Report

The 8th Swiss Biennial on Science, Technics + Aesthetics –
8. Schweizer Biennale zu Wissenschaft, Technik + Ästhetik
The Large, the Small and the Human Mind –
Das Grosse, das Kleine und der menschliche Geist

January 16-17, 2010 – Museum of Transport, Lucerne
Organization and Concept: New Gallery Lucerne

The starting point for the 8th Swiss Biennial on Science, Technics and Aesthetics was Roger Penrose's hotly disputed book *The Large, the Small and the Human Mind* published in 1997, which contributed to a new scientific world-view of physics and a more complete understanding of conscious minds at the boundary between the physics of the small and the physics of the large. During the early stages of planning the Biennial when I asked Roger Penrose whether his catchy *The Large, the Small and the Human Mind* could be used as a conference title, it became clear that it could also serve as a container for alternative approaches and views on the ideological nature of ubiquitous and tendentious dichotomies, anthropocentrism, and sociological reductionism. Consequently, two major questions lying at the core of this meeting began to unfold:

- How can we conceive of a different relationship to our human-centered world to which the humanities, science and technology, our beliefs and *everything* including our material-semiotic articulations of these beliefs belong?

- How can we conceive of a science fully implicated in the social world, and a social world just as implicated in the world of facts and theories?

In order to question views and ways of thinking about the world, ontological demands and cultural behaviours, the Biennial attempted to problematise developments from the scope of diverse cultural, philosophical and ecological perspectives or approaches. *The Large, the Small and the Human Mind* took the 290 visitors on Saturday, January 16, and the 220 attendees on Sunday, January 17,[1] on a journey through what at first glance seemed a selection of disparate topics: the science of Leonardo, the priestly culture of physics throughout the ages, observations and insights from the forefront of science studies, the ubiquitousness of our blind spot, global warming and human violence—to name only a few. This diversity of topics was significant in itself, as it captured the broad, cross-cutting approach of the Biennial and pointed to the many connections and commonalities that underlie so many of our major issues and challenges today. Brief summaries of the various topics presented and discussed at the Biennial follow here.

Fritjof Capra presented a novel interpretation of Leonardo da Vinci's science from the perspective of 21st-century scientific thought. As most authors have discussed Leonardo's scientific work through Newtonian lenses, which, according to Capra, has often prevented them from understanding its essential nature, the author presented a new view on Leonardo's science as a science of organic forms, of qualities, radically different from the mechanistic science of Galileo, Descartes and Newton.

[1] The audience was a general public among them students and non-academics with varying educational backgrounds (Source: Survey conducted at the Biennial 2010).

In her talk titled "Physics Defrocked", **Margaret Wertheim** discussed the 2000 year-long entanglement between physics and religion and argued that the use of God as a mascott for high-end physics does both the science and the public today a profound disservice. In exemplifying her thesis, Wertheim referred to a number of physicists such Stephen Hawking who in the famous end of his book *A Brief History of Time* suggests that when physicists find their much longed-for "theory of everything" (TOE) we shall know "the mind of God". Another example Wertheim brought forward was that of the American physicist Leon Lederman who, likewise, has called God the illumination that awaits his colleagues at the end of their particle accelerators, while English physicist Paul Davies, speaks of a TOE as the blueprint in the deity's mind. Wertheim suggested that the priestly culture of physics has served throughout the ages as a powerful barrier to the entry of women, and that we must be involved in deciding what we want from physics and move back to a more socially responsible grounding of physics in society.

Bruno Latour and **Isabelle Stengers** in an improvised dialogue encircled the issue of progress and addressed in particular the problem of progress in modern science. In what Latour proposed in Lucerne as a *Compositionist Manifesto* questioned the centrality of critique by explaining that composition is the opposite of critique. Arguing that the fetishization of the notion of critique produces a (self-)destructive situation, Latour introduced the idea of composition which requires that we move from "matters of fact" to "matters of concern" to reassemble the social and the common. By creating the *Compositionist Manifesto* to construct a common world, Latour wove in references to the film Avatar and pointed to the necessity to transform what it means to progress in order to compose of a subtle assemblage of human (animate) actors (actants) and non-human (inanimate) actors.

John Horgan who polled almost 400 students at the school where he teaches learned that more than 80% say that war will never be eradicated. Horgan showed that clear-cut evidence for warfare dates back only 12,000 years, and war apparently emerged and spread as populations grew denser and adopted a sedentary life-style. He argued that biological theories cannot explain the sporadic historical pattern of warfare, or the modern decline of war-related casualties as a percentage of population. Drawing on archaeological and ethnographic studies by Lawrence Keeley and others which suggest that the vast majority of pre-state, tribal societies engaged in at least occasional warfare, Horgan's talk provided critical thoughts and a controversial discussion regarding the possibility to end war.

