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Consciousness and Its Place in Nature

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What do megaliths from the Stone and Bronze Age have to do with dreaming, memes, intentionality, qualia and quantum physics? This might be too cryptic for the start a conference report, but the answer to the question is that there are important prehistoric sites near Skövde, a small town in Sweden right between Göteborg and Stockholm. And Skövde was where consciousness took its place in nature for a wonderful week, while the Ekornavallen site with its passage graves, cairns and stone circles was one of the sightseeing highlights during the 'social activities'. In fact, megalithic monuments might have been about dreaming, they were definitely a subject of memes (once they were placed all over southern Sweden), intentionality and phenomenal experience (at least for me) and, being matter, they are also ruled by the laws of quantum physics.

Although Skövde only has a small university, it is an appropriate place for a conscious conference, because it is the world's first university that boasts an interdisciplinary international Consciousness Studies Program (see http://www.ihu.his.se/medvetandestudier/). To the *Consciousness and its Place in Nature* conference last August (see http://www.ida.his.se/ida/consciousness/), which is part of the *Toward a Science of Consciousness* (TSC) conference series, approximately 300 participants came mainly from Europe, but also, e.g., from Brazil, Canada, India, Israel, and many from Japan and the USA. Altogether, there were around 250 plenary lectures, concurrent session talks and poster contributions (abstracts on http://ccsweb.psych.arizona.edu/sweden2001/ab/browse.php; tapes available from www.conferencerecording.com). As before, the abstract book was provided in a reliable and convenient way by the *Journal of Consciousness Studies*.

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‘What’, asked the conference organizers, ‘is the place of consciousness in nature? Despite many advances in science, this question remains unanswered. Some hold that consciousness does not exist; some hold that it is reducible to processes in the brain; some hold that it is an irreducible nonphysical entity; some hold that it is tightly connected to fundamental physics; and some hold that we will never understand it at all.’ Thus the conference dealt with questions like: Is consciousness a physical process? What are the neural correlates of consciousness? How can we build a systematic theory of consciousness? To what degree are animals conscious? Can machines be conscious? Is consciousness connected to fundamental physics? Are naturalistic accounts of consciousness circular, given that experience of nature is a construct of the mind?

The conference started with nine instructive tutorials (three in parallel, each about three hours long). Topics were consciousness and its relations to the mind–body problem, memes, language, neuroscience, quantum physics, process philosophy or social constructivism. While some tutorials were excellently prepared, other lecturers preferred informal discussions.

Then, in the first conference lecture, Antti Revonsuo (University of Turku) asked what a true science of consciousness could be. According to him, science requires a unified research programme. It should define a *set of fundamental background assumptions* shared by the scientific community, deliver a coherent overall story (‘big picture’), and it has a price to be paid, i.e. it takes away some degrees of theoretical freedom (‘not anything goes anymore’), namely assumptions such as that consciousness does not really exist, or that it could be everywhere or nowhere in the physical universe. Revonsuo proposed a kind of biological realism, stating that consciousness is a real, natural, biological phenomenon which is literally located in the brain (cf. Revonsuo, 2001). It should be placed into the same explanatory framework as other biological features and be reconceptualized as a ‘phenomenal level of organization in the brain’, which contains the whole sphere of subjective experience. The tasks are not only the description at the level of phenomenal experience in an objective, systematic way, but also its constitutive explanation (looking downward, on lower levels like brain areas and neural assemblies), its aetiological explanation (looking backward, at the immediate causal and evolutionary pathways), and its contextual explanation (looking upward, at the higher level of the whole organism and its interaction with the social and natural environment). Revonsuo and some of his collaborators also reported results on dream research which illustrates this programme but is important by itself too. Dreams are mostly experienced by an embodied ‘dream self’ within this virtual reality; they are usually accompanied by visual and auditory sensations but sometimes also by taste, smell and even pain, i.e., they can give a full-scale simulation of a perceptual world and create an out-of-the-brain illusion quite similar to the awake state. There is some empirical evidence that dreams are evolutionarily advantageous and that they have to do with learning (consolidation) and mental simulation of threatening events. The latter hypothesis is consistent with analyses of dream reports, indicating that most dreams are about threatening situations in everyday life.

