

## INTRODUCTION BY CONFERENCE CHAIR

Seán O Nualláin

### INTRODUCTORY REMARKS FOR THE READERS OF THE SPECIAL EDITION OF *COSMOS AND HISTORY*

The “Foundations of Mind” conference was the fifth annual meeting of the cognitive science society of Ireland. Like the first, which took place in Sheffield, England, it was held outside Ireland; in this case, at international house in UC Berkeley, California. It is worth making several remarks about the staging of the event, particularly given that the event has led to a burgeoning workshop series and discussion group.

In the first place, despite giving rise to several academic books, the meetings of the cognitive science society of Ireland have never had any funding. It is indeed meet that this new publication should take place on the site of “*Cosmos and History*”, a truly admirable attempt at open science and humanities. Secondly, we found a remarkable range of eminent academics, from Stuart Kauffman through Walter Freeman to Henry Stapp, were willing to present. Finally, I wish only to thank Arran Gare for his support for this and other projects before allowing the event to begin speaking for itself.

### INTRODUCTORY REMARKS AT THE CONFERENCE ITSELF

Thanks and welcome.

The theme of this year’s conference is “Foundations of Mind: Cognition & Consciousness”. There is a clear implication that these two can be distinguished, an implication that puts clear blue water between this conference and others apparently on the same theme.

This distinction can be found as far back as 200 AD with Alexander's interpretation of Aristotle's "common sense" as "that which perceives", an interpretation echoed in Plotinus with his theory of the "inner sense". While this move at first sight might seem to remove the magic from mental function, in fact it seems to me to be salutary. In particular, splitting the act of awareness from the contents presented to awareness allows a more detailed examination of these contents per se.

And so the panels we have examine this. We will learn in the first panel about the reconstruction of this distinction in thinkers such as Gurdjieff; we will also hear about the notion of "fine tuning" in the area of modern cosmology, an area in many ways invented by the Belgian priest and physicist Georges Le Maitre. We then go on to examine which neuroscience methods can in fact characterize content in ways that are formally sufficient. This leads to the issue of whether there is not a proper way to "reduce" one discipline to another.

The dichotomy between content and perception continues in language, where clearly attention has a valuable information-processing role to play. At the ultimate metaphysical and indeed ontological level of analysis, we find that there is an as yet unresolved issue about how the act of observation can affect an apparently objective state of affairs.

Of course, decoherence theory has established that observation may not be necessary, and the epistemological interpretation of QM withholds belief in our ability cognitively to penetrate nature at this level. Yet that interpretation of QM is precisely the "weasel words" with which Osiander introduced "De Revolutionibus" by Copernicus.

Consequently, among the many fine submissions we got for review, we will include in the program here speculative interpretations of Q entanglement and the links with subjective experience.

We have an extremely diverse group of presenters, diverse not just in the range of subjects in which they are expert but in their ethnic and political affiliation. In the old story, at the summit of the mountain we are all wearing the same kit, and we are all mountaineers as we scale the highest heights. I wish everybody here a great conference.

The Panels were as follows:

Panel 1: Jacob Needleman and Robert Spitzer

It is now accepted that the Abrahamic religions, focused as they are on community solidarity based on the sacred and with it the supernatural, are inappropriate for

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environmental preservation even without their licensing of exploitation of the earth. Yet spiritual expressions based on emphasizing the unity of subject and object, self and environment, fail to give an adequate account of acts of mind that stress this difference. The ideal would be a spiritual system wherein both the extraordinarily unlikely nature of life and earth as well as the moral imperative to protect it would emerge as consequences from its ontology and metaphysics. Does such a system exist or can it be created?

Panel 2: Linearity, psychologism, and voodoo correlations

Speakers/panellists: Ed Vul (UCSD) Session chair, Robert Campbell (Clemson), Sean O Nuallain (UoI), James Blackmon (SFSU)

Gottlieb Frege famously excoriated the attempt to reduce logico-mathematical reasoning to a description of the psychological processes underpinning it as “psychologism”. But, the response goes, these logico-mathematical entities are indeed processed in the brain, so surely it is neither quixotic nor formally incorrect to seek an appropriate psychological explanation for them. One such candidate explanation is a faculty psychology based on assignment of these faculties to the cerebral locations that fmri has been celebrated for finding.