In his talk, **Michel Bitbol,** drawing initially on Francisco Varela's "neurophenomenological" approach that promoted a mutual refinement of the first-person reports of conscious experience and the third-person descriptions of brain processes, offered a new view on the problem of the universal blind spot. Advocating a "neurophenomenological-like" strategy for the whole of science in order to tackle the problem of the ubiquitousness of our blind spot, Bitbol suggested to solve the problem by what he introduced and discussed as a "physico-phenomenological" approach.

Kevin W. Kelley and **Rachel Bagby** presented work-in-progress animations of *World Perspectives*, a work of art that utilises scientific information, advanced visualization, 3D-animation technologies and interactive media. The work encompassed a new paradigm of animated storytelling that integrates clock, calendar, map, digital universe, tree of life, and interactive timeline interfaces. Being exposed to cutting-edge scientific information, evocative sound, poetry and performance, viewers were confronted with the question of how to move from an awe-filled sense of "Oh Wow!" to the question "How *now* shall we live?".

Harald Welzer discussed the severe repercussions of climate change that, according to the author, will lead to conflicts of violence threatening human security already in this century. Welzer argued that the effects of a changing climate will make already existing problems of accessing nutrition and clean water worse, increase the competition for resources and deepen social inequality globally. Welzer's talk raised a number of important questions concerned with the consequences of climate change such as forcing rich Western societies to raise the question of how people actually will want to live in the future, and the necessity to consider processes of cultural change by which the prevailing culture of waste could be exchanged for a more participatory model of society.

David McConville used the Planeterium at the Swiss Museum of Transport to explore the contemporary atlas of the observable universe by presenting simulations of phenomena measured

beyond the range of unaided human senses to rhetorically illustrate the limitations of perception and representation. Participants were invited to imagine stepping outside of their own perspectives to reflexively consider how suspending beliefs can enable new ways of seeing and knowing the world. "Visualizing the Transcalar Imaginary" explored how visual immersion can be used to illuminate the often-paradoxical processes of cognition that dynamically structure our expectations and experiences.
In his talk, **Robert Poole** showed that in the mid-1960s nobody knew how the whole Earth looked like, and he remembered the audience that the images of the Earth (the "Blue Marble") we are now familiar are "only" half a century old. The consensus among futurists was that the sight of the home planet, distant and receding, would at last bring home the post-Copernican vision of the Earth as an ordinary and unprivileged planet, far from the centre of the universe: mankind was at last leaving home. In his presentation, Poole argued, however, that the famous Apollo pictures placed the Earth once more at the centre of the frame, fostering a sense of its uniqueness and fragility. The re-centring of the Earth was brought about, he argued, by the experience of seeing the whole Earth.
Finally, **Pier Luigi Luisi** showed that self-organization and emergence are important notions in the development of complexity and based on immanence as they come "from within" including intelligence and consciousness—with no transcendent element coming "from above". Luisi discussed both the issue of life's deteminism on Earth and the notion of contingency in the context of experimental projects in synthetic biology which tackle the question of determinism vs. contingency (the "never born proteins" and the "minimal cell" project).

In summary, *The Large, the Small and the Human Mind* triggered debate about the unequal status that we have attributed to the physical world "out there" and our many beliefs and mental conceptions "in us" about this world, and it explored—as Bruno Latour pointed out in *Pandora's Hope*—the *fingers* of science, rationality, ontology, epistemology, reflexivity, ethics, ecology, and politics that point to the realities of these beliefs. In providing discussions that encompassed the widespread and controversial range of philosophical and material-semiotic approaches for the analysis of today's heterogeneous relations and practices of mediation, the Biennial sensitised visitors to political, ethical, moral and epistemological issues concerned with our unsustainable educational, social, economic and material practices, which are likely to trigger serious consequences for life on this planet.

