

Dualism, Platonism and Voluntarism

Dualism, Platonism and Voluntarism:

*Explorations at the Quantum,
Microscopic, Mesoscopic
and Symbolic Neural Levels*

Edited by

Seán Ó Nualláin

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To Liliane and Ken Koziol, with thanks

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Dan Coates, who took time off to help me with FOM at a critical point in his Ph.D., asked me afterward what I'd have done differently. Bob Dylan's classic answer was that I'd do it all over you; mine was simply that FOM was an insane idea, and I should never have done it. An insane idea that has now spawned three volumes of proceedings, a successful seminar series, and perhaps the most cogent debate in history as to how quantum effects could be causal in neural activity. Given that the conference started on a €50 laptop bought in a yard sale in Normandy less than five months before, and whatever my gifts, I clearly owe many people.

First of all, Melanie O'Reilly decided to run it as we do our gigs; not a bad model as universities diverge ever further from their roles in the search for truth. Steve Freedkin was an effective tech person. Melanie had the barmy idea of running the conference at UC Berkeley; it says a lot for the legacy of Mario Savio and the free speech movement that we experienced nothing but support from the administration there. John Kelly, Liliane and Ken Koziol, and Dan Coates have earned my eternal gratitude.

The foundations of mind group can be contacted at foundationsofmind.org or through my e-mail. Please note all authors have maintained their copyrights for the scores of original articles FOM has published without paying anything. This has been due to idealism on our part, and also hard work by Arran Gare and at CSP.

Finally, I will note that there is indeed inherent in FOM an assertion of what Irish scholarship could have been – in the absence of the colonial administrators who until today masqueraded as an Irish government. I have undertaken to the Irish department of education to offer all the work in uoi to the Irish people as soon as it is made clear that the Irish state universities are subject to the law of the land like every other institution. Regrettably, that has not been the case since 2000 as my books on Ireland document in somewhat grisly detail. As luck would have it, today is the day that the duopoly of political parties controlling Ireland lost power.

The next FOM conference will take place in Ireland.

INTRODUCTION:

THE FOUNDATIONS OF MIND (FOM) PROJECT

SEÁN Ó NUALLÁIN

The Foundations of Mind project with its associated conference and workshop series emerged from a sense that the current prevailing approaches of cognitive science and neuroscience, based as they are on reductionism and classical physics, are inherently inadequate as a fundamental foundation for a science of mind. It sought to investigate mind in the most fundamentally possible way, not just using the computational metaphor of a processor operating on representations of the world, but in a manner aware of the nuances of dialectic between body and world, and ultimately between self and society. In particular, it sought to investigate to what extent issues of human meaning and values could admit of scientific explanation. That in turn led to a radical review of what constitutes appropriate methodology even in cognitive science and neuroscience, which are currently founded on precepts that we consider evince premature closure.

This is the second volume of proceedings. The first, “Foundations of mind: cognition and consciousness” appeared in *Cosmos and History* in 2014. Readers are encouraged to read these proceedings, which are free on the web, carefully; they also feature introductions to several of the papers here, introductions it is superfluous to repeat. Some papers had been held back for this book; then an e-list we set up became a gusher, with the participation of the great Henry Stapp and Walter Freeman, Stuart Hameroff, and many others. We feature some highlights here.

The age of “Big Data” has spawned a revival of the ambitious, but so far unrealized, dream that computers would soon achieve or even surpass human-level intelligence. The FOM project takes the view that “Big Data” cannot overcome inherent limitations to progress in disciplines such as machine translation, image understanding, speech recognition, robot navigation, and others. Although current approaches are yielding useful

engineering advances, a paradigm shift is required to achieve true machine intelligence.

Likewise, in its rush to provide reductionist explanations, neuroscience was in the early 21st century producing contested localizations of psychological dispositions like “awe” and “spite” and indeed “science” itself in the brain, neatly short-circuiting tens of millennia of human culture. We propose as a counterweight to this trend the radical assertion of the human subject as causative in human affairs and the “Noosphere” of ideas that she inhabits as well as the physical and social worlds.

The group coalesced around four critical scientific programs:

1. Neurodynamics, a rigorous approach to neuroscience that used the apparatus of non-equilibrium thermodynamics and the language of chaos theory to describe brain function in terms of transitions between formally-specified states that had been attested experimentally.
2. Quantum neuroscience, the view that quantum effects will be found in the brain and use of the classical interpretation of quantum mechanics to explore the unassailable arguments in favour of free will and the consequent autonomy of human culture. Quantum field theory should be used for mass actions of neural populations forming Bose-Einstein condensates through ephapsis (electric field effects exerting local forces in neuropil) that are patterned by short- and long-range synaptic modulation expressing memories.
3. Consciousness, while identifiable with pure subjectivity, can be studied in action neuroscientifically in terms of large-scale cerebral synchronization. Attention seems to have a distinct signature in terms of salience and information fluctuations in attended to streams versus those not so attended and mathematically in terms of the von Neumann apparatus.
4. Alternative approaches to cognitive science that stress the capacity of the human brain for recursion and other advanced symbolic feats in interaction with the noetic, physical and social worlds.

