One Magisterium

One Magisterium:
How Nature Knows through Us

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To all working at the edges of society in an uncompromising search for truth and justice.

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Kenyan middle-distance runners were famous for running like “scared rabbits”; going straight to the head of the field and staying there, come what may. Even more than was the case for my other books, I wrote this like a scared rabbit. In particular, my friends at my home in Ouistreham, France were exposed to the creative process in its rawest form; an Irishman losing 12 kilos and with that faraway look in his eye.

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UC Berkeley as ever allowed me continue this work while I was officially in the USA on a musician’s visa; it is as well to note that this is the 50th anniversary of the Free Speech movement and that doomed and heroic figure, Mario Savio, from whose greatness refugees like me are still benefiting. Unhappy the university that needs a hero……

I had wonderful exchanges with Stuart Kauffman, Henry Stapp, Jacob Needleman and Walter Freeman while the companion volume emerging from the “Foundations of Mind” was being readied. Socially in Berkeley, Le Bateau Ivre, Jupiter bar and the Starry Plough catered for my insatiable needs for good beer and life music and dance; thanks to all the staff. One of the paradoxical benefits of the $1 trillion student debt in the USA is that very pleasant young students were working at the sports centre as I worked off the beer. In random order, thank you Madison, Haley, Laurel, Laura, Katie (*2), Megyn, Sarah, Delilah, Clare……..sorry if I missed anyone!

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It would be dishonest not to mention that this book would probably not have been written but for the fact all my software, notes and so on were stolen by management at Dublin City “University” in 2002 and to this day have not been returned. This leads to my dedication to those on the edge. It is clear that the war on academic freedom in Ireland extended all the way

up to the principal secretary of the department of education, who was perfectly willing to countenance criminal behaviour to staff and students alike in service of what looks increasingly like a privatization agenda. But for this, I would have spent the past 12 years as a mentor, rather than a solo creator. I leave it up to you, the reader, to decide is this has been salutary.

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EXPOSITION OF THE THEMES OF THIS BOOK

While in the last great creative period of his life in his mid-30's, a time when he behaved toward his wife and the mother of his three children with a cruelty suggesting a sadistic streak, Einstein edged toward a view of scientific discovery in which math, rather than physical intuition, became a guide to physical reality. Later the great humanitarian and pacifist was paid royalties for military products by both sides in WW2; the great skeptic asserted moral realities like academic freedom; the great activist allowed Szilard to write the letter for him that was causative of the Manhattan project; the great mystic deployed God as he saw fit; the cosmopolitan and internationalist yet avowed his allegiance to his Jewish tribe (*Stamm*) with an avidity approaching that of the German nationalists he despised.

The casual cruelty that permitted him never to bother seeing his first child and only daughter, the conceptual agnosia that prohibited him from making any further contributions to science after his early fame, and the lack of self-awareness that allowed this apparently most gentle of men to become perhaps the most frightening weapons scientist of all time indicate a legacy that we have yet to deal with.

This book attempts a framework that future Einsteins might use as a guide as it becomes clear to them that their technical skills may indeed relieve them of any human responsibilities. It is important that the reader immediately engages with what is new in this book. Like everything else this writer has done, it is well-documented. Please do not let that stand in the way of an appreciation of the novelty of the argument.

In the first place, it interrelates science, the arts, and religion through a notion of “levels of being”. More precisely, it argues that through the arts and those etherealizations of the quotidian that we call “religion”, humanity has the tools further to develop itself in its ontology, in its level of being. That frees science up to do what it does best; objective inquiry into reality, to be realized in impersonal/third person descriptions. Conversely, religion must get away from Neolithic narratives and seek ways to celebrate and thus transcend so-called “ordinary” life.

A sequitur is appropriate; the current attempts to objectify experience itself, whether through “solving” the “hard problem” of consciousness or mapping onto neural locations, have arisen precisely because of the absence of attested cognitive science methodologies. Otherwise put, the

more able students in these areas really do not want to know where their self is located in the brain and what this means for their life, realizing how absurdly premature this is; rather, they are seeking tools for thought in the academy as they explore the very rich social life available to them in their "real" lives. The latter is the fertile ground for a new generation of religious guides and artists.

An avid reader of Kant like Einstein would have concerned himself with the perennial questions of "What can I know?" and "What can I hope for?". In our uneasy way, we postmoderns fret over "what is this I?" and "What is it to know?". Thus, the first truly new concept in this book is a distinction between the "noetic" and the "cognitive".

The latter is the capstone of third person science; the academy must end its cycle of explanation with an account of how the representational structure of the human brain has managed to understand nature. The former is more broad; it includes situations in which knowledge is situational, skills-related and often not accessible to focal consciousness. One can also be object as well as subject in this perspective; if one can't find the sucker at a business deal, one assumes it to be oneself. The "I" in turn is a socially-constructed entity based on primitive computational data-compression operations.

