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"Transfields - The Growth of Transdisciplinary and Reflexivity"

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If today on the one hand we still suffer from the separation of (natural) science from philosophy, which is based above all in Newtonian physics, on the other hand in contemporary (natural) science there are efforts to exceed modern dualism, which separates man from the world (nature) and which rests upon deterministic understanding of nature. Ilya Prigogine and Isabelle Stengers have conducted research into the transition from probability to entropy, with the laws of chaos, with the question of time, quantum theory or contemporary physical theories (1996), which extend beyond Newtonian mechanics and dynamics. They speak about new laws of nature and believe we are at the beginning of a new epoch of science: "We observe the birth of science, which is no longer limited to idealized and simplified situations, but reflects the complexity of the real world."

It is significant for our time that certainty has ended.¹

In the 80's Stephen Toulmin introduced the term postmodern science,² when the concept of neutrality was finally rejected. The modern Observer, who, according to Cartesian perspectivalism, stands outside and above the world and observed it from afar, is in crisis. Toulmin is referring to quantum mechanics, and especially to Heisenberg's principle of uncertainty, which disables the observer to get the precise comprehension of the initial conditions that would build a sufficient origin in the sense of mathematical universal science. Thus Toulmin claims the scientist as objective, isolated observer is dead as well. Toulmin suggests we should not look at nature as passing witnesses, but should be aware of our inclusion in it. His views, however, are actually very close to the philosophy of Maurice Merleau-Ponty and his struggle against the objectivity.

In the last two decades the scientific disciplines have begun to mix, the heterogeneity has increased, and similar to art, science has been expanding into the social field. In 1994 a group of authors³ raised a question, how knowledge is produced today, and noticed that there is a new form of knowledge production arising, which they called mode 2. The differences in the traditional or modern mode (mode 1) and the contemporary one (mode 2) are generally the following: if according to mode 1 problems are set and solved in a context governed by the, largely academic interests of a specific community, according to mode 2, problems are carried out in a context of application. If mode 1 is a disciplinary mode, mode 2 is a trans-disciplinary mode. If there is homogeneity in mode 1, there is heterogeneity in mode 2. If mode 1 is a hierarchical mode and tends to preservation of a form, mode 2 is heterarchical and transient. If mode 1 is (socially) independent (or autonomous), mode 2 is socially accountable (related to the society and its requests) and reflexive. Mode 2 tends to the inclusion of a wider, more temporary and heterogeneous set of practitioners, collaborating on a problem, which is defined in a specific and localized context.⁴ Additionally, according to mode 2 practitioners work in the project temporarily and thus the research groups are less institutionalized and could function beyond the traditional research institutions (are institutionally de-contextualized). Thus the institution of science and the field of science within the society have changed. Later, when they especially focus on the relation of science and society (2001) they explain: "Implication of our argument has been that science could no longer be understood as an autonomous space, clearly separated from 'others' in society, culture and (more disputably) economy. Instead of this all these domains have become

'internally' heterogeneous and 'externally' mutually dependent, even transgressive, thus it has become impossible to distinguish and separate them'.⁵

The characteristics of the mode 2 production of knowledge have been observed by the authors in the field of science and industry and in the social sciences and engineering (chemical engineering, aeronautical engineering and computer sciences). Actually, with the new mode (mode 2) the concept of science which is understood as a Newtonian empirical and mathematical physics according to the ideal of the first mode is changing as well.