In this book, we have several papers at the quantum level. We face Henry Stapp up to what could have been eviscerating criticism; it is fair to say that he comes through with flying colors. Stuart Kauffman expounds on the “poised realm,” before coherence has been destroyed.

The next level is the “microscopic” level, individual neurons. My paper with Tom Doris explores this level in the context of the Bohm/Probram “holographic model” of reality. At the mesoscopic level, populations of tens of thousands of neurons, Gautam Agarwal related his work on the hippocampus. Of course, it is Walter Freeman who has most famously explored this level; we feature several comments by him, and indeed an extended discussion about how quantum field effects could enter.

Walter’s argument, repeatedly stated here, is that math does not come naturally to the brain. The fact that our brains that are evolved to work on the perception-action cycle can handle concepts like infinity, however imperfectly, invites in a new set of considerations. This final point leads us to question how we can know a reality construed as objective. Math is simply the most elliptical description, that in fact we also have direct access to the external world through language, properly used. Also what about the “unreasonable effectiveness of music” in the depiction of emotion? Is music the most elliptical description of emotion in the same way? The position of this book is that is the case; and so math is the noetic language for science and music is that for emotion. My own paper expands on this.

By his own admission, of course, Faraday knew no math, so we can be open to the notion that non-musical artists can create great art in the same way as Faraday created great science. In fact, we should perhaps be open to a totally new account of how humans cognize the world, one that abandons genetic epistemology. While Piaget and his followers like Bruner correctly focused on action, it turns out that gross motor movements have none of the complexity of neurons, which can do sparsification, non-linearity and much else.

Indeed, we should be open to a view that allows quantum processes to inform cognition; specifically, as my 2013 paper argues, we actually break tasks down into steps, some of which exploit superposition. To bring matters a stage further, we are also open to Wheeler’s “participatory universe”; it does seem to be the case that the choice of which question to ask causes a particular state-vector reduction.

Mathematicians have long behaved as if there is an external Platonic world: the practice of the law and indeed large-scale organization of society assumes free will; every element of our discourse, as John Searle has pointed out, assumes that there is an external world of objects. We can call these stances pragmatic Platonism, pragmatic voluntarism, and pragmatic realism.

This book goes a stage further, toward non-ironic Platonism, voluntarism

and realism. In conjunction with Chapter One of its companion volume *One Magisterium*, it claims that the burden of proof is now with subjectivists and determinists. The work of Henry Stapp is attacked here and the attack falls well short.

We can even come close to proposing a scenario. In quantum observation, there is an elision of all non-diagonal elements in the Hilbert space. For Stapp, the immense space close to the diagonal allows introspective states corresponding to decision. Yet the decision to observe x rather than y will have objective effects as nature collapses the wavefunction. We are approaching a fully attested mathematics of free will, and the role conscious choice has in shaping a reality hitherto considered external. It may turn out to be the case that objects reflect the amount of conscious choice in their creation in ways that we should learn how to revere.

What is radically new here, therefore, is the idea that a completed artistic project, resulting from the sophisticated and completed activity of an attested body of practice like a drama troupe, a musical group, or a dance theme, allows exploration of reality as certain as that in math, if not as elliptical. Alternatively put, given their common preoccupation with frequency analysis, it is not inappropriate to say that music performance is applied math, and that it is really a matter of convenience that music has dealt with emotion and math with physics.

So when the object of attention is the focus of awareness, we get the situation that Pribram (1991) describes: resonance with dendritic and other processes in the nervous system giving an ever more veridical intending of an external (or at least consensual) object. The consequences are these: the objects available to us should be of a sophisticated type as described in informational theory in terms of the number of bits they consist of, the stack height of the computation, and so on.

Finally, to reply to Deepak Chopra's now infamous million-dollar challenge: as Gurdjieff said, "Take the understanding of the East and the knowledge of the West – and then seek." Let's unpack this set of attributes given by Deepak Chopra in his \$1 million challenge: "intention intuition creativity imagination perception cognition insight choice and more." (It is however worth pointing out that the video challenge only references solution of the "hard problem" which according to Chalmers himself is merely about subjectivity – and how much "more" does Deepak want?)

We asked Chopra to agree to help us put together a seminar series to assess whether his challenge has been met. I suggested the Berkeley Nobel laureates Saul Perlmutter and Randy Schekman as judges; I do not know either of them personally. The format would include any speakers of

Deepak's nomination acting as devil's advocates for my claim that the challenge put up on his video, if indeed it can ever become part of science, has indeed been met in full. Remember that Hameroff stated that the "hard problem" can become part of science. Chopra immediately turned tail and ran.

It is my view that Chalmers is a charlatan. Insofar as he has anything coherent to say, it is this from *Facing Up to the Problem of Consciousness*: "It is undeniable that some organisms are subjects of experience. But the question of how it is that these systems are subjects of experience is perplexing."