Susan Greenfield (University of Oxford) reviewed some brain research data regarding *neural correlates of consciousness* (NCC) which probably are spatially multiple, but temporally united, continuously variable, based on transient neural assemblies, etc. Nobel laureate Jean-Pierre Changeux outlined a minimal hypothesis about NCC underlying effortful tasks. He distinguished two main computational spaces: 'a unique global workspace composed of distributed and heavily interconnected neurons with long-range axons, and a set of specialized and modular perceptual, motor, memory, evaluative, and attentional processors. Workspace neurons are mobilized in effortful tasks for which the specialized processors do not suffice. They selectively mobilize or suppress the contribution of specific processor neurons.' Changeux and his colleagues performed computer simulations of a cognitive task (Stroop task) and predicted spatio-temporal activation patterns during brain imaging, which were later actually measured in the prefrontal cortex. Changeux also discussed the role of a specific neural membrane receptor and experiments with genetically modified mice. Such studies, limited as they might be, will ultimately lead to many insights into the neural machinery underlying consciousness.

Anthony Jack (University College London) introduced *introspective physicalism*. It is based on three premises: (1) A theory of the 'mechanism for consciousness' is just a theory of the processes underlying introspection. (2) The function of consciousness may be revealed by examining behaviours that depend on awareness. (3) A science of consciousness must employ introspective reports as a source of evidence about mental phenomena. Personally, I think that introspection is not necessary, because it is a higher-order state not needed for perceptual experience. However, it is a necessary condition according to Jack, because it is the only criterion for checking theories about consciousness both viewed from the inside and by experiments from the outside. 'Introspection is a faculty that allows us to make comparisons between mental states. Introspective reports are unavoidably theory-laden, and should not be taken at face value. Nonetheless, they can provide reliable data on mental states', as Jack had demonstrated in sophisticated experiments. But his central message was quite easy: 'If you want to know what the subjects are experiencing, ask them.'

Germund Hesslow (University of Lund) took a completely different road. He revived the behaviourist idea of *thought as a covert behaviour* which is explainable within a stimulus–response framework. 'Thinking that one is doing something is similar to actually doing it. Imagining that one is perceiving something is similar to actually perceiving it. Simulation of both behaviour and perception can elicit other perceptual activity.' If covert behaviour could function as another stimulus, the organism could simulate chains of covert behaviour and behavioural consequences. This matches neuroscientific evidence that imagining is essentially a reactivation of neural structures underlying perception, and that many 'cognitive' functions are performed by motor and sensory brain areas. This simulation hypothesis does not need ontological and theoretically problematic entities like representations and images. It answers how the inner world arises

(‘By simulation of behaviour and perception’) and what mental objects are (‘The source of an image is not an object but simulated seeing’).

For Susan Blackmore (University of the West of England, Bristol), the visual world is not representational, either. In a vivid lecture, she argued that the ‘stream of consciousness’ (William James) does not exist and that there is no one who might experience it. ‘Both self and experience are temporary illusions.’ Her examples (change-blindness, filling-in, etc.) are well-known, and she sympathized with Daniel Dennett’s multiple drafts model as an alternative to the Cartesian Theatre. However, rather than denying the existence of consciousness she merely took it as something that is not what it appears to be.

Animal consciousness is an often neglected topic — but not in Skövde. In a very illustrative lecture Sverre Sjölander (Linköping University) attacked René Descartes’ view that animals are automatons. ‘Studies of consciousness are not a glass-pearl game’, but have an eminently practical and ethical background. Of course, animals are not like us; they are ‘emotional beings with very little rationality’, as Oskar Heinroth once remarked. But ‘the function of animal cognition is not to represent reality, it is to allow the animal to *act* in an adaptive way’, said Sjölander, citing Konrad Lorenz, and he rejected some of the qualia discussion: ‘Consciousness has evolved to act, to survive, not to understand and depict reality. Why is there no linguistic possibility to describe what red looks like? Because there is no need. We know it anyway, language is not adapted to explain this.’ Sjölander pleaded for ascribing consciousness at least to mammals and birds. They show pain, fright, anger, boredom, sexual arousal and curiosity quite analogous to humans; they can distinguish visual signals and they even dream. In evolution, ‘they took over because of their centralized, emotive cognition’. Reptiles by comparison are not social, and seem not to have dreams and intermodal concepts.