In one of the companion volumes to this, "Dualism, Platonism and voluntarism: explorations at the quantum, microscopic, mesoscopic and symbolic neural levels" (CSP, 2014; the other volume is freely available on the web as "Foundations of mind", C+H, 2014) it is argued, time and again, that while "as if" free will etc are undoubtedly true, there is a strong case to be made from the structure of cognition that Platonism, the existence of a Noosphere, and much else can scientifically be upheld. Briefly, science is indeed an objective description; yet it contains within itself the limitations identified not just by Goedel, but a killer argument by his Princeton colleague Von Neumann stating that the choice of what to observe is part of science. This very attenuated free will is magnified by the highly social nature of our society into a system of signification in which it is clear to us, moment to moment, what is within the scope of our voluntary action and what is not – particularly in liberal democracies, themselves an exemplification of how Von Neumann's "Process 1" works out in social action.

As Einstein lurched from a language of physical intuition to one of math, it became clear that the "unreasonable effectiveness of mathematics" was to have its finest hour as the Ricci and Riemann tensors taught matter how to move and space-time to curve. A key argument of this book is that math used like this simply reflects the most elliptical and elegant expres-

sion of the basic truth that we are a microcosm of the cosmos. Math has developed through the millennia in ways that we may never fully understand to become the “noetic” language to describe our relation with the physical cosmos. In the same way, for those sensitive to it, music is the “noetic” language of emotion.

Faraday was a great experimental scientist who knew little math; Paul Dirac's cultural apotheosis was “the Cher show”; many great writers are tone deaf. Yet this book insists that a theater troupe, in preparing a performance of a serious play, is just as engaged in an authentic dialogue with an external reality as a string theorist. Conversely, it is becoming clear by the weight that the word “information” is being asked to bear - now an acolyte of energy, now a bit metric – that we cannot get away from a participatory universe, one in which our choice of what to perceive has objective consequences as nature gets to know itself through us.

Exploration of the physical has as an ineluctable this Janus-faced information; this book argues that syntax is similarly intrinsic to Biology. In fact, a computational environment modeling this is outlined in this book. On a conceptual level, what is going on is fundamental indeed; while we may keep the word “gene' for a unit of inheritance, it does not necessarily correspond to a finite set of nucleotides. On the contrary, the “gene” functions in an environment over time; this may best be done by having no nucleic acid correlate, but allowing the behaviour to be learned empirically.

With biology, for the first time, we come across a distinction between syntax and semantics, an indication that allowing ontological distinctions to enter gives us a more veridical basis for computational processing. Syntax restricts combinations of nucleotides and other codes; semantics refers to restrictions on proteins. Yet proteins do not get you “stuff', the external world; likewise, in natural language processing by computer (nlpbc), “semantics' may be little more than a further elaboration of a sentence's import in another baroque formalism.

In fact, a Whiteheadian metaphysics approach to nlpbc might begin with restriction of context progressively yielding “stuff”, meaning, and leaving the details of the syntax and semantics to be cleaned up later. In particular, the function that is melanism is achieved by different mechanisms; perhaps not coincidentally, blond hair is achieved variously by Swedes and Solomon Islanders. The details of the proteins do not help in understanding the phenomenon here unless we also look at its function. Likewise, the restrictions due normally to “semantics” are appropriated by syntax if the context is restricted. We are close to an analogy with gravity warping space-time and a logic of autonomous meanings in analogy to

Einstein's dispensing with absolute space-time, which seems related to the Newtonian approach of syntax and semantics.

Biology explanation is above all teleological; the heart's purpose is to pump blood. Rupert Sheldrake (in)famously argued that form cannot be explained without recourse to the notion that nature has a memory. While this may be a stretch, convergent evolution occurs to remarkable extents with the putative mongoose descendant in Madagascar, the fossa, acquiring the morphology of the fox and reproductively isolated steelhead trout converging in genetic composition.

With the next step in evolution, representation, we again come across an innovation. Specifically, it is argued that we should consider cognitive science as the “noetic” language for studying the mind. This of course means that they are allowing a level of abstraction, the noetic level, that cuts across all areas of human knowledge effort, and that the cognitive is just one species of this. There can be thus one Magisterium, one locus of teaching authority. Moreover, the mental in all its facets and expression cannot be reduced to its cognitive processing. Cognitive Science is an artifact of the academy; the real world involves noesis.

The real world is also meaning-driven, teleological to a fault. We cannot understand language without considering its thrust, as the later Wittgenstein so brilliantly emphasized; we cannot consider any biological process without encompassing its function. The currency of nlp is conscious intent; the currency of phenotypes is function in an environment. When we attempt to simulate these with computers, we end with situations wherein syntax has become “semantics” in a singularity, and disparate sets of proteins, including none in cases of “environmental assimilation”, are performing the same function.

This perhaps arises because any conscious creature in any possible cosmos will have benefited from coincidences that make her situation seem the result of teleological striving. Possible universes demand, in the abstract laws of physics, only conservation of charge, energy and a finely-tuned expansion. A universe that has given rise to life will include an apparent teleology. In fact, the notion of a generally benevolent creator god may reflect the discontinuities that any intelligent being will perceive in any possible universe.

That leads us to the issue of consciousness. It is argued here that consciousness reflects a resonance between neural process and the intentional object. Such resonances occur throughout nature, and were attested long ago in convergence of planetary orbits. Marvelous though consciousness is as a manifestation of how nature knows through us, the real mystery is possibly attention, which directs consciousness.

