Creating a Sense of Common Ground between the Mind in Experience and the Mind in Science

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Abstract

In *The Embodied Mind* (1) the authors (Varela et al. 1991) provide a unique conviction that only by creating a sense of common ground between the mind in experience and the mind in science can our understanding of cognition be more complete. As an independent scholar and curator, I have been interested in investigating the interrelations between scientific exploration, philosophical controversy and art production by envisioning them as in principle a continuum of activity ranging from science – as it is currently practised – to the humanities and the arts, and possibly including insights that may be gained from spiritual, religious practices, or ASCR (Altered States of Consciousness Research), too. This would explicitly include consciousness in its many dimensions, including creativity; the use of symbol, myth, and metaphor; and cross cultural aspects.
In my talk, I will present, compare, and discuss two different approaches (one from media art and one from ASCR (Altered States of Consciousness Research) which I have included in the Swiss Biennial on Science, Technics and Aesthetics) with surprisingly very similar subjective experiential realities which can be conceptualized both as an immersion in the vast, multi-channelled flow of life through space and time:

- The experience of being embodied in space-time by virtual reality technologies in art (such as the work of Char Davies) which pushes the boundaries of experience to a remarkable extreme.

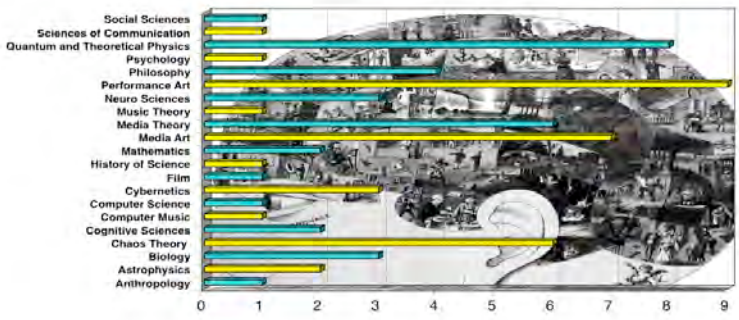
- The various non-ordinary effects pertaining to the experience of space and time that are encountered with Ayahuasca, a powerful, plant-made psychotropic brew from the Amazon.

From the perspective of my general interests and in order to envision new modes of knowledge production that may also include a perspective on knowledge with a wider scope that goes beyond the conventional frameworks of scientific and artistic exploration, I will focus and discuss in my talk on the following questions: How can the theoretical pychological accounts of these two experiences contribute to a deeper understanding of the common ground between the mind in experience and the mind in science? And how can empirical observations support the search for a more open concept of knowledge?

(1) Varela, Francisco J., Thompson, E., Rosch, E. (2000). *The Embodied Mind. Cognitive Science and Human Experience*. 8th ed. London: The MIT Press.

As an independent scholar, I have been interested in the interrelations between scientific exploration, philosophical controversy and art production, and – on a more abstract level – the different conceptions of reality in quantum physics and their

relation to philosophical theories, consciousness and its models and theories. As a museum and conference curator striving to breach scientific boundaries, I have been specifically challenged over the past ten years by scrutinizing the potential of relating different discourses to each other, quantum physics to consciousness studies to philosophy to art, for example, that have taken place in many interdisciplinary panel discussions and conversations between keynote speakers, chairpersons, and audiences of academics, laymen, and students at the Swiss Biennial on Science, Technics and Aesthetics.[1] The aim of these meetings was to invite internationally acclaimed scientists, physicists, scholars, and artists to present and discuss their research topics in Lucerne on physics[2], art[3], consciousness research and other related disciplines and make these presentations accessible for philosophical and artistic interpretation. [**Fig. 1,** Academic disciplines represented in the Swiss Biennial from 1995 – 2005].