Neo-Fregeans might have two responses. In the first place, the fmri results perhaps evince premature closure in their statistical analysis. Secondly, fmri’s localizations are scalar entities in a cerebral system clearly capable of operating with vectors and even higher-order tensors. In fact, neo-Fregeans might argue, fmri implicitly makes extraordinary claims about the nature of scientific explanation, claims that are hard to justify.

Panel 3: Cognitive science and neuroscience

Speakers/panellists: Jerome Feldman (ICSI, Berkeley), Robert Campbell (Clemson), Ed Vul, Walter Freeman (UC Berkeley)

Science is a reductionist enterprise - we look for explanations of phenomena at more basic levels. This does not entail "eliminative reduction" where only the lowest level has explanatory power. Theory, modelling, and experiment at multiple levels is important and these should be consistent. For Cognitive Science, the ancient formulation of knowledge as truth may be a serious barrier to understanding the mapping of thought to neurobiology and beyond.

Panel 4: Symbols, thought and attention

Chair: Len Talmy

Moderator: Ellen Thompson

Two burgeoning trends in 21st century cognitive science appear at first sight to pull in opposite directions. One is the re-emergence of Whorfian linguistic determinism; another is the insistence that bilingualism can retard the development of prion diseases like Alzheimer's. One might assume that the same holds for music and other symbolic systems. Yet a commonality is arguably to be found in the concept of attention; can it be the case that operating between two linguistic codes forces improved cerebral function simply because of the monitoring necessary? If so, surely it is appropriate to survey immigrants using languages like English which seem at first sight the same on both sides of the Atlantic?

#### ACCOUNT OF THE CONFERENCE

This account includes some papers that did not make it into the proceedings; a further volume will be issued as a book by CSP including these articles which are not yet ready; other authors declined to submit papers but have their work described below for the sake of completeness. . The first session focussed on the science/spirituality dialogue in this area. Briefly put, if philosophy is indeed dead and if “we” are nothing more than a mass of neurons susceptible to objective description, surely all that remains to be done is to hone this description? The response is surprisingly variegated and subtle.

First of all, which neuroscience will do the reduction? Will it follow fmri and describe the brain as a set of scalars,  $n$  locations in 3-d space which can then be compiled into a corresponding vector  $v (1.....n)$ ? That seems on the face of things to be premature closure; at the least we surely need many such vectors each with a corresponding inventory. We then confront the troubling fact that humans can think in terms of tensors of formal power greater than vectors. Just as a 90-pound woman cannot birth a 200-pound baby, a vector system cannot encompass the tensors of order 4 that Einstein used in equating the momenergy and Ricci tensors.

Clearly, if cognitive science is to fulfill its destiny and complete the cycle of explanation in the natural sciences, it will have to deepen its arsenal of formalisms. Please note that as yet I have said nothing about voodoo correlations, the career pressures that caused them, and the sampling issues to do with voxel size that are not yet solved. Nor have I mentioned that an emerging gold standard of localization of function, high gamma, finds none of the universalities in locations that fmri has found.

A better path is surely also to consider the brain as a system operating far from equilibrium, prone to the onset of chaos, with much of its activity best describable in terms of oscillations and formalizable with differential equations. Above all, time must be factored in, which means that fmri with its poor time tolerance must be supplemented with EEG and ECOG/LFP. We had the great good fortune in this conference that Walter Freeman was available to outline his work as described below in this context.

Yet there is a more fundamental problem still; what will be reduced? The most common answer echoes that of phrenology in the 19th century; a set of folk psychology terms like “self-control”, “awe”, “rational guidance of behaviour” are the faculties for which locations will be found in the brain. This is a card played from the bottom of the deck; there is surely no more reason to expect this “faculty psychology” regime to be the case than to expect with Aristotle that a stone will travel faster as it nears the ground end of its trajectory due to “enthusiasm”.