The results of such direction include our social and political worlds. We in the West have recently experienced attempts at new forms of social organization; perpetual war against abstract nouns like “terror”, accompanied by torture and massive spying without warrants. What America gave the world is the notion that the state can rely on the support of a rational individual whose freedoms and privacy that state upholds. In the face of new forms of theocracy, we might end this exposition of the themes of this book with that point.

Some terms may not be familiar to the reader. Biosemiotics (aka “code biology”) looks on biological processes as symbolic/linguistic/coded. The new term “Bionoetics” attempts to encapsulate a variety of themes; in particular, that human knowledge is a manifestation of nature attempting to know itself. In fact, it is – perhaps controversially – argued that we will never be able to explain how we relatively hairless primates can use math to understand the world, absent this drive in nature. It connotes also the idea that, in analogy with CMB in astrophysics, we can see nature’s intentions and methodology in its unfinished projects. As we humans build ever bigger cities with increasing economic specializations, we might pause to ask what ants might have done with more on-board processing power.

INTRODUCTION

A magisterium is essentially an area of teaching authority. It clearly has Roman Catholic connotations and consequent issues of credibility. In fact, it is fair to say that movements like those of the "new atheists" claim that there is, indeed, "one magisterium", - that of science. This book frequently encounters these ideas.

However, in recent times, things have become more complicated, what with the emanation of the cosmos from a single point being difficult to deny, increasing evidence of "fine tuning" of physical constants to explain our existence, and indeed crises of theory in the physical sciences and replicability in the social sciences. While it is absurd to imagine any credible reinstatement of a Biblical notion of creation, so it is also unthinkable that the eternal cosmos of the Victorian era with its ill-defined "Darwinian" evolution will ever again achieve any traction.

In fact, there are several different issues that must be confronted in a book such as this. The truth-claims of science and religion are the most obvious. These must, however, now be interpreted in a "fine-tuned" universe which various interpretations like the "anthropic principle", the "multi-universe" or "God" try to explain. Moreover, and particularly given that the Roman Catholic reluctance to separate Church and state is met with an equally stubborn insistence from the "new atheists" that morality can be derived from science, we need also to confront issues about legitimation of state authority.

This book makes several arguments that have huge scientific complications. One is that it is not desirable, even in the unlikely event that it will ever be possible, to "reduce" folk psychology a la "eliminative materialism" into brain states. Current attempts to do so are misguided and indeed occasionally fraudulent. Secondly, in the "fine-tuned" cosmos that all conscious creatures like ourselves may inhabit, there will be a clear continuity between biology considered qua codes and the cognition by which the cosmos is comprehended. Indeed, that cognition itself may evince its own small miracles, like the way our often mysteriously – founded Math works in the real world.

This book privileges all the objective, "third-person" statements that comprise attested science. Yet it argues that they do not impinge on best practice in how we conceive of ourselves in relation to the world, except

insofar as they provide facts about that world. Secondly, the issue of state authority in liberal democracies is not ultimately founded on natural law or justice, except insofar as that reflects the altogether more important desideratum that the will of the people find expression in the institutions of state and their practices.

The "unum magisterium" then, more resembles the task that Gotama set himself 2.5 millennia or so ago of creating a metaphysics, psychology, ontology and path of deliverance into a state of self -integration. Our times seem to be happier ones than Gotama's and it is unlikely that we need all his ruthless parsing of conscious experience into processes and reality. We can meet life with joy, and in freedom, hopeful that in some way we at least glimpse partially what evolution may require of us.

To recap: at first glance, it seems that science will continue its march to victory over the epistemological claims of religion, eventually reducing them to the null set. More consequentially, it is increasingly accepted among religious "thinkers" as among scientists that the magisterium, the teaching authority, of science trumps that of religion. The result is a consensus that state power, based as it should be on natural law, which is itself a reflection of the natural order of things, will increasingly base itself on science.

The evidence seems overwhelming: on the positive side there are physical theories accurate in their predictions to 7 parts in a trillion (Gribbin, 2006), print-outs of one's genome for a few dollars, a steadfast adherence to the notion that the mind IS the brain and that the brain is being mapped. On the negative side there are in the epistemological domain the clear absurdities of the biblical account of creation and the notion of transubstantiation, let alone reincarnation, and in the social domain the horrors of religious terrorism and institutional child abuse.

Yet things are now not quite so simple. It would be a pity if citizenship was reduced to following the dictates of scientists we cannot understand; yet its mythic poverty is not the only limitation of science. For a start, "science" itself means knowledge. That gives little clue that science reflects a set of practices based on a set of logico-mathematical insights and related physical observations, from which it takes its impetus. Most of its practitioners are not versed in the philosophy of science and are not aware of the controversial status of theory.

This is particularly the case for an activity like that of science which would propose eventually to give a fully rigorous account of how its practitioners construct its very own theories. With that, we encounter our first cavil. Since 1990, there has been what amounts to a mania in brain science for identifying particular human activities with physical locations

in the brain. While there is little doubt that many of these "findings" are premature, if not downright fraudulent, as the equipment and statistical interpretation have been cogently critiqued, there is a subtler point that has been missed: about how fmri-obsessed neuroscientists propose that reductionism should proceed.