A major challenge has been to scrutinize appropriate foundations for a meaningful and ongoing dialogue between science and what we could call *other ways of knowing*. This point has also been brought forward by scholars, philosophers, physicists, and cognitive scientists who lectured at the Biennial. Their contributions creatively addressed a broad range of epistemological and theoretical topics ranging from the physical concepts of teleportation and quantum entanglement in relation to consciousness research, to the concepts of space and time of theoretical physics in relation to space and time as they are conceived in Buddhism. In 2003, I organized the 5th Swiss Biennial on Science, Technics and Aesthetics with the topic *Space,*

[1] The Biennial founded in 1995 is not connected exclusively with one or more faculties, but aims to involve people from all faculties, schools of thought and walks of life in a critical dialogue concerned with art, technological innovation, science and society. It sees its role as that of a touchstone for interdisciplinary dialogues. Its activities are concerned with new challenges posed by widely varying fields of knowledge and research as advanced theory, telematic networks, artifical life, physics, art and consciousness research. Former biennial conferences were *Brain-Mind-Culture* in 1995, *Liquid Visions* in 1997, *Frontier Communication: Human Beings, Apes, Whales, Electronic Networks* in 1999, *The Enigma of Consciousness* in 2001, *Consciousness and Teleportation* in 2005.

[2] Physicists and their research topics included: Krauss, Lawrence: *The Physics of Star Trek* (1997); Nimtz, Günter: *Faster than Light and Space without Time* (1999); Penrose, Roger (his background is mathematics: *Quantum Theory and the Brain: Some Experimental Ideas* (2001); Zeilinger, Anton: *Is there a Role for Consciousness in a Quantum World?* (2001); Rössler, Otto E. (his background is chaos theory): *Is Physics an observer-private Phenomenon like Consciousness?* (2001); Finkelstein, David Ritz: *Space-Time and Quantum Theory* (2003); Hiley, Basil J.: *Relativity, Quantum Gravity and Space-Time Structures* (2003); Stapp, Henry P.: *Quantum Theory of the Human Person* (2003); Visser, Matt: *Do the Laws of Physics permit Wormholes for Interstellar Travel or Machines for Time Travel?* (2003); Shimony, Abner: *How deep into Philosophy has recent Physics taken us?* (2005); Braunstein, Samuel L.: *Quantum Teleportation and the Nature of Reality* (2005); Bierman Dick J.: *Does Consciousness Collapse the Wave-Function? (2005).*

[3] Artists and their research topics included: Möller, Christian: *The virtual Language of Interactive Architecture* (1995); Brümmer, Ludger: *The Special Aesthetics of Computer Music*; Stone, Allucquère Rosanne, as the leader of the panel discussions (1997); Weibel, Peter: *Digital Doubles* (1997); Keisuke, Oki: *Synchrony in the Computer Age* (1997); Lovejoy, Margot: *Transaesthetics* (1999); Sommerer, Christa: *Art as a Living System* (1999); Sermon, Paul: *Telematic Presence* (1999); Gabriel, Ulrike: *Perceptual Arena* (2001); Ascott, Roy: *Art, Technology and Consciousness* (2001), *The necessary Confluence of Art, Science, Technology, and Consciousness Research* (2005); Davies, Char: *Landscape, Earth, Body, Being, Space and Time in the Immersive Virtual Environments ‚Osmose' and ‚Ephemere'* (2003); Snow, Michael: *Time and Space as Representation* (2003): Scott, Jill: *Creative Metaphors and Transdisciplinary Approaches to Teleportation* (2005).

Time and Beyond with speakers from various disciplines like physics, mathematics, psychology, philosophy, consciousness research, and art. The meeting presented a variety of topics from astrophysics, cognitive science, media art, and also Buddhist meditative psychology.[4] Although it was one of the major intentions of the organizer of this meeting to have some of the fundamental assumptions of the dogma of Western scientific materialism (e.g. objectivism and reductionism) addressed, the speakers managed to circumvent these rather delicate issues in discussions. Thus neither the issue of the foundations of cognition and experience in the natural sciences nor the relationship between the observor and observed in both the Western scientific and philosophical understanding or in Tibetan Buddhism were explicitly referred to in debates and discussions.[5] A theoretical viewpoint or a common ground from which one could look at (and criticize) the fundamental structures of reality on the level of the *roots* and not the *fruits* was thus missing.