The growth of the industry of knowledge (mode 2 corresponds to the massification of research and education) has not only led to the growth of workers and an increase of the places in the knowledge of production, but has as well thwarted the demarcation between the traditional institutions of knowledge as universities and research institutes, and other organizations.⁶ In contemporary science the boundaries have blurred between science and society, which present the problem of the basic categories of the modern world – state, economy, culture (and science), since they do not present separate domains any more.⁷

Among the explicitly critical and rather approving considerations on social structural changes a dichotomy could be observed between the "modernists" (the advocates of modernity or the critics of post-modernity) and post-modernists. Ulrich Beck (80's) convinced with the explanation that an industrial society of risk has arisen, which, although a form of post society, is actually a true modern society; where the dominant logic of the industrial society that it can control the risks that it produces, is, according to Beck, turned upside down – the self-producing risks are spinning without control. In the phase the process of modernization becomes reflexive in such a manner that it is a theme and a subject to itself; thus this modernity is a reflexive modernity. Risk and reflexivity are linked.⁸

On the contrary of the aspect of anxiety of this era, presented by Beck, according to the other aspect of the comprehension of social changes this society is the society of knowledge, there is a growth of institutions of knowledge, they are extending to other social fields (the level of reflexivity has increased, but not in Beck's critical sense of auto-reflexivity). These observations defend the transition from modern to post-modern modes of production of knowledge (as according to the theory of the mode 2 science). In the beginning of the 70's (almost 20 years before the fall of the Berlin Wall and the obvious global swing of capitalism) Daniel Bell comprehended contemporary society as the post-industrial society,⁹ in which he noticed the dispersion of the national and global capital and in which an economic transition from production oriented economy to "service" economy takes place, where manual work is decreasing and professional and technical work are on their way to predominance; where the importance of theoretical knowledge has increased and influences of new technologies have become appreciated (for they are controlled if needed – this means exactly the control over the risks in which Beck does not believe); the development of new intellectual technologies has been encouraged. These processes contribute to the social extension of knowledge in the sense of the growth of universities and higher levels of education.

In the philosophy of art the ending of modernism in the West, especially in the USA, was such a striking moment that consequently the end of art was discussed, most notably by Arthur C. Danto in the 80's. In Danto's view art (in the 60's) had finally redeemed itself from the disenfranchised historical relationship with philosophy or aesthetics as philosophy of art.

In such a manner art attained its final goal when it managed to put the ontological question about itself in the proper form [this was in Danto's view best realized by Andy Warhol's *Brillo Box*, 1964]. Art has become a kind of philosophy in action. The boundaries between art and philosophy have blurred. Accordingly, Danto considered that aesthetics as philosophy [at least of art] have ended as well. At the same time in Europe, Hans Belting noticed that art, as it appeared in the modern age, ended and Gianni Vattimo claimed the metaphysics and modernity have ended. According to Vattimo within this general end the death of art took place as well. The ascertainties about the end of art, also announcing a crisis in philosophy of art, originated from the acknowledgements about great changes concerning art in and around the 60's and coincided with a wider debate on the end of modernity. The postmodern turn that was philosophically widely discussed (Lyotard, Habermas) and has its theoretical correlations in the discourse on the endings, corresponded to the arrival and inauguration of a new society, acknowledged as post-industrial society (Bell), consumer society, media society, informational society, the society of electronics, high technology, as well as the reflexive and risk society (Beck). Furthermore the discourse on all sorts of the ends (of art, art history, aesthetics, history etc.) was related to some major issues that concerned the crisis in politics and the changes in society and economy.

If the postmodern turn is based upon economic and political changes related to the process of globalization, there are significant shifts that could be observed in culture and art as well. There is one that is especially significant – that is a shift from the primacy of production to the primacy of the process or the consumerism or reception. In the natural sciences the moment of observation has been emphasized and objectivity has been criticized. In the earlier writings about the capitalist society the main role is ascribed to technology and the transformation of the industrial process itself [that is of the production], where even knowledge is understood as capital [science is thus basically understood as a production of knowledge], social-cultural consequences of these processes are here only a secondary concern. In the later aspects the main attention is devoted to those, who are subjects of these changes – the consumers, citizens, costumers, users; and science and other social fields have come to be understood anthropologically and culturally. In culture the shift has been evident in a decline of material products, commodities, artifacts for individual contemplation on the one hand, and the growth of communication [the emphasis of a consumer, reader, viewer, or user] on the other. For establishing interactivity sets of contemporary communication vehicles as internet and other informational systems have been used. Art is as well ambitiously interested in using the contemporary technologies and communication networks. Additionally, art is becoming more and more heterogeneous.