Our brains, on which materialism insists that the mind is dependent, are capable of manipulation of mathematical tensors of higher order. For example, we use vectors, tensors of order one, all the time; there are tensors of a higher order than these, and they have proven necessary to describe our linguistic apparatus, and the structure of space-time. Put in mathematical terms, neuroscience uses fmri, which claims to have solved the mystery of a brain process by localizing it. This is an attempt to reduce brain process to a system that is a zero-order tensor, otherwise known as a scalar. Yet we know that the brain can use tensors of order four, in Einstein's relativity. It is not just greedy reductionism; it is a reductionism both philistine and doomed to failure.

Even if neuroscientists up their game and learn more math, problems will remain. For a start, neuroscientists who understand tensors will inevitably begin to wonder how we hairless apes managed to construct Einstein's relation of the Momenergy and Ricci tensors. Their sense of wonder at the unreasonable effectiveness of math, from which Einstein himself suffered, may derail their careers. They may conclude that the formalisms in neuroscience surely need to be just as complicated as those used by mathematicians.

Secondly, even "successful" reductions would surely seem to be extremely problematic politically. It is highly unlikely that neuroscientific expertise would be sufficient for state office; in fact it is more likely that any worthwhile tools for mind-reading and prediction, which are unlikely to exist before 2050, would be introduced as commercial products. The handy hairless apes of homo sapiens sapiens will, as ever, gleefully add them to their artillery. With such tools they will act on each other, and move on in societies that have faced much larger changes in the past.

Yet that is only the beginning. The Victorian universe was eternal; the modern one features creation from a single point, rough-hew this how they may. Indeed, the cosmos shows fine-tuning of physical constants in a manner that leads to complex conscious creatures driven to understand said cosmos, all the while debating furiously how these constants came to be just so. The Darwinian biosphere was atomistic chance and biological necessity; ours features far-from equilibrium conditions like the gaseous contents of the atmosphere that facilitate our existence. In fact, man is right back at the center of things in a way no-one dared to predict.

This is not an attempt to re-introduce creationism; it is rather an essai at broadening the debate. We can continue along the lines above. Folk psychology, rather than eliminative materialism, will prevail precisely because it is a more effective algorithmic compression for most people than eliminative materialism. It is attested in its strengths and weaknesses by tens of millennia of human societies. People striving for self-development will passionately, head and heart together, seek through the intellect the ground of Being, and/or attempt to eviscerate the self through compassionate action or by observing it to death, and/or attempt to change the world, if necessary through artistic creation. We can call these attempts at ontological self-transformation, and be comfortable that this notion maps onto evolutionary thought as well as onto scholastic thought.

All these activities exist in the broader society outside the academy – indeed several of them, like the arts, arguably work better outside it. This allows us to introduce a critical distinction between different movements in society, of which the academic is just one. In fact, as of the early 21st century, the academic sphere is mutating its role in society so quickly that it behooves us to attempt a prediction of its role. The academic sphere will fall to whoever can attract the brightest and most free-spirited young adults to spend 3-4 years under their discipline. The web means we no longer need physical premises. The paralysis of science in controversies about the status of the "gene", "dark matter and energy", the "central dogma of molecular biology" and so on means that the truth-seeking passion of these kids can better be satisfied without the state funding that turns them into idiots savants.

So much for the academic "magisterium"; it is in fact a pedagogical process. There is but one magisterium in society: it unifies the movements misread as "science" and "religion"; it invokes as its highest value the further evolution of man singular, and humanity as a whole; it accepts the political and scientific progress made since the renaissance, and embraces scientific discovery; it does not accept greedy reductionism aka scientism.

While its community, culture and ceremonies are yet to be formed, the notion that something must be considered as sacred, be it the organic psychological development of our kids or the integrity of the biosphere, is accepted. It is also clear that the corporate destruction of our higher nature requires a reply, and that the political space still exists for both an activist and a quietist response, with much of the tools still available free in western societies.

This book is above all about clearing up the area of intersection between the magisterium and the academic components. It argues that the talk of a humanistic neuroscience and biology that we shall witness,

however well-intentioned, is nonsense. Let us explore the themes of each chapter.

The first chapter outlines "the trouble with everything" and summarizes how this book attempts to get to grips with this trouble. The next two are a ground-clearing exercise, in which the idea of evolution is subsumed under the more venerable idea of emanation. The argument suggested above about the ontological division of nature is made explicit, as is the relation to first-person experience and its transmutation by ontological self-transformation. It is suggested that the achievement of the likes of Gautama is indeed to produce a system of immediacy sufficient to compel a lucid and selfless response at each waking moment, while also encompassing a description of one's lifeworld and the cosmos sufficient to aestheticize and explain many phenomena. If what emerges from this work is a religion, it will be of that experiential nature. It is further argued that, while his work was marred for us in these more stable times by the fact that it necessarily reflected the madness of his contemporary early 20th century Europe, of recent thinkers Gurdjieff came closest to such a system.