Yet, even now, we are not altogether ready for the first presentation of the conference. According to Jeans, the universe resembled a giant thought more than it did a giant machine. Much of my energy as chair of the conference went into grounding the quantum mind discussion; that is particularly the case as there is a fundamental issue here, one that may indeed change the way we think about the world.

First of all, it is important to remember that, while in cognitive science we are studying the mind, we are doing so within the academy, and our excursions outside it are premature. We are not in a position to advise the US Democrats on the basis of fmri data, as notoriously happened with the 2004 Kerry campaign. In fact, we are in general using an arsenal of techniques like “schemes”, “recursion” and so on as the a posteriori explanation for patterns. However, an alternative level of analysis obtains from the “classical” interpretation of quantum mechanics, one that puts consciousness to the fore in the affairs of science. It is also fair to say that this analysis survived the rigours of its skeptical examination on the second afternoon, about which more anon.

In a session which was videotaped and which will be released unedited (please write to me to see the video record) it was argued that the interpretation of quantum mechanics that makes a split between consciousness on one side of the ontological/epistemological divide and quantum reality on the other holds up to the sternest of examinations. Moreover, as Henry Stapp continued, Zurek's notion of “decoherence” was anticipated by von Neumann as the latter outlined his schema. To anticipate a little, it was remarked by the conference participant W. Baer that an emanationist system, according to which events of apparent spontaneous localization

and other such apparent “without observer” reductions of the state-vector can be seen as an aspect of the unfolding of a primal “Geist”, allows for events apparently “merely” decoherent to be ultimately the result of a conscious act of observation. Of course, we do not know who or what the observer is outside the laboratory.

So it is mathematically consistent to argue that consciousness is just as elemental as matter. We do not have the attested mapping of “faculties” to locations that we thought we did. We need formalisms of greater power in our neuroscience to describe even what freshman math students certainly do, and everyone else probably does. When, hopefully within a generation, we evolve these formalisms after a redirection of the research monies currently going elsewhere, we will still not be able to say much about the world outside the academy, which will simply use our findings for money, politics and hopefully the arts and other edifying activities, and the world will go on its way.

We are now ready for the first keynote of the conference, that of the philosopher Jacob Needleman. Prof Michael Ranney welcomed the participants on behalf of UC Berkeley, and expressed his concern about fundamentalism and climate change.

One touchstone through out the conference was the Mlodinow/Hawking statement that “philosophy is dead”; it should be clear from the analysis above that the reports of the death of philosophy, considered as rational inquiry in any field, were greatly exaggerated. In particular, once we asked which neuroscience was to “reduce” what and how, in our pedantic philosophers' way, a minefield emerged. In fact, we are now free, should we so desire, to consider consciousness as primary, and indeed consider “science”, including the brain in the operating theater, as yet another content presenting itself to consciousness.

The cosmos, Jacob Needleman argued, admits of a vertical dimension along with the horizontal dimension that science investigates, To appreciate this vertical dimension, to allow ourselves to be humbled (but not humiliated) and awed by the scope of the power and divinity of the cosmic plan, requires preparation; “only a virtuous human being can know reality”. Indeed, there are states of consciousness that have the same ratio to our waking consciousness as the latter has to sleep.

The royal road to these states is not dreams, Prof Needleman continued, but through the portal of the self. He explicated this through the Jimenez poem “I am not I” that echoes “Borges and I” by positing a doppelganger for each person, a calm center of pure observation in which we locate ourselves all too rarely as we go about our frenzied lives. In particular, there is a wealth of evidence available to the fully integrated person through “inner empiricism”, which investigates states as yet

unknown to science. It is worth noting that such formation of the subject is one of the primary tasks of the arts when they are performing their role in society properly.

