Die gläsernen Gene

Die Erfindung des Individuums im molekularen Zeitalter

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Frankfurt a.M.: Edition Unseld, Suhrkamp 2009

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This book emerged from the close collaboration between a science researcher and a molecular biologist. The authors analyze how the life sciences have affected and can be expected to affect society. Their “co-production” has the effect that, at the same time as the gene is scientifically redefined, so too the individual and her multi-faceted membership in social and genetic communities is defined anew. The book thoroughly explores the resulting tensions. While new scientific and biotechnological breakthroughs pose a challenge to the existing social order, human technologies contribute to the stabilization of the newly arising configurations of natural and social order. In pluralistic societies, the new forms of life combine with new forms of living together in society. The resulting arrangements between biotechnological and social innovations point in the direction that both science and the accompanying democratic experiments will go.

Theme 1: Today there are unprecedented possibilities to give visibility to things and processes in the interior of the body. The molecular gaze penetrates the genes, instead of the organs. But that doesn’t make things and their contexts simpler. On the contrary! Under the dominance of the molecular gaze, knowledge has become action. Today, knowing about life means changing life.

Despite the widespread feeling of standing on the threshold of a new age, what is new enters into as-yet untested configurations with the old in everyday life. What stands in the focus of public controversies today was long since thought about, dreamed in myths, or prefigured in the long, common history of the domestication of plants and animals. This is true in particular about two areas in which a large role is played by both the newly achieved visibility of the gene and the continuum in the apparent discontinuity created by the new: the assisted reproduction technologies (ART) and the striving to enhance achievement levels, with its controversial but pioneering potential.

Our thesis is that the more we know about our own biology, the less we are able to fit this knowledge into a coherent whole. In the process of the molecular reduction of functioning as a person, the knowledge thereby gained takes on an essentialist shape. When the “epistemic things” are separated from their context, we lose the societal contexts in which both reproduction and the striving for human enhancement are embedded. The new visibility of the genes tempts us to attribute an essentialist status of their own to the newly created forms of life. They are – falsely – regarded as agents that can act of their own accord.

Theme 2: The ancient striving for happiness and for the improvement of human capacity will soon be achieved through genetics, as well. This will result in new discontinuities that attain great explosive power, especially in athletics. Paradigmatically for the striving to enhance

achievement that characterizes our life today, here what is natural, what comes from inside, is mixing with what is artificial and comes from the outside – and it is difficult to distinguish the two.

We use the example of doping in sports to show how, in the name of a fictional naturalness and a fictional equality, an ultimately illusionary cleansing of (natural) life is striven for. Decisive for this are not least the achievements of molecular genetics in the last two decades, which have led to a critical reexamination and revision of the concept and function of genes. These are increasingly understood as epigenes, i.e., as mechanisms of inheritance that do not depend on DNA sequences. The reason developments in sports are so interesting is that they paradigmatically reveal that a rigid boundary cannot be maintained between artificial/technological and natural.

Theme 3: Who and what belong to whom are questions about identity, ownership, and belonging that run through all encounters with biotechnology. They make clear the fault lines along which diverse and controversial designs for the future are imagined, articulated, and decided in public debate. The processes on the molecular level lead on the societal level to affiliations that are equally controversial and in need of clarification. Interdependencies on the molecular level find correspondence in interdependencies between individuals and community. We investigate two aspects of controversial membership. The first is controversial lines of descent, which make visible an unsuspected tension between the person and the community. The second aspect is the question of rights of ownership over genes and other entities. What belongs to whom also decides who belongs to whom.

Theme 4: For society, the question arises of how the molecularly created forms of life can be integrated in the existing social order. Of the fullness of scientific-technological potential, what should and what can be realized? Three discourses provide partial and contradictory answers: the discourse of innovation, that of risk, and that of values. The last, in particular, is characterized by a veritable flood of images and associations that – not controllable by anyone – enter into unforeseeable connections with the new forms of life and shape people's imagination and everyday experience. Many of these images change our perception of nature as the unchanging moral authority that it was for centuries. Nature is reduced to matter that can be manipulated and patented.