In this paper I want to examine the relationship between cognition and experience, especially as they are manifested in Western scientific and philosphical understanding in the relationship between the observer and the observed. In doing so I shall refer extensively to Francisco J. Varela, Evan Thompson and Eleanor Rosch, all of whom contributed a great deal to the idea that we need a sense of common ground between the mind in science and the mind in experience. Their proposition is that we need this common ground between (cognitive) science and human experience so that our understanding of cognition can be more complete and reach a satisfying level.[6] A main concern, they point out, has been the increasing need in the West for a more contemplative science. A science attuned to the first-person investigation of the mind. Some scientists have stressed the importance of pragmatism and a necessary pragmatic view which should be taken on the subject. One of their main arguments is that the exchange between science and human experience cannot be fully appreciated unless the *transformative potential* of human experience in a scientific culture is acknowledged and fostered.

[**Fig. 2**]. I look from two different perspectives, phenomenologically speaking, at the concepts of *boundlessness* and *groundlessness* as they may be created by specific immersive experiences in virtual reality and in ASC (Altered States of Consciousness). Going with this comparative assertion against the stance of postmodernists who emphasize “real” and “objective” differences over “imaginary” similarities (Patton 2000), it is my assumption that the concepts of boundlessness and groundlessness which can be linked to the phenomenal world, are relevant for my research-oriented approach, because they offer direct experiential insight into how we are to

[4] The abstracts can be downloaded under: http://www.neugalu.ch/e_bienn_archiv.html.
[5] For more excellent references to these questions see: Wallace, A.B., (Ed.) (2003). *Buddhism & Science. Breaking New Ground.* 1st Edition New York: Columbia University Press.
[6] Varela, Francisco J., Thompson, E., Rosch, E. (2000). *The Embodied Mind. Cognitive Science and Human Experience*. 8th ed. London: The MIT Press. p14.

live in a world without foundations.
I want to point out that my curiosity in these issues goes back to a basic interest in phenomenological approaches to the nature of reality and consciousness. An empirical perspective is therefore central for my presentation; it supports my scholarly interest in phenomenology. I must add, too, that any discussion of the meaning of spiritual, mystical, magical and mindfulness/awareness aspects, including their relationship to science, would certainly need to be addressed in a much broader context of reflection. For this reason, these aspects are not addressed in this presentation.

As a starting point I shall refer to the concept of groundlessness as it is conceived by Varela, Thompson, and Rosch in the context of Buddhist meditative psychology. I will then introduce a speculative idea which goes back to Wolfgang Pauli who assumed that the *psychic condition* of the observor might play a crucial role in the act of perception of reality. This notion will support the key idea of my presentation, that we should take subjective mental phenomena at least as seriously as objective physical phenomena. In the last part of this presentation I shall use these insights to conceptualize ongoing research ideas that call for a change in the ideology and methodology of contemporary science.

Varela, Thompson, and Rosch go for a *dialogue* between cognitive science and Buddhist meditative psychology where the concept of a world *without* foundations doesn't play the role of a philosophically abstruse analysis and which can be found in everyday experience. The philosophical concept of *groundlessness* is central in the development of this dialogue. The concept plays a key role in our contemporary world to which history, politics, art, science, and philosophical reflection have become highly sensitized. Varela, Thompson, and Rosch evoke the sense of loss of foundations in contemporary science and philosophy by referring to the trend in Anglo-American thought based on the revival of pragmatist philosophy (Putnam, Rorty, Margolis). They write "In Europe – particularly in France, Germany, and Italy – an analogous critique of foundations has been pursued, largely as a result of the continuing influence of Nietzsche and Heidegger – a trend that includes both poststructuralism (Derrida, Foucault, Dreyfus and Rabinow) and postmodern thought" (Lyotard, Vattimo). The authors analyse and consider these developments by differentiating the concept of groundlessness in Madhyamika (the *middle way* between *eternalism* [the view that something is eternal and unchanging] and *nihilism* [in Indian philosophy understood as an assertion that all things are intrinsically already destroyed or rendered nonexistent] as they are conceived in Western and Eastern philosophy.[7]

The physicist Wolfgang Pauli in his correspondence with the psychologist Carl Gustav Jung raised the question whether the *psychic condition* of the observor might play a crucial role in the act of perception of reality. In 1954, Pauli speculatively wrote to the physicist Markus Fierz: "Though, it could be that matter (...) is not treated 'correctly' by us the way we observe it in quantummechanics, *namely totally abandoning the ‚observor's' inner state*. It seems to me that 'after-effects' to which we didn't pay attention may happen in a *non-desirable* way (as atomic bombs, general