The second speaker, Fr Robert Spitzer of the Magis institute, first invoked Eddington's dictum; the knower must exceed the known, in formal power as described above, and in its aestheticization of experience as Needleman argued. This vein was richly mined by Paul Dirac, who attributed much of his success to his love of beauty. While Robert was concerned also with the Lucas/Penrose adaptation of Goedel and Bernard Lonergan's classical analysis in "insight", it is his delivery of another bombshell, the problem of fine-tuning in the cosmos, with which we will concern ourselves. Please note that we had procured a working replica of Galileo's telescope that was available to the audience as Bob proceeded. No obscurantism was to be permitted.

An infinitesimal change in the rate of expansion following the big bang would have precluded our existence. Moreover, the entropy of 13.8 billion years ago was likewise at infinitesimal levels. The fine structure constant, and the ratio of the mass of the electron to the nucleus are similarly finely poised. We can go on; the structure of scientific reasoning is now reaching one of its greatest challenges. The very brute fact of our existence betokens a set of vanishingly improbable coincidences. These "coincidences" are very unlikely to be "explained" in any way that we currently use the word "explanation". (It is worth noting that skeptics like Stenger disagree with all of these points).

There are two moves that can be made. One is the "anthropic" move of course, we as carbon-based complex creatures of course see things a certain way because so much has intervened to facilitate our very unlikely existence. Fred Hoyle successfully predicted resonant phenomena in the transition from Beryllium to Carbon on an anthropic basis, proving that the concept does have Popperian traction. Another is the "multiverse" idea; billions of universes are generated each femtosecond, and ours just happens to be the one that works. From Hume to Dennett, this has been the favoured physicalist "explanation" and is arguably at a logically lower level. As scientists, we can safely eschew it for Popperian reasons; the meticulous attempts to find evidence of other universes have, as Lisa Randall outlined, failed to unearth such.

Several other themes had emerged at this stage; the idea of a chain of being from the physical through the biological to the mental; the distinction between consciousness and its contents. Following a lively discussion, the second session featured Ed Vul, who is concerned that his meticulous analysis of fmri should not be over-interpreted as a wholesale repudiation of that method. Robert Campbell

introduced the “interactivist” framework, one in which a new place is made in the chain of being for recursively self-maintenant systems.

First of all want to interrelate this work, emerging from Robert's work with Mark Bickhard, with Walter freeman's. It is in connection with the biological roots of cognitive science that Bickhard begins to introduce the adapted dynamical systems vocabulary that will frame his discourse, a vocabulary that converges with that of Walter Freeman in very interesting ways.

Robert expresses his main theme as follows;

“What we can offer is a qualified defense of naturalism, which might improve its chance of being adopted as a direction, both for theory and for empirical research. This defense will respond in particular to three subthemes of the conference: the emergence of mind (as opposed to nonemergence or reductionism), the pervasiveness of nonlinearity in biology and psychology, and the need for levels and degrees of self (as opposed to a human self that is self-evidently unitary, or a self that turns out to be illusory, or a concealment of what is truly there).”

He concludes:

“We are confident that psychologists will continue to seek theoretical frameworks and programs of empirical research that will point them in the direction of solutions to all of these problems. Interactivism, if the arguments we have sketched here have something going for them, may here and there be pointing in such a direction.”

James Blackmon lucidly introduced the classical “zombie” argument about the evidence for consciousness. After lunch, Prof Jerome Feldman gave a carefully-written and elegant presentation. Reductionism, not eliminative materialism, was the positive thrust of his argument. Yet he makes a radical move; in following the traditional description of knowledge as “justified true belief”, cognitive science may be over-constraining the science of mind. Prof Feldman finds that Aristotle anticipated Wittgenstein in the idea that language is not necessarily propositional in intent; it is produced in language-games like prayer and has speech-act consequences.