Lucerne, May 4, 2010 / René Stettler

Biennial 2010, Media/ Press (direct links available at: http://www.neugalu.ch/d_presse.html#presse)

- *Sorge um die Erde steht im Zentrum*, Interview mit René Stettler, Neue Luzerner Zeitung, 14.1.10.
- *Hoffnung für das ganzheitliche Denken,* Interview mit Fritjof Capra, dasKulturmagazin, No 1, Januar 2010.
- *rebell.tv*, Blogs, Interviews zur Biennale 2010.
- *bloggingheads.tv*, John Horgan in Conversation with George Johnson on the "Tao of Physics", Margaret Wertheim's Criticism of Platonism and Bruno Latour's Claim to be the only Realist in Science.
- *Interview mit Fritjof Capra* von René Stettler im Schweizer Kulturfernsehen auf dem Netz (ART-TV.CH).
- *Die Katastrophen werden sich häufen und verschlimmern,* Interview mit Fritjof Capra, Tagesanzeiger, 18.1.10.
- *drs2aktuell*, Interview mit Fritjof Capra.
- *Is Science Too Reductionist?* John Horgan on Fritjof Capra, Leonardo da Vinci and Reductionism in Science (published on the website of the Stevens Institute of Technology, The Center for Science Writings), 27.1.2010.
- *Kein unbegrenztes lineares Wachstum*, Fritjof Capra sprach im D4 Business Center Luzern und Technopark Luzern, Rigianzeiger, 27.1.10.
- *Grande apocalypse écologique ou fin de la guerre de tranchées*, L'Agefi, 1.2.10.

Curricula

Fritjof Capra promovierte 1966 an der Universität Wien in theoretischer Physik. Neben seiner Arbeit auf den Gebieten der Quantenphysik und der Systemtheorie beschäftigt er sich seit über dreissig Jahren intensiv mit den philosophischen und gesellschaftlichen Konsequenzen der modernen Naturwissenschaft. Er gilt als einer der führenden Vertreter einer ökologisch-ganzheitlichen Weltsicht. Heute forscht Capra in Systemtheorie und deren Anwendungen in Pädagogik und Managementlehre an dem von ihm gegründeten *Center for Ecoliteracy* in Berkeley, Kalifornien und lehrt am *Schumacher College* in England. Seine Bücher zum gleichen Thema (u.a. "Wendezeit" [1982], "Lebensnetz" [1999] und "Verborgene Zusammenhänge" [2002]) erregten weltweites Aufsehen.

Margaret Wertheim is a science writer and author of books on the cultural history of physics, including *Pythagoras' Trousers* (1997), a history of the relationship between physics and religion, and *The Pearly Gates of Cyberspace* (1999), a history of Western concepts of space from Dante to the Internet. She has been a contributor to the *New York Times* Science Section and an Op-Ed contributor for the *Los Angeles Times.* She is currently at work on the third volume in the trilogy *Lithium Legs and Apocalyptic Photons: A Trailer Park Owner's Theory of Everything* (2010), which explores the life and work of outsider scientist James Carter and the role of imagination in theoretical physics. As an adjunct to her work as a science communicator, Wertheim founded the Los Angeles based *Institute For Figuring*, an organization devoted to enhancing public engagement with the aesthetic and poetic dimensions of science and mathematics.

Bruno Latour was initially trained as a philosopher and then as an anthropologist. From 1982 – 2006, he was professor at the *Centre de Sociologie de l'Innovation* at *École Nationale Supérieure des Mines* in Paris, and, for various periods, visiting professor at the *London School of Economics* and in the History of Science department of *Harvard University*. Latour teaches today at *Sciences Po*, Paris, where he holds the position of Vice-President of research. After field studies in Africa and California he specialized in the analysis of scientists and engineers at work. In addition to work in philosophy, history, sociology and anthropology of science, he has collaborated with studies in the field of science policy and research management. Among Latour's major publications are *Laboratory Life. The Construction of Scientific Facts* (1986) with Steve Woolgar, *Science in Action* (1987), and *We Have Never Been Modern* (1993). In a series of essays, among them *Pandora's Hope. Essays on the Reality of Science Studies* (1999), Latour explores the consequences of the "science wars". His most important contribution is *Actor-Network Theory* (ANT), a distinctive approach to social theory and research which originated in the field of science studies.

Isabelle Stengers teaches philosophy at the *Université Libre de Bruxelles*. She collaborated with Nobel Prize winner Ilya Prigogine and co-authored with him *La Nouvelle Alliance* (1979) in which she explores physics as a passionate and very singular adventure rather than the triumph of objective knowledge. Stengers has continuously extended her research in order to resist general models of objectivity or rational knowledge, which smooth over the multiplicity of knowledge in generating practices. Emphasizing the need for scientific practices that cultivate relevance—not authority—she developed a perspective for an "ecology of practices," which implies both the affirmation of a diverging plurality of practices and the existence of a democratic and challenging environment. Stengers has written numerous books such as *Which Order Out of Chaos* (1984) with Ilya Prigogine*, A Critique of Psychoanalytical Reason* (1992) with Léon Chertok, *A History of Chemistry* (1996) with Bernadette Bensaude-Vincent, *Power and Invention: Situating Science* (1997) and *The Invention of Modern Science* (2000). A recent collection of essays translated into German titled *Spekulativer Konstruktivismus* (2008) explores the link between the ecological practices and a speculative, adventurous constructivism developed in the context of the philosophy of Gilles Deleuze, Alfred Whitehead, William James, and the anthroplogy of Bruno Latour.

