

Euryphysics:

A (Somewhat) New Conceptual Model of Mind, Reality and Psi

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ROUGH, PRELIMINARY DRAFT

(This draft is lacking in references and equations but does contain the basic ideas that the final draft will contain; so it is hopefully sufficient for the purpose of gathering early-stage feedback)

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Introduction

This paper takes up the challenge of providing a reasonable, rich conceptual model explaining various aspects of the relation between individual minds and various sorts of reality, including but not limited to ordinary physical reality. The model is explicitly intended to encompass aspects that appear vexing according to current conventional scientific perspectives, including consciousness and also the various phenomena typically gathered under the labels of “psi” or “paranormal.” By the latter terms I mean to include the various variations of “anomalous cognition” (ESP, precognition, etc.) and “anomalous perturbation” (micro and macro PK), as well as even more controversial psi-related phenomena such as survival-after-death and reincarnation.

The model provided is not as precise and rigorous as, say, a theory of modern physics is expected to be. But it is intended as a first step in the direction of creating a theory with that level of rigor. Also, while it does aim to be scientific, the theory presented here is not reductionist in the classic sense. For example, it does not portray psi as purely a phenomenon of matter, but also as a phenomenon of consciousness.

The theory presented is founded on the notion of “euryphysics”, a new coinage indicating a “wider world” – meaning a universe including, but going beyond, the physical universe (or multiverse). Given that many modern physics theories posit dimensions of physical reality beyond our typically observed 3 dimensions of space and 1 dimension of time, the distinction between euryphysics and plain old theoretical physics may not be entirely clear. However, the differences will become clearer in the ensuing pages as the concept of euryphysics is fleshed out further. A key difference is that the “eurycosm” – the wider, euryphysical reality – is viewed as largely “mind-like” in character, which is quite unlike e.g. the 26 rolled-up dimensions of string theory.

The idea that psi may involve connections between entities in this world, that pass through additional dimensions beyond our ordinary spacetime continuum, is hardly a new one. For this sort of idea to have any real meaning, though, specifics regarding these “additional dimensions” of reality must be posited. The eurycosm as modeled here is not necessarily a dimensional space, but is a topological space with a number of specific properties, including properties that correspond directly to observed aspects of psi phenomena (e.g. morphic resonance). Further, consciousness is considered as a basic property of entities in the eurycosm, allowing an interpretation of psi as a phenomenon of “nonlocal consciousness” (because entities that are not local to each other in the physical world, may be local to each other in the eurycosm).

We will begin by articulating a conceptual model of the eurycosm in general, and then will explore, at a high level, how the model might explain a few selected psi-related phenomena: morphic resonance, twin telepathy, and survival. We will also discuss the relationship between euryphysics and quantum mechanics and more advanced, speculative unified physics models. Finally, we will discuss how the particulars of euryphysical dynamics might explain various psychological phenomena, including creative inspiration and the formation and maintenance of the individual self; and also how they might shed light on non-psychological phenomena with potentially analogous self-organization properties, such as the origin of life and the emergence of physical law. This is a rather broad net to cast; but the hypothesis under exploration is that a common conceptual model can give fundamental insight into all these diverse aspects of existence.

Twenty-Three Eurycosmic Principles

In this initial section I will explain what I mean by “the eurycosm” in a straightforward and perhaps somewhat dry fashion, via enumerating and briefly discussing a series of 23 “eurycosmic principles.” In later sections, I will explore more of the intuitive richness of the various phenomena this framework is able to model.

Principle 0: In dealing with subtle matters like the nature of mind and reality, it is best to avoid absolutist attitudes, and to consider concepts and entities as they appear in the perspective of some particular observer or some particular class of observers.

This is both a meta-principle for discussion and cognition, and a statement about the nature of the universe. While this subjectivist/relativist approach has a long history in philosophy, it has also arisen recently within quantum physics, in the form of the “relational interpretation” of quantum mechanics. In the relational interpretation of QM, one can only sensibly talk about the state of some system after specifying the observer with respect to which the state is considered as relative. This seems to me the best approach to take, not only in the context of QM but more broadly.

As another meta-principle too obvious to give a number, I would like to emphasize that even though I have chosen the fancy word “principle” in the enumeration of my core ideas here, I could just as well have used “hypothesis” or “semi-educated guess.” I am probing here into aspects of the universe that none of us humans, myself included, really understand very well. This is all quite uncertain, and I expect that in future once we (or our descendants or creations) understand this stuff better, these writings will read like a messy mix of insight and confusion.