We then explore the notion of magisterium in chapter 4, and how certain thinkers conceive it. It is concluded that science will in fact be liberated by eschewing authority in certain areas of human existence, and in particular the transformation of first-person experience. What then of the academy? That forms the topic of the next chapter. Again, it is stressed that moral action is not critical to the search for objective truth; conversely, amoral engagement in society is sociopathic.

Given the existence of myriad works on the anthropic principle in physics, it is peculiar that few since Fred Hoyle have explored it in biology. That is the task of the next chapter, and it comes to many surprising conclusions, including that code biology and cognitive science now seem in some way continuous. This analysis is extended to what can also be called the reasonable ineffectiveness of math in the next chapter. The final chapter synthesizes all these themes. Let us revisit these themes in a cognitive biology context.

Bionoetics

For a generation or so, a group of researchers frustrated with the limits of the computational metaphor of mind have sought to found Cognitive Science on biological roots. This writer is one of them; the Nobel laureate Gerald Edelman is another. While this author can perhaps be forgiven his naivety, it is surprising that two salient facts have not been picked up. One is that Biology is in at least as deep a conceptual muddle as Cognitive

Science; the other is that molecular biology is ripe for a thoroughgoing cognitive revolution of its own, an exploration of how symbols work that gives rise to the nascent field of biosemiotics.

In fact, we took on way too much in Cognitive Science. Symbolic processes required understanding of the arcana of formal automata; yet there were also outstanding philosophical problems both from epistemology and the philosophy of mind that remain unsolved - if "solution" indeed is desirable – millennia after being noticed for the first time. One of the results is an infantilization of the central discourse to trivia like the "hard problem", fully as misleading as the outrageous claims of the HGP were for biology. A first theme of this book then is a cognitive/symbolic biology to complement the biological Cognitive Science.

A second theme in this book relates to evolution and teleology. It is now acceptable to use teleological explanation for biological function; the heart is designed to pump blood. Yet the greater idea of purpose in nature is still verboten, at a time when the coincidences omnipresent in nature have cleared the way for the anthropic principle to gain respectability. Fred Hoyle famously remarked that it was extraordinary that even a single protein worked. It is likewise bizarre that an obscure group of relatively hairless primates talk about the cosmos and make predictions about quantum processes precise to 7 parts in a trillion or so.

Finally, this book treats of spirituality and action. It sees contemporary spirituality as capable of accepting the challenge offered by science, by the existence of many narratives, and by the crises facing us in the real world. We are fortunate to live in a time when mystical intuition can ground itself, as it has done for close to a century, on allowable interpretations of physical fact.

A central subject of the book is that acceptance of teleology in evolution, and ontological distinctions in nature, allows us both to construct a new area called "Bionoetics", which unifies biosemiotics and Cognitive Science, and to consider what the next step in evolution will be. It is argued that the latter move requires intensive dialogue with a number of stakeholders in society, from economic concerns through to practitioners of genuine spiritual traditions, ones that revere silence over dogma.

Methodologically, the book focuses on evolution as a symbolic process, with clear syntactic progress visible well before humans emerge. The book sketches a programming environment which can handle this. Another new result this author has produced is that consciousness may have emerged in humans as the result of an attempt to mitigate the

metabolic demand by the brain on the rest of the organism. The book will show how such energy consumption can be measured, and how states like meditation and consciousness decrease energy consumption. It is argued that many subsequent human evolutionary accomplishments result from this sporadic ability to "catch oneself in the act".

With respect to specifics, this book features the first quantitative analysis of the energy consumption of the brain in a meditative and conscious state, and the first programming environment in which human and non-human symbolic processing can be considered together. It contains analysis of how education at tertiary level can continue using the web outside the current abusive system, which has resulted in over $1 trillion in student debt, much un-repayable, and abuse worldwide as colleges game the ranking systems. It includes a discussion of evolution that regards it as intrinsic to spiritual development, a thesis that is worked out with empirical neuroscience work.

What "Bionoetics" attempts to do is on the one hand to provide an overarching framework in which the partial insights of some other thinkers are put in a larger and more informative context; on the other, it seeks to ground the often unbridled speculations of "Big picture" thinkers like Ken Wilber by putting them in contact with the facts, and with the best of science as currently pursued. There are hundreds of such books.

Early 21st century life features some themes that together seem to guarantee global catastrophe. Several billion new consumers have been added to consume the resources of an already distressed biosphere. The apparent neoliberal consensus has revealed itself to be an ephemeral manifestation of unprecedented and unrepeatable economic growth, rooted as it was in encroachment onto hitherto virgin resources (both human and geological) and leaps of faith in magical financial instruments.

In response, paralyzed by a plethora of competing grand narratives, poststructuralism and a surfeit of irony, the best in the arts and humanities do indeed lack all conviction while the hard sciences value precision above reflection . The attack on the academy by globalized corporatism has quickened, and real thought is increasingly rare there.

Religions have debauched themselves in a series of scandals, while coming under attack also from science with its altogether apparently more well-founded claim on objective truth. Likewise, the arts have become infantilized, with music reduced to TV competitions, and aesthetics mired in relativisms to the extent that it is inevitable that many literally cannot hear or see any more in these areas, as complex musical and visual structures are beyond the computational stack heights they bring to bear.