In this collection, Walter Freeman has once more cogently demonstrated how intentionality, the capacity for mind to refer to the external world, occurs in nature, starting in evolutionary terms with the tiger salamander. That will give us "intention, perception and cognition."

There are good computational accounts of creativity in many sources: working musicians and composers do not doubt much of what they have to say. In fact, we can probably tick off all of this list one by one, with choice of course handled by the von Neumann/Stapp work. All that remains is subjectivity, which Hoffman's paper in *Two Sciences of Mind* handles. Enough of this; I have included it only as an exemplification of why we need to lose the "hard problem."

So we go here from the quantum level (Stapp and his commentators) to the microscopic (my paper with Tom Doris) to the mesoscopic (Walter Freeman) to the symbolic (Tantucci and Talmy), eventually focussing on issues of methodology (Campbell, Smith et al.). This collection includes new papers from James Blackmon, Vittorio Tantucci, Jacob Needleman, and commentaries on Stapp by de Barros and Montemayor, with Stapp's reply. My own paper is commentated on by Stuart Kauffman.

There are indeed techniques for specifying states expressed in psychological terms. They are called novels, symphonies or arias. Please bear in mind that "solving" the "hard problem" would reduce the arts to the sciences. Fortunately, there is no chance whatsoever of that happening.

1. We do not specify psychological states in neuroscience. We report data, and Walter Freeman has developed a language of phase transitions to interpret these data.
2. Nor do we specify psychological states in cognitive science. We use a vocabulary involving Grammars, recursion, intentionality, et al. It is possible that Walter Freeman considers this already a step too far.

3. It is possible that quantum mechanics has developed a model for inserting subjectivity into the structure of modern science. Otherwise, when we refer to subjective states, we are admitting that we are failing in neuroscience and cognitive science. In fact, most of the charlatanism (Lakoff, Vul's targets) emerges from wanting to talk about the self in a pseudo-scientific context.

It is important that any new discussion be well-informed. Thus, this is an incomplete list of the subjects required for mastery of cognitive science:

1. Cognitive psychology.
2. Philosophy of mind, of language, epistemology.
3. Algorithms including formal language theory.
4. Linguistics: generative, functional, computational.
5. Neuroscience: microscopic (including neurobiology), mesoscopic, macroscopic.
6. Math: set theory, linear systems, chaoplexity.
7. AI.
8. Anthropology.
9. Physics: classical and the observer in 20th-century physics.

Much of the dialog here is between 5 and 9. We hope to expand it in further books.

This book is the second in a series. The Foundations of Mind conference was published by the Open Humanities Press e-journal *Cosmos and History*, and CSP is publisher both of this volume and my monograph *One Magisterium*. It is hoped that the reader will be sufficiently engaged to delve into all these sources in order to intuit the overall perspective.

Let us end this introduction with some housekeeping. The “voluntarism” in the title refers to free will, not the scholastic notion that God could have created any type of universe, including ones in which evil triumphs. Both the Platonism and Dualism, whose justification is hinted at here – particularly in the discussion, along with free will – are motivated at length in the companion volume *One Magisterium*.

In particular, Dualism is accepted for all practical purposes, and deeply encoded in the notion of legal responsibility. However, we might also consider what it is to discuss the issue with a hard-core physicalist, who insists that we all are just a bunch of neurons. Obviously, she is committed to the idea that the debate itself is the firing of neurons.

The first cogent counter-arguments refer to what model of the neuron

is being used, and what results have emerged from the accompanying research paradigm. For example, in 2014 hundreds of European scientists signed a petition complaining about the Markram project which the EU had funded with over \$1 billion. Markram was unable to adduce results to vindicate his approach; we still see through a glass darkly.

There are severe methodological limitations with fmri (time), with eeg, and this book shows just how complex the bridges are that span explanation from the quantum level up. More to the point, as “Big data” takes over, we are getting ever further from credible neural networks that can process language.

So reduction of the discourse to a “bunch of neurons” is currently an eschatological hope. Yet that is only the beginning; our neuroscience may get better, but we will still communicate to each other in symbols. These symbols, in turn, have clear markers for actions over which we have control and others over which we do not have control. It is hard to avoid slipping into a pragmatic dualism.

Indeed, given the success of Henry Stapp in defending his voluntarist position in this collection, it is hard to avoid an ontological dualism. We really do have free will, be that attenuated to the statistical tail of our actions; much of the time, as David Eagleman and others have shown, we allow ourselves to be creatures of our environment. Indeed, in a domain like politics, we are now subject, now object: “What am I meant to feel now? – what if I want to give the impression, not the substance, of caring?”

In fact, one can argue that science itself arises in consciousness, the primary reality. I do not wish to go that far. However, I argue in *One Magisterium* that paths have been blazed over the centuries using words like “awe” (pace Michael Shermer in *Scientific American* (March 2014)) that can give us a sense of our place in the cosmos. For those not math-oriented, there are ways to evoke resonances in the hands of a skilled writer that can begin a sense of transcendence.