From the 60's on art has been apparently tending to expand from the narrow, closer world of art to the wider, social sphere; and the opposite: social and political has intensively started to intrude into the field of art. Contemporary art is fundamentally obliged to the corresponding phase of capitalism, but the significances should be found in the structural and functional homologies between the social fields (as well noticed by Pierre Bourdieu). Changes that structurally first concerned the opening of the closed traditional structure of the artwork (openness according to Umberto Eco and Roland Barthes), the deconstruction of the product and the totality of the work in the profit of the process and interaction, experimentation, later turned into a more precisely organized management and a project-based research mode, in all kinds of arts and sciences, including humanities and thus the field of aesthetics. This as well means that the projects have been structurally opening in the sense of inter-disciplinarity, in

the sense of bringing together people from different institutions, countries (there is a strong political tendency to inherently connect European nations into one European whole), and continents, according to the political interests.

The postmodern turn has brought changes not only to science, but to the contemporary mode of culture as well. Wolfgang Iser has introduced a term transculturality to denote the changed mode of culture today. According to Iser the traditional concepts of the separated cultures that tend to homogenization and separation (including the concepts of multiculturalism and interculturality) do not suit the contemporaneity since today cultures "do no longer have the insinuated form of homogeneity and separation, but are marked with mixing and permeation."¹⁰ The contemporary theories that try to comprehend the contemporary appearance, structures and functions of society, science and culture, are similar in emphasizing the premises of the new paradigm. Global society and culture hold certain features: global establishment of the premises and consequences of the late capitalism, consolidation of the significant information-communication system [net structuring, digitalization and telecommunication], the rise of specific sciences and technologies etc., which are structurally, functionally and in the sense of the engagement as well present in art. Art has become very interested in international, interdisciplinary and transdisciplinary collaboration, thus there is a growing interest in art & science collaboration trans-projects. The work of art turned to become a platform for a research, a project structurally similar to a project in science or economy.

To denote the contemporary appearance of art that significantly corresponds to the contemporary premises I use the concept of trans-art. I use the term to denote art that is accommodated to the new conditions and has exceeded the modern determinations. The prefix trans expresses more than post-phenomenon and emphasizes significant contemporary tendencies of art at several levels such as: mobility, flexibility, orientation, changeability and exceeding. Trans-art is not post-modernist art as the one that comes after modernism and which is for the most part only its radicalization. Trans-art is even not contemporary art in a general sense since trans-art basically exceeds the obstacles that would significantly render it back to modernism or to other retro forms (as has been, on the contrary, observed by Terry Smith with choosing the examples that present the continuation of modernism).¹¹ Trans-art is not even art anymore, as the concept of art has been developed through modernity; it is significantly contemporary "art" that appears after the postmodern turn, after the "end of art". According to trans-art institution and "art" projects that have rather become trans-disciplinary projects lead to adaptation of the foundations, founded in the 18th century artistic paradigms [from authorship to originality and comprehension of the art practices, artists and art in general] and has to be adjusted to the reality of the 21st century.

The degree of social responsibility has increased in art as well, and this is evident in the orientation to social-critical strategies that are often related to an increased interest for contemporary sciences and technologies. Trans-art is especially interested in reflecting the recent scientific achievements, the usage of sophisticated technologies (it for example presents alternative usages), post-modernization processes at different levels and it opens actual social problems (waste, poverty, control, consumer culture). Furthermore contemporary accessions in art can almost not avoid the general presence of technologization, digitalization or computerization. This is related to the equally important coming of the computer paradigm in economy and culture, which corresponds to a shift from commodification to consumerism.