This book starts from an analysis of the apparent dichotomization of truths from the academy and those from greater society, of which the academy is a part. For the real battle is not between creationists and evolutionists; that is the phoney war presaging the real campaign. This eschatological battle is between those who argue that Nature – whether conceived of as God or not – demands from human beings further development in all aspects of our being, and those who insist that a third-person account frozen in our contemporary science already affords an adequate engagement with reality. It is a historical accident that only the latter group is called "evolutionists"; ironically, it is the former "creationist" group who has a better grasp of how a new evolutionary imperative might manifest itself in us. The book insists that "evolution", properly reconstructed in the context of emanation, affords a perspective that all sane people of good will can agree on as soon as the twin extremes of "biblical truth" and neo-Darwinism are shown up for the absurdities that they are.

It argues that the academy will never fully implement programs like those of "eliminative materialism" (which attempts to rescind all our commonplace notions of who we are - our "folk psychology") except by appeal to politics, a leap outside itself. Slight though this point might at first seem, the result is that the academy is thus put in its correct place in society, as a locus of untrammelled free inquiry in the third person domain, and a way is left open for the establishment of truths and aspirations that start from a more commonplace being-in-the-world than academic hothouses. Historically, the latter activity has been called "religion"; this book carefully makes sure that the truth-claims from the carefully-reconstructed academy and religion will not contradict each other now, or in the future.

It is argued that a central set of truths pertaining to subjectivity can convincingly be established only through analysis of the whole of life, and one's response to it, and that these truths have repeatedly proven beyond the reach of the academy. For a variety of reasons, including historical ones, we will call some of these "religious" truths. Yet they must be asserted in a non-sectarian manner, and in a milieu in which science is properly attended to and honored. However, the very nature of the academy means that occasional manias issuing from there - like behaviourism, Freudianism, the ether and so on - must be ignored to maintain a grasp on truth. Finally, part of the religious quest is one for self-integration, for refinement of experience and control of impulse, as distinct from the academy's relentless search for the objective.

This book argues that a life fully in conformity with the best in modern sciences and the arts, and indeed the great global adventure that technology has opened to many billions of people, can be lived in harmony with nature. Moreover, in the tradition of emanationist system-builders, it is proposed that the next step in evolution requires us to attend more to development of our information-processing ability, and granularity of our conscious experience, than to exploit nature further in order to "torture" secrets from her, in Francis Bacon's unfortunate phrase.

Biology will be the battleground for many years to come, and the book focuses much of its energy on it. The first part of this section analyses the dearth of theory, and the negative consequences, in some of the major subfields within biology. It manifests itself in evolution, where the absence of theory and meta-theory has led to entrenchment in the opposing camps of neo-Darwinism and intelligent design (which, in turn, was recently allegedly outed as creationism in documents arising from the Dover trial). In genetics, the much-hyped human genome project has led to frustration, as the absurd claims made by its proponents have fallen massively short of the reality, and as researchers desperately seek for new paradigms in network theory, language, and so on.

In previous published work, which has become the "go to" paper on the foundations of biology, this author (2008a) wrote about the history of attempts to regularise biological practice; in particular, two aspects - the observer paradox in biology, whereby reductionism results in losing life itself in a mass of physicochemical detail, and the "Where is the program?" theme. If cells work on the basis of programs, is biology not ipso facto an informational science, and the HGP correct in its thrust? If it is not an informational science, what kind of science is it? A chapter is dedicated to the issue of how far we can push the most promising current analogy, that coming from linguistics.

The "silver bullet" ethos of the human genome project exacerbated the destructive over-emphasis on curative, versus preventative medicine. In neuroscience, the very salience of synaptic transmission has been questioned by neural resonance on the one hand, and extra-synaptic bursting on the other extreme; moreover gap junctions (see my 2013 paper) show completely different properties. In the meanwhile, the failure to explain even the elements of human symbolic behavior with respect to neural events has led to crises within cognitive science, and a vacuum in consciousness theory.

The second part of this section looks at alternatives; concepts from chaoplexity pioneered by Conrad Waddington, the interpretive framework supplied by biosemiotics and other linguistics-influenced models, and

alternative frameworks in neuroscience. En route, we find a framework in which consciousness and meaning are naturalized in a way that does justice to human dignity and to the myriad cosmic coincidences that have placed us in Gaia on earth, or indeed have ever called us to any kind of self-reflective consciousness anywhere.

The final perspective is one that works inside the academy, as this mutates in the 21st century, as well as in larger society. It insists that the physical, biological and psychic, while ontologically distinct, also demand different types of "noetic" stances at the fundamental metaphysical level of subject and object distinction. In particular, the moral stance required in the human sciences must be extended to how we conceive of Gaia, the intricate and intrinsically delicate web of relationships that has promoted our perhaps ephemeral existence on this most fortunate of planets, in this challenging period of its evolution.