Bernard Baars (The Neurosciences Institute, San Diego) went much further and suggested that there is ‘scientific evidence for animal consciousness since the Mesozoic’. The known NCC appear to be evolutionarily ancient, thus Baars claimed that there are ‘no known differences in fundamental brain mechanisms of sensory consciousness between humans and other mammals’. Species differences such as neocortical size appear to be irrelevant to perceptual consciousness, probably including pain perception. Public, reliable and consistent evidence is sufficient for scientific inferences, ‘the burden of proof for the absence of subjectivity should be placed on the sceptics’. Thus, Baars saw good and bad news: ‘We are surrounded by consciousness in the biosphere, but because consciousness exists, ethical dilemmas are unavoidable.’

Rodney Cotterill (Danish Technical University, Lyngby) suggested that consciousness mediates acquisition of novel context-specific reflexes (see Cotterill, 2001), and context-specifically he added some reflections about neural constraints and cognitive mechanisms. Cotterill also opened the computer simulation camp and *machine consciousness* debate by showing his ‘CyberChild’: an infant with stomach, bladder, abilities for crying, acquiring new schemata, dreaming and drinking milk. To the thrill or shock of his audience, Cotterill let it ‘die’ after a while — but he did not claim that it was conscious.

Igor Aleksander (Imperial College, London) was not so reluctant. He presented a few of his implemented design principles and reviewed some *necessary conditions for an agent (A) being conscious of something (s):* A must have internal perceptual states that depict parts of s; A must have internal imaginational states that recall parts of s or fabricate s-like sensations, respectively; A must have some control over these imaginational states for action planning; and A must have additional affective states that evaluate those plans. Stan Franklin (University of Memphis) even talked about 'conscious software agents' which could be designed on the basis of Baars' Global Workspace theory. Franklin reviewed some implementation constraints and predicted that 'we will build conscious software agents or robots so intelligent, sophisticated and communicative that people will simply assume that they are sentient. Some day the same 'conscious' software agents will find themselves discussing whether or not humans do *really* experience qualia.' During the panel discussion the old but still gripping AI debate flourished again. Is consciousness more than performance? how could it be proved or disproved? could there be zombie machines? and will computers be conscious when postgraduate students refuse to switch them off?

Even more radical than computer consciousness is *quantum consciousness*. In Skövde several leading theorists presented their — often quite diverging — views. Scott Hagan (British Columbia Institute of Technology, Vancouver) reviewed the well-known microtubule hypothesis by Stuart Hameroff and Roger Penrose and defended it against a harsh critique published by Max Tegmark. According to Hagan, decoherence times are much slower (in the order of only 10^{-4} seconds) than Tegmark had calculated, and quantum holism is needed to explain emergent properties of consciousness (e.g. binding and unity). 'Consciousness is an emergent whole which fits not into classical science.'

Basil Hiley (Birkbeck College, London) reviewed some basic features of quantum physics and the interpretation (or theory?) of David Bohm with whom Hiley had closely cooperated. Hiley suggested that active information and Bohm's 'implicate order' might be helpful for a deeper understanding of consciousness, but ultimately he did not tell how. I was left with a similar impression after the talk by Giuseppe Vitiello (University of Salerno). He argued that non-classical, i.e. quantum, dynamics underlie the brain's macroscopic phenomenology and that memory can be modelled as 'coherent condensation of certain quanta in the brain ground state'. The dissipative quantum model of the brain takes brains as open systems with an intrinsically irreversible dynamics and speculates about information encoding and recall. But — even if this were true — why are some brains conscious while other brains, or things like crystals, are not?

Perhaps Gordon Globus (UC, Irvine) told why, for he spoke so much about quantum brain dynamics, a tilde universe ('I am the annihilation of no-thing because I am tilde, which is why I am not *res extensa*'), a new kind of dualism, Martin Heidegger and Jacques Derrida, that the open brain system of the author probably locked itself up. On a panel discussion Ted Honderich characterized the different approaches and interpretations of quantum theory as confusing and confused ('quantum theory is obscure, far from completely articulated and could fail

to be true'); he doubted that it is clear what emergence and the unity of consciousness means or that quantum physics is the correct approach for explaining emergence in relation to consciousness ('you scientists do need philosophers to clarify your concepts!'); and he vehemently insisted that it is unclear how consciousness could — and why it should — be explained by quantum physics.