In such situation art practices are those social agents that try to communicate with subjects (who are subjected to several ideologies) and stimulate their critical consciousness. For trans-art the explicit tendencies to exceed modern differentiation with new modes of connecting art to science and technology are especially interesting. As forms of research practices such arts use contemporary expressive tools, technologies and specialized environments. For the special interests and objectives trans-art projects include not only artists (whose practice, profession have changed much in comparison to modern forms) but also various professionals from other social fields, disciplines (neuroscientists, cosmologists, biotechnologists etc.). Trans-art is entering various "non-artistic" discourses in relation to which it questions actual ethical, cultural, anthropological and philosophical questions – it appears as a hybrid between art, humanities, social and natural sciences, and technology.

According to the new structural and functional orientations of science and art (which is additionally becoming strongly intertwined with science) contemporary aesthetics as a form of science and as a philosophical discipline related to art has changed as well. Philosophy of art has, similarly to art, lost its autonomy, and has become heteronomous; thus this field should as well be understood as a transfield. If the most significant change of art after the postmodern turn is in its turning away from autonomy which was the prime quality of modern art, the same could be said for aesthetics, and this could as well mean aesthetics is becoming a transdisciplinary field crucially related to anthropological, social and political issues (additionally following art in this orientations) and has thus in its major part rather become philosophy of culture, philosophy of society, philosophy of politics and philosophy of science.

Science and art are becoming more and more socially responsible and there is an increased level of reflexivity in both of them. According to the postmodern theoreticians of science, natural science should or is raising the questions about its presumptions, thus physics as postmodern science in Toulmin's view should produce its own meta-theory. As claimed by Pierre Bourdieu, social sciences should be auto-reflexive as well.¹² Last but not least, art has not only become reflexive with the ready-mades (Duchamp) and modernism in general (and Warhol in particular) what was understood as its end (as claimed by Danto), but the level of reflexivity has only been growing in art after the postmodern turn. The growth of theory within the art institution is evident in the phenomenon of the curators producing theories of art. But the crisis of aesthetics as an autonomous field is especially related to the inclusion of philosophy as the immanent for art, in the rhizomatic trans-art compositions as the "planomenons or the planes of consistencies" (a term borrowed from Gilles Deleuze and Félix Guattari, 1980),¹³ including the diversity of fields, linking the heterogeneous, diverse elements, disciplines and methods.

Hair in vitro ([URL: www.horizonti.net](http://www.horizonti.net)) is a part of the four-years lasting transdisciplinary research project, within which a team of collaborators cultivate hair in vitro. The project has been further developed from the project *Hair* (Polona Tratnik, 2005).¹⁴ After getting a human tissue sample with hair from a donor by plastic surgery, they execute a series of experiments in reaching a maximally long lasting life period of the artificially cultivated biomaterial, separated from the human body in the highly controlled laboratory. The aliveness is being proven with visualization in time. For this purpose they perform monitoring with sequence photographing of the sample in the bio station that shows how the observed cells divide and form the hair form – this experiment will be conducted for the first time ever in the world. The project is a

part of the research programme *Human Stem Cells – Advanced Medical Treatment with Cells* (conducted by Blood Transfusion Centre of Slovenia, Educell and Clinical Centre of Ljubljana, leader: Prof. Dr. Primož Rožman). The research as well includes a team of researchers in humanities to simultaneously conduct a philosophical reflection on the ethical, biopolitical, cultural and phenomenological issues.¹⁵

The project is rhizomatically structured at several levels and connects techno-science with heterogeneous artistic strategies and with humanistic research in tissue engineering and immunology as socially especially actual fields of biotechnology that promise revolutionary consequences, especially in medicine and aesthetics surgery. The project as well reflects the hybridization of art, humanities and techno-science, which is today at slope. The team of authors-executors is focused on research processes and on consistent connecting fields, harmonizing the heterogeneous interests. The work is not oriented to producing finished products, artifacts for observer's contemplation, but to the opening-up of the research process and the whole discourse to the public at diverse occasions. The aims of the project are communication of biotechnological potentials within the wider public, realization of specific goals, which are interesting from the biotechnological, artistic and other aspects, and discussing the related issues, which are extremely important for contemporary individual and society.