John Horgan is a science journalist who teaches and directs the *Center for Science Writings* at *Stevens Institute of Technology*, Hoboken, NJ. A former senior writer at *Scientific American* (1986 – 1997), he has also written for *The New York Times*, *National Geographic*, *Discover*, *Time*, *Newsweek*, *The Washington Post*, *Slate*, *New Scientist, The London Times,* and other publications worldwide. His books include the bestseller *The End of Science* (1996), *The Undiscovered Mind* (1999), and *Rational Mysticism* (2003). Horgan blogs at the website of the *Center for Science Writings* and participates in the weekly "Science Saturday" show on *Bloggingheads.tv.* His awards include the *Science Journalism Award* of the *American Association for the Advancement of Science* and the *National Association of Science Writers Science-in-Society Award*. His articles are featured in the 2005 – 2007 editions of *The Best American Science and Nature Writing* and the 2009 edition of *The Best American Science Writings*. Horgan graduated from the *Columbia University School of Journalism* in 1983. He lives in Cold Spring, New York.

Michel Bitbol is director of research at the *Centre National de la Recherche Scientifique* at the *Centre de Recherche en Epistémologie Appliquée* (CREA), Paris, of which he is assistant director. He currently teaches philosophy of modern physics and epistemology to graduate students at the *University Panthéon-Sorbonne*. He was educated at several universities in Paris, where he received his M.D. in 1980, Ph.D. in physics in 1985, and the Habilitation in philosophy in 1997. Bitbol worked as a research scientist in biophysics from 1978 – 1990. From 1990 onwards, he turned to the philosophy of physics, edited texts by Erwin Schrödinger and published a book titled *Schrödinger's Philosophy of Quantum Mechanics* (1996). He also published two books in French on quantum mechanics and realism in science. More recently and in close relation to the work of the late Francisco Varela, Bitbol's work started to focus on the relation between the philosophy of quantum mechanics and the philosophy of mind. In 1997, Bitbol was honored for his work in the philosophy of quantum mechanics by the *Académie des Sciences Morales et Politiques*. Bitbol has been interested in Indian philosophies for a long time and studies Sanskrit.

Kevin W. Kelley is an artist, entrepreneur and author of the international New York Times best-selling book *The Home Planet* (1988). He has immersed himself in the majority of photographs taken of the Earth from space by Astronauts. He also co-authored, with Payson R. Stevens the widely acclaimed *Embracing Earth. New Views of Our Changing Planet* (1992*)* that was the first book to present an integral perspective of the Earth's five interconnected systems: the geosphere, the hydrosphere, the atmosphere, the cryosphere and the biosphere. A generalist with broad interests and immense curiosity, Kevin has worked as a boat builder, wild rice harvester, fisherman, general contractor, professional photographer and start-up entrepreneur, to name a few. Kevin has owned and sailed beautiful wooden schooners, walked for three months solo along the highest ridges of the continental divide and has been in the arctic ocean as high as the 80th parallel near the North Pole. Kevin has been living alone on a small British Columbia island for the last few years, and feels at home on Earth and in the Universe.

Rachel Bagby is an arts and social change innovator, speaker, leadership coach, vocal artist, composer and author. She graduated from Stanford Law School, where she focused on the dynamics between public policy and social change. She received a *Bioneers Award* in recognition of her artistry in creating experiences that link the living systems we call nature and culture, e.g. *Dirt Rich*, a program she co-produced in the *US Library of Congress* with former Poet Laureate Robert Hass. She is also a *Donella Meadows Sustainability Institute Fellow* in 2009 – 2010. Founder of *Choral Earth*, Rachel received the prestigious *Art and Healing Network Artist of the Year Award* in 2008 for her leadership in the fields of vocal community and social healing. Her writing and speaking about social and ecological justice movements, clean energy and resilient community have been featured in *Natural Home*, *The Wall Street Journal*, *Time Magazine*, *Ms. Magazine,* and *The Huffington Post*.