Jerome's leitmotif is the notion of actionability, the organism's active assessment of its actions. To forestall obscurantism, we must ground our science on this. Ed Vul, in his reply, reinforced the notion of different levels of explanation. In this lucid paper, Smith and Vul eschew a naïve reductionist approach and argue for multi-level explanations

Some very significant comments were made by Walter Freeman in his analysis of what it would mean for the brain of the tiger salamander to have intentionality, to refer to something in the world. It is surely about time that Prof Freeman is given resources appropriate for him to pass on the massive trove of knowledge.

Walter states three precepts;

1. The only evidence for consciousness other than introspective is the existence of group behaviour and goal-directed such, particularly when both attributes are combined in hunting;
2. Thus, it is speculated consciousness emerges around the Cambrian, perhaps 500 million years ago;
3. Neuropil, generically considered as the stuff of the brain, is the organ for consciousness

He summarises his viewpoint thus;

“Consciousness is a biological process that is sustained by coordination of activity in many parts of the brain of a subject who is engaged in an action of searching for information that it needs to cope with its environment..... My hypothesis is that the summary action is expressed in a global field of synchronized oscillation, which will shape the next action. My conjecture is that we experience this wave packet as consciousness”

We then moved to the next panel on language and other symbol systems. A previous conference in this series was “Language, vision and music” and, in this vein, Len Talmy gave a superb overview of how these modalities can parallel and interact with each other. Some years ago, in late 1998, I wrote the following call for one of the predecessor conferences to FoM;

“Language, vision, and music: What common cognitive patterns underlie our competence in these disparate modes of thought? Language (natural and formal), vision, and music seem to share at best the following attributes: a hierarchical organization of constituents, recursivity, metaphor, the possibility of self-reference, ambiguity, and systematicity. Can we propose the existence of a general symbol system with instantiations in these three modes, or is the only commonality to be found at the level of such entities as cerebral columnar automata?”

The conference proceedings were published by Benjamins in 2002. One of the regrets I have about this project is that we were missing a paper like Len's which minutely dissects the interrelations at a degree of granularity much finer than I had the time and perhaps talent to do.

In a talk that is certainly a harbinger for the future of California with its incipient Hispanic majority, Ellen Thompson remarked on specifically syntactic mechanisms that reflect patterns of second language learning. We had the pleasure of a skype presentation from Lancaster, England by Vittorio Tantucci on the aetiology of the expression, so peculiar to non-native English speakers “You don't want x”. The experiment with Skype was a resounding success, with Dr Thompson co-ordinating a panel over two continents which prevented at least some global warming.

Stanley Klein gave a two fold presentation. On the one hand, he ably directed attendees to references in media and academia that pertain. On the other, he lucidly pointed out the institutional problems that have ended with generations of students in our disciplines failing to learn their elements as they get entrapped in the ego of their PIs.

Too often have poster panels resulted in brilliant young people standing forlorn beside 4 years of their life. We pre-empted this by asking Jack du Vall to talk about non-violent resistance a la his book “A force more powerful”. While we are a long way from a cognitive science of satyagraha, Jack appealed for a start. Matt Langione delivered an elegant presentation on “ Poetry and the architecture of consciousness” before we broke for a fuller look at the posters at a reception, and a wonderful concert of Celtic jazz with Melanie O'Reilly, Frank Martin and George Brooks in the auditorium.

Stuart Kauffman began the second day with the provocative notion of recoherence. The quantum mind discussion had truly begun, and there was an articulate reply by Terry Deacon. Karl Zipse then outlined the fascinating fmri work from the Gallant lab on visual scenes. Bernard Haisch lucidly introduced the idea that we are living in a simulation written by hyper-intelligent beings, and the quantum mind hypothesis gained traction with Cynthia Sue Larson's well-designed presentation on quantum biology, As she agreed, there are as yet no links with healing, and the jury is out about whether D-Wave has produced a quantum computer. It is fair so say that her paper goes from the relatively uncontroversial statement that “Robust examples of macroscopic quantum coherence and entanglement contain unmistakable biological advantages, such as are observed in the green sulphur bacteria photosynthesis transfer mechanism, and in the navigational system of the European Robin” to more speculative areas.