As science proceeds, philosophy can seem more and more secondary. But this is not so, because science always is based on philosophical assumptions and needs conceptual clarification and reflection. Philosophy can make important contributions, for not every question regarding consciousness is either a scientific or meaningless one. Let me introduce three lectures in some more detail which were among my personal conference highlights and should shape future discussions.

Daniel D. Hutto (University of Hertfordshire) expressed scepticism about the prospects of developing a science of consciousness if its job is conceived of, in David Chalmers' words, as connecting 'first-person data to third-person data by explaining the former in terms of the latter or at least discovering systematic theoretical connections between the two and explicating broad connecting principles by appeal to a fundamental theory of simple, universal laws'. He agreed with Chalmers that there are problems in characterizing the first-person data in that we lack adequate languages or formalisms for characterizing it and robust methods for its investigation. However, he argued that this was not simply a set-back: He denied hope of developing languages or formalisms for capturing the structure of experience or developing theories about the non-structural aspects of experience (e.g. a building block theory of proto-qualia). For example, he rejected Chalmers' claim that we might 'bootstrap' from our understanding of common elements of experience (e.g. colour = saturation, brightness and hue) on the grounds that this would not constitute a theoretical advance, merely a reification of our ordinary discriminatory capacities. For Hutto the crux of the matter is that there is no independent standard to determine the meaning or reference of the postulated entities. 'Thus, we cannot adopt David Chalmers' first-person characterization of the raw data, unless experiences constitute the content of our reports. Yet, we cannot endorse Daniel Dennett's characterization of the data as third-personal without reducing our speech acts to "mere noises".' Given this, neither approach could provide a basis for a future science of consciousness.

In contrast Hutto proposed a two-tiered approach: 'Experiences are identified with non-inferential dispositions. Conceptual judgments are separate, but become connected through training.' A crucial and misleading mistake is to misconstrue the 'subjective' data. There are not inner objects that constitute our reports, and not fictional objects at which our claims are directed. Thus, the possibility of meaning, error and its assessment require an inter-subjective (not private) space. Hutto also commented briefly that, in order to be credible, non-reductive physicalism would need to explain notions of composition, realization or emergence and show them to be at peace with a commitment to subjective experience and physicalism. 'Simply, pressing for a distinction between epistemic and metaphysical physicalism, and then advocating only the latter, is to shirk all explanatory commitments.'

Ron Chrisley (then University of Sussex, now University of Birmingham) spoke 'In defence of physicalist accounts of consciousness', asking whether we can have a physicalist science of consciousness. Here, 'physicalist' means non-dualistic, ontologically conservative, 'roughly: business as usual'; 'account' means scientific, 'where the action is'; and 'consciousness' means phenomenal awareness, i.e. the well-known hard problem. Chrisley's take-home message was: 'If we gain a better understanding of what science is, then we will have a better idea of whether particular scientific accounts of consciousness are possible.' This seems to be modest, but in fact Chrisley attacked three influential arguments against the possibility of a physicalist account of consciousness. His strategy was to show that these arguments only work on a particular, inaccurate and implausible view of science:

(1) *Scientific objectivity as 'the view from nowhere', i.e. missing any perspectivity:* This underlies Thomas Nagel's account of the incompatibility of subjective and objective. Consciousness is a subjective phenomenon, only accessible from a subjective point of view, while scientific accounts should be objective, contain no subjectivity and therefore cannot explain it. However, science does not need a perspectiveless perspective but is rather a way of negotiating human, perspective-bound views; it is 'a view form anywhere', as Brian Cantwell Smith wrote. Therefore, objectivity and subjective experience are not incompatible (as Nagel would agree).

(2) *Science as non-experiential, exhausted by linguistic information:* This underlies Frank Jackson's knowledge argument concerning Mary, the scientist who possesses all the *physical* information about vision but has never actually seen colour. Jackson claims she learns something new by seeing, say, red — she learns 'what it is like' to see red — thus, physical information is not all the information about consciousness. However, science is an experiential activity, not just the output of that activity which is a set of propositions that can be written down and read independently of experience. Science presupposes that one already has experienced what is trying to be explained. Thus, the fact that Mary learns something new does not indicate some limitation of science, but only shows that she did not know everything that science knows about vision.