But precisely this way of looking at things arouses opposite forces that want to hold fast to an image of unchanging nature. In this fissured moral landscape, the genetic visibility of life encounters the visibility of (reinvigorated) values. But in a pluralistic society, values are and remain heterogeneous. They change and they contradict each other. The struggle to shape the future has begun, but however open and uncertain the future is, it must make it possible to live together in a pluralistic society.

Theme 5: The social order is coming apart at the seams because of the offerings of the life sciences. The task of stabilizing it is being taken up by human technologies that supplement and support each other. The newly created forms of life and other biological entities must be integrated in the society in such a way that human beings and the artifacts they have created can coexist in an acceptable way. Human technologies have suitable mechanisms and procedures for this task; of course, they must be adjusted to the respective context. In living together in society, human technologies function similarly to material technologies: once they are established, they replace the necessity to create consensus again and again anew. They create standards that serve as a reference point and benchmark for otherwise incomparable situations, for the use of various means, and for suitable behavior.

The oldest and most proven human technology is law, which constantly confronts great challenges as new technologies are introduced. Since industrialization, the aim has been to adjust technology to the needs of people, rather than vice versa; the aim is technology's humanization. The relatively new instrument of governance is another human technology that serves to translate the widest variety of often incommensurable interests of a growing number of actors into political options and to manage the resulting interdependencies. Bio-ethics is a third human technology that has become indispensable for the life sciences. It is meanwhile highly professionalized and has established itself as the generally valid currency of a global moral economy. Liberal democratic societies apply these human technologies with varying success in the attempt to shape their controversial future pluralistically.

Theme 6: The efficient arrangement of standards based on the measurement and unification of molecular life finds its correlate in standards for the right socially, politically, and ethically responsible behavior. This convergence opens the view onto a future in which the standardization of life is explicitly pursued in this double sense. One of the most timely areas of research, synthetic biology, has set itself the goal of reordering life by designing its components. To this end, however, these must first be made standardizable. Synthetic biology develops beyond the ad hoc use of technical procedures to a systematically operated enterprise.

An example of this is the complete sequencing of the ocean's microbial diversity. Starting from the parts gained in this way, artificial modules will be produced to be assembled anew for specific functions. Standards and an accessible register of standards play a decisive role in this process. We will use an astonishing example to elucidate one of the characteristics of synthetic biology: the coupling of biological with social standards, in this concrete case with moral values. Design will become the guiding principle for synthesizing the future. On the one hand, this is a consistent further development of engineering sciences and their ideal of designing. On the other hand, it makes it clear that designing standards is far more than a question of technology.

Theme 7: The conviction that one stands before an epochal breakthrough with "revolutionary" possibilities is not new; it accompanies every technological vision. In the face of the fascination that the new inherently has and of its supposed discontinuity, however, we must not lose sight of the persistence and the "shock of the old". The continuity of societal developments should not be underestimated. In the last chapter, we attempt a synthesis consisting in measuring the relationship between three reference points, a kind of triangulation. This aims to open up the view to a possible shaping of the future.

The first reference point is an increasingly globally operating science whose form of organization is rapidly changing. A scientific super-organism is emerging whose decentralized parts are all networked together. The second observation has to do with the experiences of individuals and the question of what it means for them to find themselves in voluntary and involuntary amalgamations on the molecular level. Their identity and (multiple) affiliation will be genetically and socially redefined. The third reference point is the institutions. Their task is to stabilize social practices whose official status is still controversial or not yet determined, so that people can live together pluralistically. Experimentation with new forms of life and living together requires legitimated "playgrounds". The interplay of these three reference points reveals the primacy of politics, which redefines the options of society and its individuals, "beyond the arbitrary polytheism of social values and individual opinions and preferences" (Thévenot).