The afternoon began with Mike Cifone nuancing Galileo's primary and secondary quality distinction, and referring to the phenomenological primality of subject/object lack of differentiation, with a thrust toward a science of experience exemplified by

music. He ventures into European phenomenology to reassert the subject from the attack by scientism.

My paper on Tononi's work proposes that this popular view of consciousness is fundamentally flawed by adducing LFP/ECOG data. Gautam Agarwal overtured the minutiae that were to come about oscillators by a thorough analysis of what we currently know about brain waves.

Harmonic oscillators were to be stage front in Henry Stapp's brilliant exegesis of von Neumann. A classical such oscillator a la Gautam's work can be readily reconstructed as a quantum such. Henry's critics were allowed time to question all his work; it is interesting that the decoherence argument may not even be relevant here. Acacio de Barros ably chaired this critical session and adduced his work with Pat Suppes. Stuart recapitulated his earlier arguments, respectful we all were of what we had just seen from Henry. Carlos Montemayor introduced necessary philosophical arguments about agency. In a lucid presentation, Kathryn Laskey expressed the sympathy for Henry's views that we all felt at this stage.

My own paper on biology and cognitive science argues that our attempts to found cognitive science on biology neglected the crisis in the latter discipline. Alex Haskey focuses a la Freeman on "theories of regulation emerging from complexity biology"; another of our contributors is also correctly referred to;

"Kauffman (17) found that genetic networks only function effectively at 'The Edge of Chaos', meaning that they contain critical instabilities."

The main conclusion is worthy of our attention; "A hitherto unsuspected, new form of information, 'experience information' has been defined by considering information properties of excitations of a system at criticality – critical fluctuations "

Sperry Andrews took up Prof Needleman's work on subjectivity in a quantum context. Sperry Andrews and Steven Salka engage with aspects of subjectivity sub specie QM and other physics. Interestingly, there are beautiful paintings by Sperry.

John Jameson invokes Mach's Principle: "that the inertia of our bodies must be due to all the other stuff out there in our universe6 ." From this John goes on to "posit that the *maximal relatedness complex*, expressed as fixed point dynamics, corresponds to the consciousness support mechanism (CSM). " The work has a very wide and interesting scope

Wolfgang Baer followed a little-known theme of Walter Freeman's about "The Force of Consciousness". With some credibility, he argued that it was discernible in Mass Charge Interactions. In his "Mind/Body/Spirit Complex in Quantum Mechanics". Wolfgang Baer comments that "Astrocyte cells .... implement a field of feedback loops in tripartite synapses that control the pulse processing and through it

external communication.” He correctly adds that “ The idea that a field of systems can provide a kind of ether for conscious space and its content to appear is very attractive “

Justin Riddle engaged an urgent issue; the status of “world 3” objects, the Noosphere. It is worth noting that at 6-15 pm, when Kathryn Laskey spoke for a second time, we still had 80% of the attendees present in a quiet listening atmosphere. On this occasion, Kathryn chose to juxtapose the Newell/Simon PSSH with the quantum Hamiltonian. While this is preliminary work, undoubtedly we need to look further at it.

The conference ended with Karla Gadamez on “An ab-initio model for brain to brain communication“. While this may strike the reader as unnecessary, I ask her to consider how indeed we can talk to each other about anything? Is there a resonance from an objective state of affairs? Or, to adapt Walter again, is synchrony between two people sufficient?

We eventually came to a realization that there is something seriously wrong with the current state of cognitive (neuro)science, leading to this manifesto and set of conclusions;

#### THE QUANTUM NEUROSCIENCE MANIFESTO

As this is being written in 2014, the “pragmatic Platonism” in Math championed by the likes of Martin Davis is being echoed by Paul Bloom’s pragmatic dualism in the rational control of action necessary for the ordering of societies. While neither claims that philosophical dualism or Platonism is anything but absurd, it is hard to see how this can be maintained. John Searle, by contrast, is an unashamed philosophical realist; how else can we talk about the nose on your face, were it not objective, he might ask?.