So will we have a new age of woo-woo? On the contrary; I believe that we can look at any particular religious and/or artistic expression and do smell tests. Is there total openness to reason? If not, ignore it. Does the expression tend to ever greater complexity as measured by cognitive criteria like stack height in recursion? If so, begin to trust it. Is there hate? Ignore it.

The alternatives to art and religion, properly reconstructed are indeed woo-woo and eliminative materialism. It is my firm belief that both are equally wrong. If we allow ourselves, we are about to enter a Golden age in which we can again trust the natural movements of our psyche as it

attempts to search for its ground in the beauty, truth and harmony of the cosmos.

The final part of this book is discussions involving me (SON), Walter Freeman (WF/WJF), Henry Stapp (HS), Stuart Hameroff (SH/Stuh) and Stu Kauffman (Stuk).

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FOUNDATIONS OF THE SELF

JACOB NEEDLEMAN

EDITED BY DAVID TAN

As a philosophy professor I wanted to start by quoting a few lines from the introduction of Stephen Hawking and Leonard Lobanov's book *The Grand Design*. They say,

We exist for but a short time and in that time explore but a small part of the whole universe. But Humans are a curious species, we wonder, we seek answers, living in this vast world, that is at times kind and cruel, and gazing at the immense heavens above people have always asked a multitude of questions. How can we understand the world in which we find ourselves, how does the universe behave? What is the nature of reality? Where did it all come from? Did the universe need a creator? Most of us do not spend our time worrying about these questions, but almost all of us worry about them sometime. These traditionally are the questions of philosophy, but now they say in no uncertain terms, on the first page of their book,

But philosophy is dead. Philosophy has not kept up with modern developments and science, particularly physics. And scientists have become the bearers of the truth and the quest for knowledge.

I am here to say that reports of Philosophy's death are rather exaggerated. We philosophers still breathe. Don't close the coffin on us quite yet. The questions of the heart, which is the root of philosophy, are the great unanswerable questions that define us as human beings. Because we ask these questions such as, "Does God Exist?" "What is Man?" "Who Am I?" "What ought we to do?" "What can we know?" "Is death the end?" "How should we live?" "Why do we suffer?" philosophy is in no way dead.

These are the questions that keep us up at 3 o'clock in the morning, as F. Scott Fitzgerald once said. These burning questions are fueled by what Plato called *eros*, which is the yearning to understand and participate in that which is greater than ourselves. Starting with the questions, "Who am

I?” “What is the self?” and “What is the mind?” we stumble upon questions responded to by great teachings throughout history, especially religious teachings, particularly in their contemplative and sometimes mystical spiritual aspect. We find this not only in the teachings and religions of Asia, whose mystical aspect many of us are aware of, but also in the seemingly more familiar Western Christian and Judaic teachings. If we can get past the dogmatic repulsion we initially have to these religions, we find a vast psychological teaching about the mind and consciousness.

One idea found in many traditions, both East and West, is levels of consciousness. Few of us have any idea of the meaning of consciousness in, say, the Tibetan Buddhist tradition or in the Hindu tradition. In these systems there exists spiritual psychology that points to what human beings can be. This potentiality is what true consciousness is. It is not limited to what goes on “in the head”; rather, it is in the “mind” of the heart, or the “mind” of the instinctive part of our nature. Altogether, the human being is uniquely composed of mind.

Almost everything in us serves our need to understand, to *see* in the fullest sense of the term and to participate consciously in a great universe. If you begin to truly study this vast psychology you will find it not just in the Eastern traditions, but also in the contemplative metaphysics of the Christian doctrine of *cosmos*, the place of God in the Earth. It is in the tradition of the Cabala which is a psychology of what a human being is or can be. More importantly it also shows us how far we are from our true potential.

Once we begin to read these messages from this very much misunderstood thing called mysticism we find it is a doctrine of consciousness. It posits the human being in the cosmos as high vertically as our present scientific knowledge of the cosmos is horizontally. This is the universe of the authentic mystic who has an inner discipline that makes him or her one of the great guides of the past. These include some of the great philosophers, particularly Pythagoras, his pupils, and Socrates. The cosmos is a vast vertical structure composed of levels of mind emanating true power, beauty, and divinity.

A universe with levels of consciousness, levels of being, is something that we have lost sight of. We think of it rather fancifully, “religious” in a way that is not altogether positive. Yet when you go into it and see the language that is used it is often symbolic and full of images. It is the language of story and of metaphor. And when you begin to read that language a little bit, you find they are speaking of mind and of consciousness. This is a movement inward from inside the human psyche.