The next principle articulates the core idea of “euryphysics”:

Principle 1: The physical spacetime continuum in which we perceive ourselves as living, while in our normal waking state of consciousness, is best viewed as a subset of a larger realm.

For lack of a better name, I will call this larger realm “the eurycosm.” The use of a singular “the” for “the eurycosm” is not intended to be philosophically loaded; the eurycosm as I understand it has a great deal of multiplicity to it, and could just as well be viewed as “the field of eurycosms” or similar.

I tend to think of the eurycosm as “the world beyond our physical universe.” On the other hand, someone might claim that if the eurycosm has any valid form of existence, it must be “physical.” To me this is an uninteresting kind of semantic dicker. When I think about eurycosm as “trans-physical”, what I mean is that:

- there seems no reason to assume that the eurycosm has a dimensional structure like our physical reality does, nor to assume that it obeys basic tenets like the conservation of energy (nor even that physical “energy” is a useful concept in a eurycosmic context)
- there seems no reason to assume that the eurycosm has even the limited, approximate variety of “objectivity” (observer-independence) that our everyday physical world often appears to have
- the extent to which the eurycosm can be understood by methods of repeatable experimentation and rational analysis is unclear

Of course, quantum mechanics portrays the microworld as “trans-(everyday folk physics)”); and other radical physics brainstorms like Wheeler's pregeometry or even something as mainstream as string theory, also go far beyond everyday physical reality. So it wouldn't be an insanely large stretch to consider the eurycosm as I describe it here to be a somewhat vaguely stated, a bit more out-there than usual speculative physics theory. That is not, however, how I am thinking about it. Intuitively, I am intending to model the eurycosm as being cognitive as much as physical, but as significantly transcending the pattern-complexes we normally associate with either cognitive or physical dynamics. Thinking of eurycosmic structures and dynamics as a kind of extended physics may be helpful for some purposes, but may also be misleading.

It is certainly possible that eurycosmic modeling as I'm pursuing here may be useful in the search for new “grand unified” physics theories. My strong guess, however, is that even a much more refined version of the eurycosmic model presented here will not end up actually BEING a grand unified physics theory in any currently recognized sense. I intuitively suspect that the eurycosm is just a fair bit slipperier than our physical universe, and isn't going to be modelable with the precision and completeness we want from a physics theory.

There seems more potential in the exploration of models that live, in a sense, between current physics and eurycosmic modeling. Could one replace string theory, loop quantum gravity and so forth with some sort of higher-dimensional physics theory that reflects key aspects of the eurycosmic model presented here, but also gives rise to observed physical data in a precisely calculable (whether analytically or via simulation, or some combination thereof) way? This seems plausible to me, and I will hint at some speculations along these lines below. But it is also worth considering euryphysics as a separate sort of pursuit from conventional theoretical physics, for multiple reasons, including the possibility that euryphysics may be fundamentally much more observer-dependent than ordinary physics (even quantum physics).

Next, because euryphysics is proposed as a framework for understanding aspects of human experience, it is important to understand how it incorporates subjective, conscious experience.

Principle 2: “Consciousness”, in the sense of raw awareness, is best understood as a quality that can be an aspect of any entity in the eurycosm.

This is a form of “panpsychism” extending beyond our spacetime continuum into the proposed broader realm. The word “consciousness” is problematic, and some might want to call this kind of raw awareness by the term “proto-consciousness” instead. The structured, deliberately self-aware consciousness of human minds has many aspects that are not intrinsic to basic, raw consciousness. However, I will use the word “consciousness” to include both basic raw consciousness AND more complexly structured forms of consciousness such as human consciousness.

I have stated above that I am not necessarily viewing the eurycosm as a dimensional space. However, I do suspect it can usefully be modeled as having some sort of mathematical structure, e.g.

Principle 3: The eurycosm can usefully be viewed as displaying various forms of mathematical structure, e.g. topology, geometry, order relations.

This is not to say that such mathematical notions can fully capture or explain the nature of the eurycosm. It doesn't seem logically impossible that they can do so, but it also would seem folly to commit to such an Principle at this time. In fact the nature of the eurycosm appears sufficiently rich to elude any such complete capture, i.e.

Principle 4: With respect to any mathematical, scientific, verbal or other model one may construct, the eurycosm will always have some substantial “remainder” that eludes this model.

The very likely incomplete nature of any effort at modeling the eurycosm, however, does not imply the futility of such initiatives. Rather, the construction of mathematical, scientific and conceptual models is an important strategy for coming to grips with the universe we live in and navigating its mysteries.