The chapters are as follows:

1. The trouble with everything; main themes of the book introduced
2. Emanationist systems from Plotinus onward; Islamic mysticism, Hegel, Marx, Darwin, and neo-emanationists like Stuart Kauffman. Mysticism in Quantum and secular cosmology; how all the world's religious and secular traditions converge.
3. The relationship between first and third person knowledge; the notion that "religious truth" shapes the pre-conscious at psychic levels inaccessible to reason. Scientific issues currently inaccessible to scientists with an understandable vested interest in keeping their careers going. A cosmogony, and ontology, to which both "science" and "religion" can responsibly subscribe, is outlined.
4. One magisterium; The issue of authority. Neuroscience; Time as the lingua franca of the brain; and the naïveté of current reductionism.
5. The academy under attack; the university-industrial complex, and how to rectify matters there; how the web, and Free speech, thwart the attack. The temporary convergence of truths from within and outside the academy, facilitated by the availability of free courses from elite universities on the web,, is featured.
6. The crisis in biology; HGP material will be used as leverage to bring in broader concerns about systems biology. Description of the HGP and its problems. Biochemistry examples are given to show the critical importance of metabolism. Intelligent design versus creationism; synthesis wrt thermodynamics. The attempt to use

linguistic analogies, its usefulness, and where it comes unstuck – due to the incomplete nature of linguistic theory itself.

7. The anthropic principle manifest in biology; The failure of the cognitive, neural and social sciences to explain how cognition develops; an extended notion of "code and context" as a solution. Other cosmological considerations leading to a biological anthropic principle.
8. Bionoetics, an alternative framework which simultaneously naturalizes cognition and elevates biological adaptation to the status of an epistemological principle, is introduced. Applications: health, ageing and metabolism. Given its roots in physics, we take some time to study the anthropic principle in physics, and its strange relationship with math.
9. Synthesis; bionoetics as eschatological biology. We find a framework in which consciousness and meaning are naturalised in a way that does justice to human dignity. The final goal of the book is one in which humans fully alive and healthy are indeed seen to be the glory of the biosphere, naturalising Origen's quote that "Man fully alive is the glory of the cosmos".

Ancillary themes:

1. The web has allowed a revolution in education whereby courses and technical apparatus of the highest standard are now available, free, a click away.
2. This will undermine the current status quo wherein control can be exerted by university administrations on the work of scholars, both students and researchers. That undermining, that disruption, is a very good thing.
3. In fact, it allows education to be returned to where it best fits into society; as part of the search for the sacred, "the ennoblement of man" as Einstein announced the common goal of religion and science to be.
4. Religions all lead to practitioners who are capable of selflessness. That granted, a hierarchy of spiritual development can be proposed, and markers on the path to at least relative enlightenment can be discerned.
5. Bionoetics unites "science" and "religion" as Einstein proposed.
6. Our engagement with reality fundamentally involves morality, and those who insist on moral principles always gain personal self-sovereignty. The first important issue relates to what issues to

connect with moral principles; it would seem to be clear that the preservation of Gaia trumps that of sexual continence. The second issue is to dislodge from power the psychopaths who have arrived there on the wave of fervent true believers in nonsense principles.

7. The state should be minimal and egalitarian. With respect to the former desideratum, it is a fact that nations sometimes intervene in industry in a way that is surprisingly successful, like South Korea with its steel industry.
8. When fighting institutions, one should never abandon the principle, the contesting of which prompted the spat; never risk this principle by taking on the institution without representation; and above all wait, as time is on the side of the just.

CHAPTER ONE

THE TROUBLE WITH EVERYTHING

Prologue

Much of the language and thought forms of this book is new but its main thrust is summarized in the following two sentences and the rest of this section is an attempt to orient the reader to what is to come. This project is an initial foray into a vast question about unifying domains of knowledge from the "scientific" to the spiritual; it seeks to reinstate a notion of the ontological to distinguish between the various "physical" sciences, starting with physics and biology. Indeed, we will produce better science – even in the short term – if, eschewing statistical extravagances, we begin to honour ontological distinctions

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 introductory chapter 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 over knowing?

Some years ago Lee Smolin (2006) published a book, revisited below, entitled "The trouble with physics". Not "crisis in", "a new paradigm for" but – courageously in my view - "trouble with". There is indeed scope to say that a science that pronounces over 24/25 of its avowed subject-matter

to be “dark” and outside its current purview is in trouble. Moreover, the solutions Smolin tentatively proposes - like nuancing the notion that gravity is everywhere an inverse square law - are often judicious and creative. This book can be read as a contribution in that vein.

The devastating news for any reader venturing a toe into the stormy waters of this book is that its writer’s view is that we may never be able to dignify the moral, epistemological and political miasma of the early twenty-first century with terms like “crisis” for which the appropriate solution is of course a “paradigm shift”. It may simply be a set of hideously interconnected messes; epistemological and administrative in the academy, institutional and moral in the greater society. As a consequence, the landscape of possible “solutions” may seem so unconstrained that the wisdom of Joe the barman may be seen to equal that of any series of tomes, no matter how well-researched.

This book is above all an attempt to unify the plurality of discourses – scientific, religious, moral, aesthetic, and so on – that obtain at the start of the third millennium. Science teaches us that an “objective” - that is third person - description will prevail. Religious discourse is itself incorrigibly plural, to adapt Louis MacNeice. On the one hand, it consists of admonitions from a creator god with an unhealthy interest in prurient details of our private lives; on the other, there are exhortations both to give of oneself selflessly for the sake of this god, and – from an entirely different source – directions out of the suffering that obtains in human life by paying attention to certain indisputable facts about the to and fro of our consciousness in its being-in-the-world. Needless to say, science would claim to explain this to and fro, at least in the future.