To a large extent science could be understood as a movement toward inner knowledge from the outer self. The scientific method gleans knowledge from sensory observation, logical connections, theory, and prediction, that is, the exterior self. You have two selves yearning for a bridge. The rapidly developing sciences serve the brain, and observe the brain, but inner observation serves the mind. The inner activity of self-knowledge is a different enterprise from the complex neural structure observed from the outside. So with that point we begin to say, "What kind of bridge can there be?" Because the first thing that the scientist has to understand is the object that he is examining. How do we know the mind? The word "mind" is somehow implied in the word "brain." But what is the relationship of their differences? How do we know the subject we are studying if we go at it without realizing that our knowledge is state-specific?

According to the great teachings, each level of consciousness has its own epistemological power. It has its own cognitive power. We know we have at least two states of consciousness: sleep and walking around in our everyday life. We know more or less that this state of waking life, that we live most of the time, is cognitively more reliable than our dreaming life when we sleep. It is not a mistake to say "walking-around-consciousness" is cognitively more reliable than dream-life.

Is there a state of consciousness that is to our everyday waking state as our everyday waking state is to our sleep? Is it a possibility? I would say that we all experienced and touched what I would call the third state of consciousness. This third state is to us now as now is to us asleep. If that is so, just as a possibility, if there is another state of consciousness whose cognitive element's epistemological power would be greater than ours is now as ours is greater than our sleeping state. Now this may seem obvious, but it is not so obvious when we try to ponder moments when we've been touched by a completely different sense of presence, togetherness, and selfhood. That other sense of selfhood is another sense of "I am," the crucial words of this discussion. It gives us a key or a clue into deeper meanings of consciousness.

So this other beautiful state of consciousness occurs when I am aware of "I Am." Inside myself hides that which is waiting to come out. It waits to penetrate our bodies and our feelings. This has been a constant theme in the West but more explicitly known in the East. This constant theme is becoming more popular and well known in the Buddhist and Hindu traditions, yet I think it is very well known in the Judeo-Christian tradition as well. It is just in a different language. "The Kingdom of Heaven is within you." This kind of language is what the great monks in the deserts

of Egypt in the early centuries were searching for: the divinity within, the Godhood within, the contact with some other level within oneself, and the suffering that ensues when apart from that.

I started out as an absolute atheist, but what I discovered, when I was compelled to teach courses in the history of western religious thought, was that an incredibly powerful, sophisticated philosophical, psychological, and metaphysical teaching lay at the heart of the Abrahamic teachings.

This other sense of “I” becomes higher and deeper when you hear the words *Manas*, *Bhodi* and *Nirvana*: realizing that the way to understand the brain is to first ask “what is the mind?” The mind is not just another name for the brain. It is another movement, another energy that is side-by-side with the physical brain. This goes for the *cosmos* as well. Circles within circles within circles. Levels. You begin to see that the idea of states of consciousness it is all over the place. This may sound extravagant, but when an honest scientist says, “All right! Where is the evidence? Where is the experience? Where is the empiricism?”

There is nothing but evidence.

It is provided as inner evidence under very definite conditions as rigorous as a scientific laboratory. It is conditions of the inner world, of the inner life requiring an attitude of humility, the wish for truth, and a sense of the sacred. This is not something that a normal sane person can repeat in a laboratory expecting the same results. It requires a special attitude and a special orientation of the individual. Only then will the experiences come.

These results that come eventually to the right person are what I call *inner empiricism*. It is as empirical, rigorous, careful, and historically consistent as anything modern science has to offer, only it is what Kierkegaard called *inwardness*. A cosmic system related to this is found in the Hindu tradition. In the Sankhya philosophy there are two fundamental realities, *purusha* and *prakriti*. *Purusha* is the watcher, the seer, the consciousness of the universe. *Prakriti* is the thing seen, the nature, the actions of human beings, animals, weather, and whatever we encounter. At the same time there is the watcher, the consciousness of the universe. The rest of life, the Earth, nature, human life, in all its glory and tragedy is the content of the conscious universe.

Similarly there is another idea that can be brought in from the Judeo-Christian tradition. “I will make man in my image,” says God. We are made in this image according western spirituality; the image of God. This can mean, in oneself there is the *purusha* and the *prakriti*. The creator and the created make a distinction between consciousness and the content of consciousness in our everyday life and in the universal scheme itself.

We all have moments of great crisis where you have to act immediately. We also have moments of great unutterable joy. In these moments you can experience *I am*, I am here, I am present, I am all together. Nothing can disturb me, nothing can distract me, nothing can make me angry, we have all touched moments like that. We have felt it in our body, we have felt it in our life. Whether it is the birth of a child or a great disappointment, when the rug is pulled out from under me there is a moment of great presence that is unforgettable. These are the moments we remember. It is in those moments of full presence that we are more like the person we wish to be than at any other time.

In moments of grief no one can irritate you and nothing is too much trouble because you are now in a truly central existential *human* moment on Earth. Then we get distracted and taken up and we get attached as the Buddhists say. Or we get impassioned and we lose ourselves and our attention. We “lose our consciousness” all the time. So all of this is a way of saying that consciousness is a vast vertical realm. The level of consciousness that we are at most of the time is just the surface, the beginning. This level is just the beginning of what is possible for a human being. It also raises the question: What state do we have to be in to experience the possible transcendence of our usual level of knowing? How do we become “transcendental scientists” discovering our role as spiritually developed human beings?