Miomir Knežević, a biotechnological collaborator in the project explains the reason for collaboration: "I decided to cooperate mostly because of the observation that there is a big void between contemporary science and everyday life. I see that some people expect too much from science or they have a distorted picture, while scientists often believe that they have to function in a closed environment where the communication is confined. When information leaves the closed environment it is with excessive enthusiasm or more often with an excessive affair. When the latter happens the damage is hard to repair. With art, science can communicate with people and get their response in a different way. That is on an emotional level, on the level of impressions, reactions which an artist can with greater ease and more sensitivity detect than a scientist with his experimental methods."¹⁶

Another scientific collaborator in the project, a plastic surgeon Aleš Leskovšek is attracted to the multidisciplinary which opens innovative ideas and offers fresh results: "Our story of transplanting and growing hair may not be directly applicable but it is very instructive. Every such project must unite the whole chain of experts and much diversified knowledge is needed. With growing some preparation the surgical part is smaller, is in withdrawal and in some basic understanding of tissue. Afterwards comes the growing of tissue, certain preparations etc. These are the whole chains of people and their knowledge. The thing that is interesting is cooperation and multidisciplinary, is to walk over your own limited condition, into which you can quickly fall and that you create something new and good."¹⁷ Additionally he is persuaded of the similarity of the fields, art and science, which is a reason for their convergence: "Art probably meets with serious science in that they both originate from the same roots. Both arise from some deep human search. Not only art is beautiful, real science can also be beautiful. Mathematics is beautiful. It has some transcendence. Such work, playing, researching as we find in science, we probably also find in art. In art are also people who sacrifice their lives, people willing to give up something in order to achieve something else, to dive somewhere. We just call something science, something art. Now that there are so many possibilities things start to intertwine. Soul mates find each other and something is born."¹⁸

In the planomenons, planes of consistencies or compositions of such a transdisciplinary hybrid, which are not hierarchically organized any more, once predominantly biotechnological, secondly artistic, thirdly humanistic, fourthly some other colonies condense, however they are never purified of the others, the elements of one have become the satellites of the other. It has become impossible to distinguish such colonies since they intertwine and function simultaneously in mutual reconciliation. Among several specific goals of such a project, there is a fundamental aim related to the tendency of multidisciplinary or even transdisciplinarity – that is to practice reflexivity. Exactly in conducting reflexivity participation of philosophy and art is inevitable. In such a manner humanities and art have increasingly important contemporary social roles.

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1. Ilya Prigogine, Isabelle Stengers, *The End of Certainty: Time, Chaos, And The New Laws of Nature*, NY: The Free Press, 1997, p. 7.
2. Stephen Toulmin, *The Return to Cosmology: Postmodern Science and the Theology of Nature*, Los Angeles, London: University of California Press, Berkeley, 1985.
3. Michael Gibbons, Camille Limoges, Helga Nowotny, Simon Schwartzman, Peter Scott in Martin Trow] publish a well read monograph titled *The New Production of Knowledge* in which that try to comprehend these changes in science.
4. Michael Gibbons, Camille Limoges, Helga Nowotny, Simon Schwartzman, Peter Scott, Martin Trow, *The New Production of Knowledge*, London: Sage Publications Inc, 2009, p. 3.
5. Helga Nowotny, Peter Scott, Michael Gibbons, *Re-Thinking Science. Knowledge and the Public in an Age of Uncertainty*, Cambridge: Blackwell Publishers Ltd, 2007, p. 1.
6. Ibid., p. 15.
7. Ibid., p. 47.
8. Ulrich Beck, *Risikogesellschaft: Auf dem Weg in eine andere Moderne*, Frankfurt am Main: Suhrkamp Verlag, 1986.
9. Daniel Bell, *The Coming of Post-Industrial Society*, London: Heinemann, 1973.
10. Wolfgang Welsch, "Transculturality: the Changing Form of Cultures Today", in: *Filozofski vestnik*, Vol. 22, Nr. 2, 2001, p. 67.
11. Terry E. Smith, *What is Contemporary Art?*, Chicago, London: The University of Chicago Press, cop. 2009.