(3) *Scientific explanations as logical deductions:* This underlies David Chalmers' argument for a lack of logical (!) supervenience. He presupposes that scientific explanations must show how the lower-level facts logically entail what is to be explained. For example, we can imagine a Zombie Earth, physically identical to earth, but with no consciousness at all. Therefore consciousness is not logically entailed by physical facts and cannot be explained by them. However, science is not purely deductive (and it is a subject of change). Chrisley: 'Showing how low-level facts entail what is to be explained is only one mode of explanation. An explanation need only make it intelligible how something with one description also has another description. Scientific understanding consists in a practical capacity to interrelate the two descriptions.'

In conclusion, Chrisley argued for the possibility of physicalist accounts by refuting three influential arguments against them, because science is 'a situated,

embodied activity carried out by experiencing agents'. But this does not prove that physicalist accounts will work, because the failure of the three arguments is still compatible with the failure of physicalist accounts.

Ted Honderich (University College London) distinguished three kinds of consciousness: *perceptual* (awareness, experience), *reflective* (cognition without perception) and *affective* (matter of desire, intention, action) consciousness, where the first is a foundation for the latter two. He reviewed five criteria or constraints which must be considered by a good theory of consciousness: (a) *phenomenality* (truth to what is called the seeming nature of the kinds of consciousness), (b) *reality* (the loss of consciousness for instance proves that consciousness has a physical reality or something close to this), (c) *subjectivity*, (d) *intentionality* (aboutness) and, last but not least, (e) the *mind–body problem*, which a theory of consciousness need not necessarily solve, so long as it does not make it worse. Next, Honderich distinguished and criticised five accounts of consciousness against the background of the five constraints above. (1) Seventeenth century materialism (e.g. Thomas Hobbes and nowadays Australian materialism and David Papineau): Consciousness is nothing but physical events, e.g. the mind is the brain, i.e. has only neural properties. According to Honderich, this account fails in respect to (a) and (c). 'Consciousness is not cells and does not have only electrochemical properties.' (2) Two properties materialism (e.g. Donald Davidson, John Searle and once Honderich himself): It does not explain the psycho-neural intimacy and the conscious side of the coin (or give criteria for it), and it is not conceptually adequate. (3) Dualism (e.g. René Descartes): It fails with respect to (b) and (e), is unintelligible, and does not even explain (c). (4) Future physicality: Consciousness is realized by physical stuff or events which we do not know yet. But this fails with respect to (c). (5) Functionalism and cognitive science with philosophical ambition (in contrast to cognitive science at work): It is about functional, causal and/or logical relations between conscious and physical states and events. But input/output relations are not enough, because they fail with respect to subjectivity (e.g. due to John Searle's Chinese room argument) and do not explain the difference between mental activities (e.g. thinking about England) and physical ones (e.g. weight gain after breakfast, denting of the chair). Thus, according to Honderich, all accounts fail and we need a fresh start. He also characterized different philosophical accounts of intentionality (from Franz Brentano to John Searle) and criticized them all – 'they are a mess with no future'.

Finally, Honderich made a new proposal to understand (perceptual) consciousness: 'For you to be aware of this room now is for a certain world — certain things — in a particular way to exist. A spatio-temporal and otherwise propertied world, variously dependent on you rather than perceivers generally, but also dependent on one part of the physical world — atoms, etc., the scientific world.' This world of subjective awareness is related to the first part of the physical world — space–time occupants, e.g. chairs, with secondary properties partly dependent on perceivers generally. The second part or scientific world are space–time occupants in lawlike connection with the perceived space–time

occupants in the first part. 'The difference between me now and a chair in this room is that for me a world exists, and for the chair a world does not exist. My consciousness now consists in the existence of a world'. This somewhat Kantian but also externalistic account subscribes both to mental realism and near-naturalism. But: 'Consciousness is something to which the distinction between appearance and reality, and thus talk of phenomenology, in fact does not apply. Its seeming nature is in fact its real nature. Consciousness is what we can non-inferentially report.' In a series of papers Honderich is now working out this approach. I think this could start a very promising new turn for philosophical studies of consciousness.

Very important for TSC conferences are the concurrent sessions and poster contributions. The problem with the former is that four or five run in parallel. The quality of the talks was very uneven, and the problem of which session to attend could have been significantly eased by reducing the number of oral presentations. Topics covered were AI, the hard problem, the ontology and concept of consciousness, higher-order thought, language, NCC, vision (there were some interesting reports about binocular rivalry), free will (I tried to explain why evolution forced us to believe in it, though Libertarianism fails), personal identity, epistemology, quantum approaches as well as literature, arts, ethics and religion.