Is the knower less than the known? Can the knower be less than the known? Science brought us remarkable data of the brain, but can it ever touch the scientist without the observer coming into question? Now we all know that is true in physics about how the observer influences what is seen and even what happens objectively. In our case here, the observer is *the great subject* of study in these great traditions. How can the observer “know” if he does not have any idea what the phenomenon is he is studying?

I propose that when you see a Buddhist monk whose head is wired up to an electroencephalograph, it is no surprise he smiles and laughs. You cannot observe his *attitude* toward it. Brain readouts aside, you do not know what is going on in that laughing monk’s mind. Possibilities of consciousness occur with a kind of movement of the heart. Knowledge of consciousness is knowledge of the human being.

“Know thyself” says Socrates. I think that means what the Buddhists, the contemplative Christians, and the Cabbalists, are saying: “Know” not only your small “s” self, your likes, dislikes, weaknesses, strengths, and habits, but also know the capital “S” Self. Self-knowledge means both the ordinary ego that you know and the transcendent “I Am” that is at the

heart of human life and the universe. So this is a tremendously exciting time in human existence. This is a time when science, initially created to rule out consciousness in its object of study, ruled out purpose as a result. By removing teleology, it took out “why?” It suppressed value because it was subjective.

If you call value “subjective,” you are taking it out of the universal world, out of objective reality. No wonder there is an epidemic of relativism! There is no sense of absolute value anywhere! The instrument for perceiving value is in the feeling. We are not talking of the egoistic emotions, which of course do not provide anything much of cognitive value. Rather there is an element of feeling in a human being that actually is an instrument of knowing when highly developed. It is not a knowing of the abstract intellectual kind though necessary and important. That kind of knowledge is only one little part of the epistemological potentiality of the human being.

No wonder there are no values out there! The mind that can receive values is locked away. It is necessary to understand that Plato called the highest reality *the Good*, not *the is*, not *the what*, but *the Good*. This is a revolutionary thing that I am attempting to say in a very crude way that *only a virtuous human being can know reality*.

“What? You mean all our scientists cannot know reality because some of them are not virtuous enough?”

Yes.

There are degrees of course for there are aspects of reality that you can deal with using just the head and the senses but without the heart-knowledge a whole aspect of reality is cut off objectively.

“Are you saying there is something called objective good and evil?”

Yes! That was what Plato was saying, that was what the great spiritual teachers said. Our culture has developed intellectual knowledge and has gone very far with it but past a certain point this knowledge turns destructive. There is now an awakening sense of bringing the heart, the feeling, the love, into science. And if that is what brain science is going to come up against, a wall of love, a wall of value that will be a remarkable moment. It will be the moment the mystic, the spiritual master, and the great scientist, sit down and actually listen to each other. I would like to be there for that.

COGNITIVE SCIENCE AS/AND SOCIAL SCIENCE: THE COGNITIVE AND THE NOETIC

SEÁN Ó NUALLÁIN

Prologue

Broadcast TV's "The Big Bang Theory" has an anti-hero, Sheldon Cooper, a theoretical physicist, who never wastes an opportunity to lord it over rivals in other disciplines, like geologists or "gravel monkeys" as he calls them. Eventually, he meets a female neurobiologist, Amy Farrah Fowler, who is quite as arrogant as he is. She explains that hers is the basic science because, once Sheldon has developed a theory of everything, she will describe the neural mechanisms by which it is implemented in the cortex. Outraged, Sheldon accuses her of "psychologism" and their relationship is ended, as Sheldon locks himself in a room full of cats named after the team of the Manhattan project and his mom intervenes.

The point to be taken from this, it is to be argued here, is that Sheldon is actually correct. The description that Amy proposes will not be more elliptical than the terms of mathematical physics that Sheldon uses. The language of math is more concise and precise than anything that will emerge from her work, if only because math has been developed for this very task. In fact, she is indeed also in danger of "psychologism" – of using a formalism that is formally inadequate for the task in hand. It will be argued below that this mistake is ubiquitous in cognitive science. In fact, it cuts right to the core of this enterprise. Indeed, it cuts right into the enterprise of scientific explanation itself, as well as the role of the academy (including universities) in the world.

Thus, there are several routes that can be taken into the themes of this piece. It enunciates limits to the whole enterprise of cognitive science, while gracing it with the idea that it should complete the cycle of explanation of sciences within the academy. In so completing this cycle, it should use representational formalisms of power at least equal to those in mathematical physics. The following prologue should be read as the working out of a theme over the following set of variations:

1. Which is the basic science?
2. The “hard” problem: content versus consciousness
3. The academy versus the world
4. Religion versus science
5. Politics and science: subjectivism in ethics and morality
6. The arts and science: subjectivism in aesthetics
7. Does science – which after all means “knowledge” – have a monopoly of knowing?