[7] Varela, Thompson, Rosch. *The Embodied Mind.* pp229-235.

anxiety, ‚Oppenheimer Case'".[8] Varela, Thompson, and Rosch address the *Problem of Observation,*[9] too, which was first coined by the Danish physicist Niels Bohr (Bohr 1963). Bohr basically addressed the limits of attainable knowledge in physics as evidenced by theoretical developments and practical experiments in quantum mechanics at the time. Varela, Thompson, and Rosch point out that "the observor that a ninetheenth-century physicist had in mind is often pictured as a dis-embodied eye looking objectively at the play of phenomena". They write "The indeterminacy principle in quantum mechanics, for example, is often used to espouse a kind of subjectivism in which the mind on its own 'constructs' the world. But when we turn upon ourselves to make our own cognition, our scientific theme – which is precisely what the new science of cognition purports to do – neither of these positions (the assumption of a disembodied observor or of a dis-worlded mind) is at all adequate."[10]

I would like to state that both issues – the concept of groundlessness (which articulates a world without foundations in Madhyamika) and the relation between the psychic condition of the observor and the world (addressed by Pauli and Jung) – offer an interesting exploratory perspective on the nature of subjective experience. Perceived as means of exploratory investigations into our subjectivity they may be conceived (in the sense of Husserl) as a reflection upon the essential structures of thought, and they may also be conceptualized as a 'loosening of the fragmentation of the self' as a result of scientific objectivity. The contemplation of these issues is strongly supported by the suggestion that the idea of a continuous external world (like that of a continuous self) may be according to David Hume a *psychological construction* (Hume 1740).[11]

Along these lines, there was a informal exchange of thoughts at the Swiss Biennial in 2003 between the Canadian media artist Char Davies and Benny Shanon, a psychologist and cognitive scientist from Israel who studied Ayahuasca, a powerful plant-made psychotropic brew from the Amazonian region.[12] Their conversation challenged me to ponder upon in this broader theoretical context where the combination of the persuasion of considering pragmatic and progressive approaches to experience and its possibly crucial role in science are reflected.

Char Davies claims that her interactive installation *Osmose* is about "our subjective experience as sentient, embodied, incarnate, living beings embedded in enveloping, flowing space."[13] To create the experience of "immersion" or being in an "immersive virtual space" the artist creates a 360 degree spherically-enveloping virtual environment through the use of HMDs (head-mounted displays). Her goal is not to project artificial worlds, but to "remind people of their connection to the natural (rather than man-made) environment not only biologically, but spiritually and psychologically,

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[8] Fischer, E. P. (1993). Der «kalte Teufel» und seine Nachtseite der Physik. Zum nun veröffentlichten Briefwechsel zwischen dem Physiker Wolfgang Pauli und dem Psychoanalytiker C.G. Jung. *Die Weltwoche.* Nr. 3, p25. For further references see: Meier, C.A. (1992). *Wolfgang Pauli und C.G. Jung.* 1st Edition Berlin Heidelberg New York: Springer Verlag.

[9] The *Problem of Observation* signified that the method of learning through theorization and experimentation suffered from a fundamental breakdown that imposed limits on what exactly could be learned and the manner in which it was learned.

[10] Varela, Thompson, Rosch. *The Embodied Mind.* p4.

[11] Ibid., p231.

[12] Char Davies and Benny Shanon, personal message to author, January 19, 2003.

[13] Wertheim, M. (1997). Virtual Ecology. Virtual reality shimmers on the horizon of our collective consciousness like a technological mirage.., *Yes!,* Summer, http://www.yesmagazine. org/article.asp?ID=897.

