

Multiply-encoded Biotext

A method like genetic semiotics reduces a human being to a readable set of codes. The myth that has been built up by the life sciences industrial complex and its allied software industry whereby the human being is said to be a prisoner of the structure of his genes is countered by the fact that genes, as dynamic, emergent, and complex microstructures of the body, are embedded in a social context and are also determined by, for example, social relationships and nutritional habits.

Eugene Thacker makes it clear that it is fallacious to assume that genetic semiotics delivers clear and neutral results which are independent of the interpreter's point of view. On the basis of scientific theoretical models like constructivism, it is a simple matter to refute the hypothesis that there is nothing aside from genetic truth. Genetic analysis is imperfect in a number of respects, since genetic mapping calls for visualization that is likewise not neutral. The microstructural modifications of genetic engineering are impossible to carry out without visualization. Thus, interpretation and modification follow from the proposed visualization concept. Therefore, it is not the gene itself that speaks to us and reveals itself directly; rather, a human being acts as mediator. Visualization and systematization are necessary procedures in this process with which mankind makes technology more accessible and increases its utility.

Another important point that Thacker has brought into the discussion is the reference to the bio-industrial discourse on the human being, which proceeds under the assumption that

human uniqueness is to be found in an individual's genetic constellation, whereby the biological body alone is said to define human subjectivity. Here, the Christian body-soul paradigm is turned on its head, and with it the question of the imperfect nature of the body.

Genetic Loops vs. Death

In the Internet symposium, Sean Cubitt and Eugene Thacker also raise the question of the immortality of the body. The popular conception of biology always implies the duality of death and life/reproduction. This scientific field presents itself as construed around these binary poles. After all, the name life sciences was not chosen at random; here, death is consciously omitted from consideration and remains public enemy #1.

Thacker reports on the work of biotech scientists on telomers, the ends of a chromosome. These are subject to a process of decay over time, which gives rise to the presumption among scientists that these are also responsible for the entire process of degeneration of the body's cells. The upshot of this is the desire to create the immortal cell, which serves as a micromodel for the immortal body.

Thacker regards death as a necessary fact for an ecological system. Even a secular concept of death–like the Freudian compulsion–sees death as irreversible and life-forming. Death imparts to life a linear structure which could be discarded as a result of genetic engineering. With interventions and modifications in the living body, living through various different youth-loops or, perhaps, even a number of different biographies seems to be looming on the horizon. Cloning could bring about a second life course; from the frozen clones of the dead or from fertilized egg cells, new life could emerge. Death is no longer the endpoint, but rather a single juncture in the middle of an endlessly-linked, no-longer-chronological sequence of generations.

Utopia would be to make the process of cellular reproduction in the body into an infinite, uniform and predictable loop. This reprogramming of the body proceeds under the assumption that death is a "bug," an error. Genetics as immortality technology serves to "debug" the ephemeral body, which life sciences now reveal to be the outcome of a programming error.