The viewpoint here, therefore, is also informed by issues within cognitive science and its relation to other sciences. There will, in my view, remain a central mystery related to observation and quantum mechanics. There are and will increasingly be good neural descriptions of cognitive processes with plausible stories about how they lead to certain types of experience. What we won't have is some solution of a “hard problem” whereby we can take a random neural phenomenon and

1. show how it leads to a subjective state irrespective of the physical activity manifest in the brain
2. extend this to “explanations” of the arts, of political activity, of healing, etc.

For the record, this fallacy, as we shall see, was originally proposed by Locke and refuted by Leibniz; one of the reasons the Tucson consciousness conference has kept going for 20 years is that they are demanding the “solution” of this “problem.” There is also increasing skepticism about the whole “consciousness” industry and belief that it arose when all the myriad issues involved in mind have been conflated into non-issues like the “hard problem.”

I write that as an experimental neuroscientist who believes that we will get precise measurements and a decent quantum entanglement interpretation and then we'll move on. In particular, a lot of the “woolly” material will prove appropriate for the arts which is an area I revere. Some others will be appropriate for talented spiritual innovators to produce new “religions.”

A related point is that what is wrong with Google, Facebook, et al. as they confront difficult problems like language translation is what is wrong with spirituality in a secular and pluralistic age and is what is wrong with the Human Genome Project: a failure to recognize degrees of being. That results in inappropriate algorithms being used. For example, a massively-funded cancer database compiled by David Patterson at UC Berkeley and

colleagues at UCSC has failed to take into account the fact that cancers are aneuploid pathologies at the chromosomal level. While the principals of the project have grudgingly admitted in public that this is a problem, no remedial action has been taken.

For over a generation, the eminent Berkeley cognitive scientist George Lakoff has produced a creative synthesis of modern thought in the natural and social sciences that blazes a path from molecules to meaning; or, with even more consequences, from computational petri nets to politics. The work is backed up with cogent reasoning, with fMRI and linguistic data, and has had huge popular appeal. Its reasoning goes as follows: it is self-evident that we as humans decide, perceive and act on the basis of neural processes. If we can gain insight into these processes, we can understand the springs of action. If we understand the springs of action, we can modulate thought and behavior in ways that are less destructive, more true to the facts, and more life-enhancing. To reprise the central argument, at the computational level lie primitive processes that gain expression in language. These low-level activities gain access to important features in the world through metaphorical transfer. Much of this is undoubtedly true, but arguably was anticipated by Piaget and other genetic epistemologists.

We could continue to say, along with Nunez and Lakoff, that this schema also applies to math, itself a language processed by the brain in this way. Consequently, math is indeed unreasonably effective; we have no reason to believe that it can give privileged access to the external world any more than any symbolic product can. It also applies to politics, which has classically been described in psychodynamic terms. The Freud of *Totem and Taboo* would not have difficulty with a perspective in which the American republicans are paternal superego lawgivers, and the Democrats are nurturing mother figures.

I wish to argue that practically every step in this latter set of arguments is wrong; even were the fMRI data more reliable than we now know them to be, indeed, the final step of the argument could lead to the elision of the normative in politics with disastrous consequences. To begin with the first step, the correct insistence that indeed all that we are is ultimately processed by the brain, there is attendant the danger of psychologism, the fallacy of reducing an entity to a psychological description of how that entity is processed by the person. Yet such description might strike one as reasonable, unless it is made clear that the psychological terms used are neither in formal terms complex enough nor elliptical enough to perform the description.

In particular, fMRI is a description in terms of scalars, or tensors of order 0. It is uncontroversial to suggest that the brain routinely uses

vectors, tensors of order 1; indeed, we know from general relativity that tensors of order 4 are within the scope of human cognition. Yet even this category error pales in comparison to the attempt to make politics conform to the dictates of the academy in a single academic discipline, an attempt that may well have helped cost the Democrats the 2000 and 2004 presidential elections.

Consequently, while it is not unfair to privilege “science” as indeed the only form of knowing relevant in the academy, we cannot discuss this for long without considering the academy in its role in the larger society. That society includes activities like the arts and politics that will use and indeed abuse the products of scientific minds as they will. It is possible that we might propose a woolly area, perhaps called *bionoetics*, that investigates how other forms of knowing are possible – knowing that encompasses the unformalizable certainties of political activists, of artists, and indeed of those students of quantum entanglement who wish to propose a “noosphere.” It is also possible, on the basis of this, that we develop a new notion of the normative in morality, one that insists on the transcendent nature of moral dictates that work within a regulated environment. The final argument on Wittgenstein below will hopefully make this clear.