Harald Welzer ist Direktor des *Center for Interdisciplinary Memory Research* am *Kulturwissenschaftlichen Institut* in Essen und lehrt Sozialpsychologie an der *Universität Witten/Herdecke* und an der *Emory University,* Atlanta. Er forscht über Erinnerung, Tradierung und Gewalt. Neuere Buchveröffentlichungen u.a. "'Opa war kein Nazi'. Nationalsozialismus und Holocaust im Familiengedächtnis" (2002) mit S. Moller und K. Tschuggnall; "Das kommunikative Gedächtnis. Eine Theorie der Erinnerung" (2005); "Das autobiographische Gedächtnis. Hirnorganische Grundlagen und biosoziale Entwicklung" (2005) mit H.J. Markowitsch; "Täter. Wie aus ganz normalen Menschen Massenmörder werden" (2005); "Klimakriege. Wofür im 21. Jahrhundert getötet wird" (2008); "Autobiographical Memory" (2009) mit H.J. Markowitsch; "Das Ende der Welt, wie wir sie kannten" (2009) mit Claus Leggewie. Die Bücher wurden in zahlreiche Sprachen übersetzt.

David McConville is a media artist and theorist whose work explores the interplay between immersion, reflexivity, and visualization in the processes of worldview construction. He is co-founder and Director of *Noospheric Research* of *The Elumenati,* a design and engineering firm that creates custom immersive installations for clients ranging from art festivals to space agencies. He is currently a Ph.D. candidate in the *Planetary Collegium, University of Plymouth* and a Director of the *Buckminster Fuller Institute*.

Robert Poole is a cultural historian. He received his Ph.D. in history from the *University of Lancaster,* UK, in 1985, and is currently reader in history at the *University of Cumbria*. He has also lectured at the *University of Keele*, and in 2000 – 2001 he was a Leverhulme Senior Research Fellow at the *University of Manchester*. He moved from social into cultural history with an article on the English time riots of 1752 in the international journal *Past and Present* (1995), followed by the book *Time's Alteration: Calendar Reform in Early Modern England* (1998). He then brought the perspectives of an historian to bear on the space age, working in the USA on the archives of *NASA* and the *Smithsonian Institution*. His latest book *Earthrise: How Man First Saw the Earth* (2008) has been enthusiastically received across a wide range of periodicals, from *Nature* and *Scientific American* to *Metro News* and *Fortean Times.* His current project, tentatively entitled "Big History in the Space Age", looks at the grand ideas about human history and progress that were influential in the middle decades of the twentieth century, and at the Stanley Kubrick / Arthur C. Clarke film *2001: A Space Odyssey* (1968) on which he has written in *History Today* (2001).

Pier Luigi Luisi holds a degree in chemistry from the *Scuola Normale Superiore,* Pisa. Important steps of his academic career took place at the *Swiss Federal Institute of Technology* (ETHZ), Zurich, where he started to work in 1970 and did research for over 30 years as Professor of macromolecular chemistry. His research interests are in biopolymers and the supra-molecular chemistry of surfactant aggregates with a special interest in micellar enzymology and the study of vesicles as models of biological cells. He developed the chemistry of micelle and the self-reproduction of vesicles. Luisi has researched the origin of life by using the compartimentalistic approach based on Maturana's and Varela's theory of autopoiesis. In 2003, he moved with several of his research fellows from Zurich to the *University of Rome* where he has done more research on the origin of life based on chemical synthetic approaches, and in particular on the concept of synthetic biology, the "never born proteins" and the "minimal cell". In 1985, Luisi's long-term engagement at the interface between the sciences and the humanities materialized in the foundation of the Swiss *Cortona Week* at the *ETHZ*. Recently, he got involved with the interdisciplinary program of the American *Fetzer Institute*.

René Stettler is a cultural researcher with many years of international experience. He is the founder of the *New Gallery Lucerne* (1987) and the *Swiss Biennial on Science, Technics and Aesthetics* (1994). Both institutions are supported by the City of Lucerne and the Regionalkonferenz Kultur Region Luzern (RKK), the Swiss National Science Foundation and private donors. In 2003, Stettler received the *Swiss Art Award* for his work as an intermediary between science and art. In the same year, he was also awarded a prize from the Canton and the City of Lucerne for his crosscultural and transdisciplinary projects. Stettler holds a diploma in culture management of the University of Berne, Switzerland, and he is a Ph.D. candidate at the *Planetary Collegium*, University of Plymouth, UK. In his thesis, he explores the potentiality for a renaissance of cultural work and knowledge in the global cultural economy. Stettler teaches at the *Lucerne University of Applied Sciences and Arts.* The focus of his teaching lies on media theory, media art and culture management addressing the growing public concern about issues to do with scientific research and technological innovation, globalization, environment, social accountability and procreation.