I can mention only some of the talks. Andreas Roepstorff (Aarhus University) reported a brain scanning experiment investigating the intentional stance. This is challenging, because the interaction between subject and experimenter influences both subjective and objective characterizations of the experiment and a second-person perspective has to be addressed. Juraj Hvorecky (Charles University, Czech Republic) argued for the importance of studying content, not states in NCC research, because the first-person (in contrast to the third-person) perspective of states (e.g. dreaming and wakefulness) seems to be identical, but their contents radically differ. Miloslava Kozmova and Richard Wolman (Harvard Medical School) reported that self-awareness is not absent in non-lucid dreaming; 98 per cent of participants in a dream study were able to describe it (e.g. 'I never see myself'). Lennart Karlsson (Lund University) speculated that the measured inactivity of the dorsolateral prefrontal cortex during dreaming is responsible for a lack of wide spatial awareness. 'Whereas the dream as remembered may strike me as a rather coherent world, it might be that the dream was not experienced as such a world, but rather as a series of isolated events. This would also explain why we, as dreamers, seldom react when discontinuities occur and the dreamworld becomes incoherent.' Data on mirror-neurons and prenatal development led Elfed Huw Price (Oxford University) to argue that the experienced body image of humans with congenitally absent limbs is learned although some of them have phantom sensations. Morten Overgaard (Aarhus University) reported that subjects perceived visual stimuli in an experiment slightly differently, depending on whether they concentrated only on them, or whether they also explicitly introspected their experiences while perceiving. This could be explained by assuming that the subjects are performing different cognitive tasks, or by inferring that introspection changes the experience. William Seager

(niversity of Toronto) argued that 'there is no consciousness of emotion except via introspection. Introspective awareness requires the "conceptual categorization" of our conscious states within a theory of mind. . . . This is not to deny that less sophisticated creatures than ourselves have emotions, but . . . in the absence of a complex theory of mind which incorporates the emotions, there is no consciousness of them.' And Helge Malmgren (Göteborg University) showed that 'the epistemological problem of other minds is tightly intertwined with the problem of how you know (if you know) the contents of your own consciousness'. He rejected the argument of analogy as an explanation of knowing other minds as well as mirror neurons and phenomenal intersubjectivity (perception is not knowledge) and argued for reliability theories of knowledge.

It is not only difficult, but probably a bit unfair to draw conclusions from one conference, so I will restrict myself to a few personal impressions. The field of consciousness research has not really matured yet, but as it spreads and grows, both increasing confusion and some degree of rapprochement are apparent. Bernard Baars remembered that a decade ago there were many more different languages and a 'brilliant behaviourist denial of consciousness' while nowadays 'the dark age for consciousness due to science', starting in the nineteenth century, draws to a close. According to Baars this is important also when seen from a humanistic angle, because considering individual experiences as meaningless is ultimately dehumanizing. He urged the audience 'don't be afraid of your own experiences' as well as 'don't be afraid of the brain'.

No big break through was reported in Skövde, but there were many small advances, including philosophy. There is still a certain sense of helplessness and confrontation, some arguing the mystery of consciousness needs no solution, others that there is no mystery, while others again still insist that no solution is possible or only a very radical one. It also remains unclear in which direction the main process is moving, but neuroscience and cognitive psychology still seems to be the field with the main thrust. Unfortunately, these disciplines — in contrast to 'softer' approaches and quantum studies — are much less present at TSC conferences (not only in Skövde) than at the ASSC conferences. Not surprisingly, there is an ever growing specialization, which is one main reason why conferences like TSC are so important and will probably get more and more important in the future. This is not only to get reviews but also to meet people and communicate at some length. In this respect, the Skövde site was almost perfect. Located a few kilometers out of town, high up on the Billingen plateau, the conference hotel allowed conversations with many different people from breakfast until late at night, during breaks, meals, poster sessions, trips and in public after the main talks and within concurrent sessions. Thus, there was plenty to learn and enjoy. TSC 2001 provided a relaxed and relaxing atmosphere and some wonderful days, expanding one's own consciousness not only about consciousness.

References

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