It will be argued here that, while cognitive science is indeed the mind’s attempting to understand itself, there is a very real sense in which this does not qualify its practitioners to comment on the consensually-validated products of mind in society like politics, any more that they are experts on knowledge can trump mathematicians (which Lakoff both in print and in person has tried to do). There are certain universals about human attempts to describe domains, the existence of an apparatus, conceptual and/or physical, and experimental results to observe; but these are clearly general enough to be relatively uninformative. Likewise, it is argued here that we can speak of a “noetic” level of apprehension distinct from mapping onto the structures of cognitive science, a level that involves an appropriately elliptical language like math and/or a call to action. This point was famously made by Wittgenstein in his argument that a builder could simply say “slab!” and nothing else if the context is sufficiently restricted, and get a slab to use from his co-worker.

It may seem to the readers that in his rejection of his early work that argued in favor of formalizing language in a logical calculus, Wittgenstein is less naïve than Lakoff (see my 2003 book). There was a very interesting paper by Andrius Galisanka called “Wittgensteinian paths around the fact-value gap” at the recent “Wittgenstein and Anglo-American philosophy” conference at UC Berkeley (2 Dec 2013) with this observation:

Importantly for the purposes of Wittgensteinian normative inquiry . . . the notion of “practice” was associated with those of “goal,” “purpose” and in some cases “function.” The term “language-game” is telling . . . giving orders, reporting events, forming and testing a hypothesis, play-acting, and making a joke.

So Wittgenstein, subtly as ever, has introduced teleology.

Introduction: How Cognitive Science succumbed to the New Phrenology

Cognitive science studies the mind as an informational system. In its 60 years of existence, it has accepted explanatory schemes involving grammars, algorithms and – less precisely – concepts like schemes, schemas and cognitive stages. It failed properly to address consciousness, leading to an autonomous but related field of consciousness studies. The latter, as we shall see, includes insights from sensorimotor behavior and from quantum mechanics as well as information theory; the schema here would suggest that the higher achievements of consciousness require the kind of formation that German psychologists like Wundt tried and failed to systematize, and would be better studied in another context, perhaps one willing at times to swap the rigors of science for those of applied experientialism. In this paper, we treat the issue of consciousness studies at length.

The breaking away of cognitive and social neuroscience has been altogether more problematic. Very quickly, neuroscience began to make the behaviorist mistake that gave rise to cognitive science as a movement in psychology in the first place. It also attempted a new phrenology – the mapping of sophisticated mental attributes to locations in the brain. It is time to welcome back home this wayward lad, this prodigal son. Here is not the place to discuss the absurdities in funding of science that gave rise to the myriad and often fraudulent claims of social neuroscience (Vul et al., 2009). Rather, what we need to do is make sure that this does not happen again.

There are a few in-principle arguments that pertain. The first was due to Chomsky and his followers; it is that human languages evince a systematic structure, and that this has a certain formal complexity. Cognitive science must allow at least that tensors able to handle context-free grammars are used to model the brain. It also must eschew behaviorism as a program to explain all, and reinstate the algorithm as an explanatory device.

The received history of cognitive science has often focused on the

poverty of the stimulus, an “in principle” argument from Chomsky’s notorious review of Skinner. Yet that argument has not worn well, with the data in question more available than Chomsky thought. Can we then, as this author believes to be correct, revisit Chomsky’s argument with reference to the fact there is no guarantee that we can induce the correct context sensitive grammar from raw linguistic data, an argument that holds a fortiori for neural impulse?

This of course means that the mega-projects on the brain, headed by the likes of Christof Koch in the USA and Hernry Markram in Switzerland (with EU money in a non-EU country as of 2014!), are doomed to failure. For a start, such early mappings as that of the earthworm revealed that few of the neurons ever fire. It seems rather the case that we need to look at the mass of electronic junctions that complement the chemical synapses on which Markram, Koch et al. will focus. More importantly, absent a formal cognitive theory of what’s going on, these mappings will produce nothing.

Likewise, at the Hixon symposium in the late 1940s, as described in my 2003 book, it was argued purely on speed grounds that the beginning of sentences cannot be the stimulus generating the response that comprises the rest of the sentence as certain trends of behaviorism thought. In short, there had to be some on-board processing. Does the notion of a mind with a capacity for recursion and internal representation arise naturally, or as a considerable stretch, from this? What then of the status of eliminative materialism, which this author believes tumbles – in its eschatological form as the attempt to map onto bare signals – on the grounds of representation alone? For reasons that will be outlined below, we can insist that cognitive science studies the mind as a representational as well as an informational system.

Another argument is due to what we know about the more remote achievements of the human mind. Ricci flow involves a tensor of order 4; somehow great mathematicians can handle this. It is now absurd to suggest that the scalars used in fMRI “explanation” are in any way adequate, even were the statistical analysis correct (and Vul et al. (2009) credibly argue that this is by no means always the case). In fact, no explanation of human cognitive function can be accepted that does not show formal capacity to handle all achievements of human cognition, as described formally. MVPA (Multi-Voxel Pattern Analysis), the great hope of fMRI research, is almost certainly not really sensitive to first order structure in the activity pattern and is likely simply a more elaborate scalar representation.

The study of tensor formalisms at various orders and their application is the holy grail of cognitive science, which is a superset of cognitive