12. Philosophy of science, history of science, sociology of science, epistemology – all these disciplines take the analysis of science (thus itself as well) for its subject and set themselves in the meta-order, in the sphere of reflexivity (governed by philosophy), with which they, as observed by Pierre Bourdieu, [1.] submit to "mirror effect: each word, which could be said in relation to social practice, could be turned against the one that states it." (Pierre Bourdieu, *Znanost o znanosti in refleksivnost* [= *Science of Science and Reflexivity*], Ljubljana: Liberalna akademija, 2004, p. 39) [2.] The one that will develop the history of science will develop its vision in regard to the interests and function in relation to its position in [this] history, thus historical narratives "cannot pretend to the statues of undisputed truth"; still more, even in stating "we see the effect of reflexivity: what I have told warns the audience of what I will say, and me who states this, warns of the danger to privilege some

orientation or of the temptation to feel being objective." (Ibid., p. 45) According to Bourdieu (social) sciences have to take themselves for their subject, this is the only way to exit the paradox that takes place, when we demand relativism for other science, whereby we are obliged to realistic epistemology. In his view with reflexivity the possibilities to access the truth are strengthening in such a manner that mutual censorships are strengthening and the principles of technical critique are assures. "It is not about pursuing of a new form of the absolute knowledge, but about execution of a specific form of epistemological wakefulness." (Ibid., p. 139)

13. Gilles Deleuze, Félix Guattari, *A Thousand Plateaus. Capitalism and Schizophrenia*, New York: Continuum, 2004, p. 558.
14. Team: Polona Tratnik, PhD [project leader, art and humanities], Miomir Knežević, PhD [biotechnology], Primož Rožman, PhD, dr. med. [biotechnology], Ajda Marič [biotechnology], Živa Marinko [biotechnology], Aleš Leskovec, dr. med., spec. plast., rec., aesthet. surgery [plastic surgery], Miha Turšič [visual communication], Damjan Švarc [photography], Robi Černelč, MA [film director], Jože Baša [film production], Miško Šuvaković, PhD [art theory and philosophy], Maja Murnik [phenomenology], Katja Kolšek, PhD [biopolitics], Marija Antonia González Valerio, PhD [philosophy], Jens Hauser, MA [curator], Jurij Krpan [curator]. Producer: Horizonti – Institute for Art, Culture, Science and Education. Co-Producers: Blood Transfusion Centre of Slovenia – University of Primorska, Science and Research Centre of Koper.
- Project support: Ministry of Culture of Slovenia – Slovenian Research Agency – Educell d. o. o. – Tehnopolitika Smolnikar d. o. o. – Kapelica Gallery – Museum of Modern Art Ljubljana – University of Ljubljana, Medical Faculty – SIMED Zdravstvo d. o. o. – INCUBATOR: Hybrid Laboratory at the Intersection of Art, Science and Ecology, School of Visual Art, University of Windsor – Universidad Nacional Autónoma de México, Facultad de Filosofía y Letras – Center of Digital Arts, School of Social Sciences and Humanities, University of Science and Technology of China – Artist's Association of Tampere – ARTE Television – EuroNews.
15. One of the early results in humanities is the consideration within the monograph: Polona Tratnik, *In Vitro. Live Beyond Body and Art*, Ljubljana: Horizonti, 2010. URL: www.horizonti.net/transars
16. Polona Tratnik, "Hair in Vitro. Interview with Miomir Knežević", 15. 06. 2010. <www.horizonti.net>
17. Polona Tratnik, "Hair in Vitro. Interview with Aleš Leskovec", 15. 06. 2010. <www.horizonti.net>
18. Ibid.