as regenerative source and mythological ground."[14] The work of Char Davies is referred to as a "highly crafted construction, a product of both great technological sophistication and intensive conceptualization."[15] Margaret Wertheim describes Char Davies' virtual worlds as "not only visually unique but also breathtaking in their technological sophistication. (...) They give you the feeling of really being immersed in 'another reality'."[16] Davies concludes: "On another level, my method involves circumventing the conventions of linear perspective, Cartesian space and objective realism (probably inherent to the computer as progeny of western civilization) in order to collapse a culturally-created distance between subject-viewer and the world. In this light, my research is philosophical, as it attempts to express a non-dualist worldview which envisions the human self inside the ‚natural' world, alive and flowing, enveloping like a womb."[17] In *Osmose* the interconnected "worlds" are each identified with a simple description: the Grid, the Clearing, the Forest, the Subterranean World, and so on. Interwoven with the *forest* is leaf where one enters the space of the leaves on the forest floor; the *pond*, where the user descends into a strangely plastic pool of water; the *clearing*, where one can literally enter a tree, its lifeblood coursing through the veins in its trunk; and the *abyss*, a glowing subterranean chasm. [18]

Among the nearly 40'000 people[19] who have been immersed in the virtual reality installations of Char Davies, Jon McCormick, an Australian media artist describes his experience in *Osmose* as follows:[20]

[**Fig. 3, 4, 5**]. " (...) It was this kind of (...) feeling like there is something natural about it and something unnatural about it, as well. A very strange mixture (...) like a sensation about nature and not really understanding what that sensation is. Saying something about the feeling of exploration, but not being really conscious of my body at all. (...) It was like moving around a space, like swimming. It was incredibly sort of like dying, going to heaven or something. (...) I would imagine that it's a mythological kind of nature. It's the way like you are following light and the way light is moving around things – like this sort of solid forms you float through. (...) It's very intuitive. (...) You have these sort of scenes where you would travel, you are on a journey. Part of it seems like you are almost not controlling the destiny of the journey. You have got these choices that you can make but eventually you are gonna be somewhere anyway. (...) I did feel very magical in a mystical kind of place, not being threatened at all, very comfortably moving around in

[14] Uchtmann, R. G. (2003). Visions of the Emerald Beyond. 5th Lucerne Conference on Consciousness, Physics and Arts, 'Space Time and Beyond, January 18-19, 2003. *Journal of Consciousness Studies*. 10 (8), p77.
[15] Wertheim. Virtual Ecology. *Yes!,* http://www.yesmagazine.org/article.asp?ID=897.
[16] Ibid.
[17] This statement refers to the artist's 3-D digital still images prior to her conceptualization of immersive virtual space. References: Davies, C. (1993). Char Davies. In: Leopoldseder, H. *Der PrixArs Electronica93. International Compendium of the Computer Arts, Computergraphik*. Linz: Veritas-Verlag. And Char Davies, personal e-mail to author, May 29, 2005.
[18] Wertheim. Virtual Ecology. *Yes!,* http://www.yesmagazine.org/article.asp?ID=897.
[19] Char Davies, personal e-mail to author, May 29, 2005.
[20] Video-taped in September 1995 by Char Davies.

it. (...) It looks like the way you can kind of move around inside someone's mind and, yet, it's not just about inside, it's about outside their mind, as well. A very powerful experience."

Ayahuasca[21] and its various non-ordinary effects pertaining to the experience of space and time may induce powerful effects upon personality, e.g. the entering of a personal relationship with a reality established in a mythical time, the development of relationships with an animal spiritual realm which is the source of power and self identification, the dissolution or death of the ego and its resurrection and transformation.[22]

[Fig. 6]. Regarding the understanding of perception and its relation to desire Luna and White (2000) refer to Gilles Deleuze and his conception of desire "as something that directly charges the perception-system". They describe the Deleuzian understanding of perception as something *internal* and *external*, especially attentive to space-time perceptions, the interest in the way drugs are concerned with velocities, the modifications of velocities, the thresholds of perception, shapes and movements, micro-perceptions, the perception that becomes molecular, superhuman or subhuman times, etc..[23] Char Davies assumes that traditional interface boundaries between machine and human can be transcended. Manie Eagar concludes about Char Davies' media installation *Osmose*: " (...) while reaffirming our corporeality, Cartesian notions of space as well as illustrative realism can effectively be replaced by more evocative alternatives (...) – as embodied consciousness in an enveloping space where boundaries between inner/outer, and mind/body dissolve".[24] For Eagar