Two great thinkers famously attempted a pre-suppositionless analysis of our existence. One became known as the Buddha; for him, the critical issue was suffering. Yet, like Immanuel Kant, he proposed a sophisticated metaphysics and epistemology. For Kant, the critical issues of human existence culminated in questions like “What can I know”, and “what should I hope for?” The post-moderns might add “what then should we do?”

This book makes several radical moves. The first is to insist on levels of being. It is argued that, even computationally, this is a salutary move.

The second is to insist on a category called “the noetic”, intersecting with but not identical to the cognitive. It is argued that the latter is explanation in terms of the third-person language of Cognitive Science. Yet much of our expertise is also first-person, a sense of what “I” will do in a particular context.The noetic in political activity is related to right action in art, to a nexus of audience expectations and aesthetic refinement.

The third move is to argue that mathematical physics displays the mind in stark outline. From this, we get a sense that there is a hierarchy of complexity of mental operations, described either by the Chomsky hierarchy or by tensors of order 0 to 4.

The fourth move is an operational one: to exile the subjective from the academy into its natural homes of arts, politics and religion. This frees universities to do the type of formation and research at which they excel, and frees up a marketplace of ideas and subjectivities.

The fifth move is a radical one. Instead of "faculty psychology", which explains subjective states like love and awe increasingly in terms of FMRI locations in the brain, it follows from the relocation of the subjective to the real world that this book is open to a description entirely distinct from faculty psychology.

The sixth move relates to the levels of being. While cognitive science is clearly constrained by the thought-patterns of math, the brain is constrained by the fact that it is a physical, chemical and biological entity. Geniuses like Einstein, Newton and the Chaoplexity theorists catalogued the constraints arising from the mere "physical": the chemical, *pace* nanotechnologists, includes constraints from chemical bonds and geometry. Biological constraints include the fact that biology is a code system.

The seventh move is the reference to the "fine tuning" in our cosmos. The "a priori" odds of intelligent life emerging are so remote that it is almost natural to take a teleological view of nature, with us conscious humans in a delicately-balanced biosphere as the end. The consequences that arise from this will occupy much of this book.

The cognitive and the Noetic

Much of the following discussion is amplified in my current paper with New Ideas in Psychology and the Foundations of Mind collection (both in press). The term "noein" (οεῖν) means "to perceive", "to observe" or "to think" and is used here in the service of a radical hypothesis.

At each level of being, humans have developed models on the basis of observations. In physics, the state of the art includes the "standard model" (including special relativity and gravitation) and the theory of general relativity. In the production of such models, principles emerge. One such is that there are tensor systems of various orders, from scalars to the tensors of order 4 used in the theory of general relativity. Another such is that there are Grammars of various levels, formalized in the Chomsky hierarchy. These two sets of principles may be interlinked, as researchers

like Smolensky have argued. Goedel's theorem and the various Church-Turing treatments of computability are other such principles. In each case, mathematicians have found the most elliptical way to express these truths.

Psychologism, identified by Frege as a fallacy, has two aspects. One is the attempt to reduce a principle to the speaker's understanding of the psychological operations implicated in the cognitive processing of that principle, be those operations expressed as metaphorical transfer, Piagetian schemes/schemata, or whatever. For this mapping to be correct, and psychologism to be avoided, it is surely necessary that the formal power of the cognitive operations proposed must be sufficient for the purpose. For example, given that metaphorical transfer seems to rely on fmri with its scalar level of explanation for its basis, it is difficult to see how it can explain principles involving tensors of higher order.

The second aspect is the fact that such mappings are almost invariably expressed in natural language, rather than the more elliptical language supplied by mathematics. Were we, for example, to trace the neural pathways involved in the processing of the tensors of order 4 used in the theory of general relativity, we would not find a more elliptical way to express them than the momenergy and ricci formalisms used by the best mathematicians. It is also psychologism to suggest otherwise.

It is proposed that cognitive science must reflect, and equal in complexity, all explanation patterns attested in third-person science. Yet such third-person science involves constructs like vectors and curved space that would seem to be outside the explanatory ambit of scalar methods like fmri. In fact, for cognitive science to succeed in completing the cycle of explanation of the sciences, it must use all representational structures used in the academy.

Superimposed on this is the anomalous status of the "academy" - which will be viewed as synonymous or at least related to the university – in contemporary society. The very existence of land grant universities and staff on the state payroll will always draw fire from those who would see more productive uses of this land. The troubling fact that these staff often taught students to question the values underlying the state which exacted tax from citizens has historically been resolved by the institution of academic freedom, and with it a form of job security called academic tenure. Both of these are now under threat.

With respect to (wrt) the first set of issues, this book takes the radical step of arguing that third person science itself is not a monolith. It argues that science changes its mode of explanation as it explores areas that are ontologically at different levels – the material, the biological, the mental. It further argues that science is currently bogged down in "dark matter",