Likewise, after Landauer, hitherto disincarnate “information” has an inextricable mass-energy correlate. This agrees with Susskind’s analysis that of adding entropy to black holes changes their area. Conversely, the notion that the hitherto “physical” is also noetic is suggested by JS Bell. There could not be a more radical assault on mind/matter dualism, nor on the Galilean distinction between “primary’ and secondary” qualities. This latter move exiled our secondary affective states and indeed all our qualia from a “scientific” description in the face of a third person/objective/scientific “primary’ description.

This manifesto is being written at a time when the universe has a large preponderance of dark energy and matter; when the genome is overwhelmingly “dark” non-coding regions; and when we do not have a single example of how neural events gives rise to any symbol. Moreover, , the *idée fixée* of mapping non-scalar

processes to scalars (like fmri) used in conventional contemporary neuroscience has arguably caused serious destruction and like the foregoing examples supports a move to alternative models.

It does seem rather convenient that these, our contemporary scalar methods, so quickly appropriated the mantle of psychological predicates like “intent’ and “decision” So as we move to a neuroscientific language involving process and oscillation, rather than static locations, a critical and fundamental question may be asked. Was it right in the first place to project psychological predicates like “intent” and “decision” onto brain locations? Given that quantum neuroscience asserts that these entities are on the classical side of the Von Neumann split, and that what remains to be done is to explicate how quantum phenomena are causal in the brain (which is now on the quantum side), are we entering a new realm in which free will does exist, not only as a pragmatic tool for ordering society but in an absolute scientific sense?

It seems equally peculiar that, when lower animals like worms have had their nervous systems scrutinized, very few neurons actually spike. Can it be the case that this is the wrong track and that electrical synapses, with a time transmission in femtoseconds, are where much of the work is done in mostly non-spiking systems? Will we find Bose-Einstein condensates forming in the brain through emphasis?

If this language seems unfamiliar, that is as much a reflection on the current sterile metaphors in neuroscience as anything else. It is not impossible that we end with a real paradigm shift, with a Copernican revolution in which predicates like “decision” and “intent” - together with many other such – are taken out of current scalar descriptions and placed outside the realm in which our Platonism and dualism are merely pragmatic, and our realism at risk.

We may not stop there. It could be the case that actually artists are not wasting their time in creating communities of practise that perfect their art; it could in fact be the case that they are in touch with something as real as the “objective” science which is now showing its limitations. In fact, it may be the case that education involves the shaping of the psyche to accept new realities, and that symbolic behaviour requires consciousness. Indeed, it may be the case that inverting everything and starting from consciousness and efforts to refine it, a path attested by history, is also valid on the metaphysical plane. We do not know; however, undoubtedly the old paradigm is creaking and we can look at real facts that show its limitations.

## CONCLUSIONS

1. Neuroscience has fared at least as badly as philosophy in explaining the mind. We have no credible account of any symbols emerging from neural impulse; we have not developed tools to monitor electrical junctions; indeed the current gargantuan Markram/Koch efforts are doomed as they look at chemical synapses in the absence of theory
2. There is a way out here; dynamical systems theory, modulation of carrier waves, the harmonic oscillator as central, honouring the in-principle arguments that exist about tensors
3. Von Neumann's arguments in his "Grundlagen" of quantum mechanics still hold up.
4. Linguistics and other symbol systems need to be honoured
5. We need physicists!
6. Absent any input from extravagantly-funded Neuroscience, it is intellectually responsible to attend to psychological and indeed spiritual accounts that are rooted in best practise from other sciences
7. The so-called "hard problem" (considered as linking neural event and subjective experience a la John Locke) is simply nonsense and has retarded the area
8. Finally, we must find a way of funding and organizing courses and research away from the current PI model. As it happens, I paid for this conference myself (and, given the reaction, do not regret doing so).

What I think we did at the least achieve is an environment where for 2 full days people listened to each other in a respectful way. It is very powerful to experience an environment where people can be heard out.

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