[21] As someone who consumes almost no drugs (besides the frequent enjoyment of a good glass of wine for dinner), I cannot claim of being an experienced Ayahuasca consumer and I am therefore no expert. I have taken the brew twice. I was first sceptical about the experience but then completely overwhelmed by its non-ordinary, affective reactions, hallucinations, reflections and visual experiences and visions. Benny Shanon who certainly is an expert partkook of the brew in different locations and in contexts of use e.g. South America over 130 times. Shanon refers to unexperienced Ayahuasca consumers as follows: « (...) This is, I think, like studying music without ever having heard any music or making statments about classical music after just having listened to one piece by Bach and one by Mozart. I wholeheartedly believe that just like ordinary consciousness, non-ordinary consciousness cannot be studied without firsthand acquaintance of the phenomenology at hand». Shanon, B. (2001). Altered Temporality. *Journal of Consciousness Studies*. 8 (1), p39.

[22] Luna, L. E., White, S. F. (Eds) (2000). *Ayahuasca Reader. Encounters with the Amazon's Sacred Vine.* 1st Edition Santa Fe, New Mexico: Synergetic Press. p1.

[23] Luna, White. Ayahuasca Reader. Encounters with the Amazon's Sacred Vine. p5.

[24] Eagar, M. (2003). The Shaman reborn in Cyberspace, or Evolving Magico-Spiritual Techniques of Consciousness-Making. *Technoetic Arts*. 1 (1), p40. At this point, I believe, a key issue may be to reframe new *peripheries* where art could again play a crucial role as an interpretative interface between different boundaries, inner/outer, experiential/scientifically constructed ect.. Mark Weiser frames the role of art in the periphery: «Where science and technology deal with what can be written down, art functions with what cannot be said explicitly. Art cannot just say, it must communicate under the surfaces of our center. (...) Art uses referents and consequences and resonances to achieve what is not itself a ‚meaning'. Art reframes, re-peripheralizes, pokes at consequences, hints at hidden peripheries, pulls periphery to center and vice versa.» Weiser, M. (1997). Periphery and the FleshFactor. In: Stocker, G. and Schöpf, C. *Fleshfactor. Informationsmaschine Mensch (Ars Electronica Festival 97)*. Wien New York: Springer. p143.

this means that it is a representation of a very altered state of consciousness which may be conceptualized as a 'boundaryless experience' – an experience of boundlessness which transcends ordinary perceptions of space and time as Jon McCormick describes it in his experience of immersion in Osmose.

I would consider both experiential realms discussed here as a kind of *creation* of new ways of seeing reality which we interpret in the multiple layers of synapse and cortex. Nevertheless, it seems to me important to accept a working hypothesis that the notions of *space* and *time* are brought into all experience as a way of *looking*. According to Ernst von Glasersfeld "all our representations, all our images are structures which could not be built up without the conceptual scaffolding of space and time. Without these concepts the world is unimaginable and turns into the all-encompassing *One* of the mystics, the sphere that inspires poets and artists but remains inaccessible to reason because rational concepts and meanings glance off it".[25] It is my conviction that this constructivist point of view is of high relevance when we refer to the psychological accounts of such different experiential realities and our expectation that they may contribute to a deeper understanding of the broader panorama of human, lived experience in a disciplined, transformative analysis.[26]

In order to encourage further communication between experience and science, science and experience, Varela, Thompson, and Rosch refer to the image of the mechanism that they have created (the embodied metaphor of groundlessness) which is that of enactive cognition with its image of structural coupling through a history of natural drift. They write "Ideally such an image can influence the scientific society and the larger society, loosening the hold of both objectivism and subjectivism".[27] Ideally again such a view could be used as a strong argument against the many artificial dualities that we actually use without really contemplating them (as Brian Josephson and Beverly Rubik have suggested). A new "extended science" would have to address these dualities like those between ourselves and nature, mind and body, mind and matter, feminine and masculine, observor and observed, science and values, inductive vs. deductive logic, and philosophy and science. Josephson and Rubik emphasize that it could be important that such an "extended science" would envision "as in principle a continuum of activity ranging from science as it is currently practised to the humanities and the arts, and possibly including insights that may be gained from spiritual or religious practices. It will explicitly include consciousness in its many dimensions, including creativity; the use of symbol, myth, and metaphor; the role of the feminine; the historical perspective; and cross cultural aspects."[28]

Furthermore and according to an Ascottian contention the insertation of a new but very ancient technology may also play a future role: The experiential worlds of psychoactive plants such as Ayahuasca might be supportive in the creation of a new ontology which will combine virtual reality with vegetal reality.[29] I am persuaded (in

[25] Glasersfeld, E. v. (1996). Zuerst muss man zu zweit sein. Rationale Gedanken zur Liebe. In: Lischka, G. J. *Über Grenzen des Begreifens*. Bern: Benteli-Verlags AG. pp39-40.
[26] Varela, Thompson, Rosch. *The Embodied Mind.* p14.
[27] Ibid., p238.
[28] Josephson, B., Rubik, B. (1992). *The Challenge of Consciousness Research*. Philadelphia: University of Cambridge/UK and Temple University, Center for Frontier Sciences. p4.
[29] The scientific interest in Ayahuasca is growing with biomedical studies, EEG studies, and studies from the point of view of cognitive psychology, carried out by scientists with first hand experience of the brew. It may provide

accordance with Varela, Thompson, and Rosch) that if science is to continue to maintain its authoritarian position in a responsible manner, it must widen its horizon to include mindful, open-ended analyses of experience. To include experience can envision new modes of knowledge production that may open-up a perspective on the *origin* of knowledge with a wider scope that goes beyond the conventional frameworks of scientific and artistic exploration.

I conclude with some central points that call for a change in the ideology and methodology of contemporary science. This change should encourage further inquiries in the nature of reality and consciousness, and it ought to be understood as an important contributing factor to the advancement of knowledge: A contribution to a deeper understanding of the common ground between the two minds, the mind in experience and the mind in science.

These points are:

- The recognition of the important role of human experience in a scientific culture.[30]

- A deeper investigation into the assumption that the psychic condition of the observor might play a crucial role in the act of perception of reality.

- Further comparative phenomenological investigation into the concepts of *boundlessness* and *groundlessness* (where the loosening hold of both subjectivism and objectivism is central) from the perspective of experiences as they may be created by new technologies of virtual, immersive and cyber realities, ASC (Altered States of Consciousness), and meditation.

- The recognition of the psychoactive complexion of (immersive) interactive art.[31]

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new knowledge and broaden the view of the Ayahuasca experience which is based on ethnographic, artistic, literary and experiential sources already. An example is the recent study on the effects of Ayahuasca on binocular rivalry: *Effects of the Amazonian Psychoactive Beverage Ayahuasca on Binocular Rivalry: Interhemispheric Switching or Interhemispheric Fusion?* (Frecska, White, Luna 2003). An early theoretical analysis supposed changes in hemispheric integration as the basis of altered state of consciousness induced by psychoactive drugs. Ingestion of Ayahuasca in this study resulted in a decrease of rivalry alternation rates, increased length of one percept and there was evidence of phenomenal fusion. The findings are in line with results of brain activation studies and support the concept of interhemispheric fusion in altered states of consciousness. Though, here again the question should be asked *if* and *how* such scientific exploratory investigations may contribute to a deeper understanding and reflection upon the essential structures of thought processes or do they only further support a fragmentation of the self as a result of scientific methodology which is based on objectivity?

[30] The physicist Piet Hut in a conversation with the Dalai Lama speaks about «a filter that separates experience from the construction of science». Replying to the Dalai Lama's counter-question of what is ‚filtered out' from the construction of science with regard to which aspects of general experience Hut answers: « (...) Three hundred years ago, people determined that the length of an object is physics, but its touch and color is subjective. Human beings can feel the object and can see the color. But in physics we only talk about mass, length, and time. Color has not been interesting for physicists. Now we have a much more detailed understanding of matter, and we have modified the filter: now we can compute the color of materials. Our filter is getting larger and we can describe more.» Hut, P. (2004). Science in Search of a Worldview. In: Zajonc, A. *The New Physics and Cosmology*. New York: Oxford University Press. p196.

[31] This idea was first introduced by Roy Ascott. He writes: «For some years now, artists working at the edge of the Net have been exploring the nature of consciousness and the potential of artificial life. Compared to the art of previous eras, the work is inevitably more constructive than expressive, more connective than discrete and considerably more complex both semantically and technologically». Ascott, R. (1996). Art @ The Edge of the Net.

- The conceptualization of a new ontology which may bring virtual reality, vegetal reality and mindful experiences into meditation together.

In this presentation my arguments were based on the conviction that the inability of contemporary Western views to articulate the loss of foundations for the self and for the world[32] (resulting in the fragmentation of the self due to scientific objectivity) may be better conceived by looking at it from the perspective of experiential realities and their transformative potential. The exchange between science and human experience, however, cannot be fully appreciated as Varela, Thompson, and Rosch have showed unless the *transformative potential* of human experience in a scientific culture is acknowledged and fostered. On the other hand science cannot transcend the domain of experience and scientific theories should be seen as models that help to order and manage that domain.[33]

Pauli's speculative assumption of the crucial role of the observor's psychic state in constructing reality may support the idea that we should take subjective mental phenomena at least as seriously as objective physical phenomena and posit interdependent causal connections between them (Wallace 2003). Neither a disembodied observor or a dis-worlded mind exists. Human observation may play a highly constructive key role in science and it should be illuminated more profoundly from the perspective of the world of subjective experience. Subjective, anecdotal and more tenuous aspects of nature (including spiritual, mystical, magical, and mindfulness/awareness aspects of consciousness) should also be investigated more profoundly. They may then be recognized as illuminating concepts in the broader comprehension of the workings of the mind.[34]

It is my hope that new ways of exploring the nature of human experience and the mind will extend the concept of what constitutes science and the quest for knowledge, help to transform the ideology and methodology of contemporary

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In: Shanken, E. A. *Telematic Embrace. Visionary Theories of Art, Technology and Consciousness*. Berkeley and Los Angeles: University of California Press. p365.
Media designers conceptualize interactions between humans, computers, and the physical environment which is done in extensive research of HCIs (Human Computer Interfaces/Interaction). Media technology can extend the space we inhabit and within we interact with others. Hiroshi Ishii interestingly conceives the shoreline between physical space and cyberspace as a «Digital Seashore». The complexion as outlined above by Roy Ascott may justify further investigation into the nature of distorted and dis-continuous hybrid spaces where our bodies often lose orientation. For further references see: Hiroshi, I., (1997). Blurring the Boundaries between Bodies, Bits & Atoms: From Clearboard to Tangible Bits. In: Stocker, G. and Schöpf, C. *Fleshfactor. Informationsmaschine Mensch (Ars Electronica Festival 97)*. Wien New York: Springer. p198.

[32] Varela, Thompson, Rosch. *The Embodied Mind.* p230.

[33] As the experiential field expands, models are replaced by others based on novel conceptual constructs. The constructivist perspective suggests a substitution of ‚viability' or ‚functional fit' for the notions of *truth* and *objective representation* of an experiencer-independent reality (v. Glasersfeld 1995). This by-passes the sceptics' incontrovertible arguments against certain real-world knowledge and proposes the Piagetian conception of cognition as the function that generates ways and means for dealing with the world of experience.

[34] Luis E. Luna, a Columbian anthropologist, foresees another direct research link between science and experience which includes investigative possibilities of Ayahuasca as a powerful problem solving tool for scientific research. Luis E. Luna, personal message to author, January 21, 2001. It is not known to the author when this paper was written if any seminars have been organized in the Amazon which have included investigations into the capacities of Ayahuasca as a scientific tool for problemsolving.

science, and support the exploration of boundaries between physics, psychology, and philosophy.

Lucerne, April 2005

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Illustrations

Fig. 1 Academic disciplines represented in the Swiss Biennial from 1995 – 2005 © New Gallery Lucerne, Switzerland, 2005.

Fig. 2 Digital frame captured during live performance in immersive virtual environment © Ulrike Gabriel, 1995.

Fig. 3, 4, 5 Digital photographs of video-taped interview with media artist Jon McCormick after live performance in immersive virtual environment Osmose © Char Davies, 1995.

Fig. 6 “Tree pond”, Digital frame captured in real-time through HMD during live performance of immersive virtual environment Osmose © Char Davies, 1995.