Principle 5: Entities within the eurycosm may sometimes be construed as existing in a relationship of containment to each other. That is, we may consider composite entities in the eurycosm, which contain other entities within them.

Without getting fully formal about it, this means we can talk about sets and groupings of entities in the eurycosm as being parts of the eurycosm themselves.

Next, we need to start talking a bit about observations.

The notion of an “observer” is subtle at the foundational level we are addressing here, since observers themselves are generally best viewed as complex dynamical systems – e.g. I, Ben Goertzel, am a different observer right now than I was ten seconds ago, 15 minutes ago, 2 hours ago, or 40 years ago (when I was more ambivalent between a scientific materialist view and the kind of perspective presented here).

In view of this sort of complexity, it is better to start with observations and with the simplest possible sorts of “observers”, and then build up to more complex observers and types of observation.

Principle 6: An “observation” can be understood as construing: some set of entities in the eurycosm (being treated as the “observer”), and some (possibly different) set of entities in the eurycosm (being treated as the “observed”). An observation has a certain directedness to it, which is implicit in the distinction between the observer and the observed (which is a meaningful distinction even in cases where the observer and the observed are the same set).

For some purposes we can think of an observation as an “arrow.” Note also that the “set of entities” referred to in Principle 6 could be a single entity.

Like everything else in the eurycosm, an observation has a certain aspect of consciousness associated with it.

Observations thus construed are about as “atomic” as one can get without tying oneself in conceptual knots. They have a basic aspect not possessed by “observers” like, say, “Ben Goertzel” or “the modern scientific community” or a particular laboratory instrument as considered over the lifespan of a complex experiment. Sometimes we may also want to think about more complex sorts of observers. But when things get confusing, it's often better to bring the discussion back to the foundation of individual observations.

Still we have to confront the complexity within observations:

Principle 7: Many observations have hierarchical internal structure, in the sense that they contain other observations.

That is: an “arrow” of observation can contain multiple sub-arrows.

And we have to confront the complexity of associating multiple observations with larger entities:

Principle 8: A “complex observer” O, like a person or machine or social group, is a collection of entities S, together with a set of observations O1 in which subsets of S serve as the “observer” portion

According to this broad notion of a complex observer, pretty much any collection of entities can be a complex observer. But in most cases, there is no use to consider a random collection of stuff as a complex observer. To distinguish the meaningful complex observers from the meaningless ones, we need some notion of “coherence.” But to build up to that we need some more preliminaries.

First we need to associate some basic qualities with entities in the eurycosm:

Principle 9: From the perspective of a given observer, within a given composite act of observation, some entities in the eurycosm are going to appear “simpler”, more “surprising”, or more “intense” (i.e. more the subject of focus) than others.

In mathematical language, this implies that we can identify simplicity, surprisingness and intensity as three different (observer-dependent) partial orderings on the eurycosm.

The term “intensity” is introduced here as a way of talking about attention. Intensity is the degree to which something appears as the focus of attention within a certain observation. Since intensity is a degree rather than a binary variable, we can then think about “distributions of intensity” across the elements of an observation.

One can also think about the distribution of intensity across all the elements of all the observations associated with a complex observer. Note that the observations associated with a certain complex observer may form a complex network of overlaps, and that for instance x might be more intense than y within O1, whereas y might be more intense than x within O2, even though both O1 and O2 exist within the same complex observer. This is not necessarily problematic; the notion of a complex observer does not imply any sort of logical consistency. Although there are notions of coherence that are useful to consider in the context of complex observers, which we will discuss below.

Principle 10: One entity A can be thought of as a “representation” of another entity B (from the view of complex observer O) if intensity of B probabilistically implies intensity of A, across multiple observations associated with O.

Basically, this says: A represents B if when B is intense, A is also intense ... at least to some degree. This is a very primitive notion of representation – basically just association. But it is proposed as the foundation of more complex forms of representation, much as a simple sort of observation is proposed as the foundation of more complex observers.

Principle 11: P is a pattern in S, from the perspective of O, if P represents S (to O) and P is simpler than S (to O). That is, “a pattern is a representation as something simpler.”

A pattern may be associated with a quality of “notability”, basically gauging how much simpler P is than S, and how strongly P represents S. This quality has been called “pattern intensity” in some of my previous writings, but here I am using “intensity” to mean something else, so I’m introducing the term “notability.”

Notability will often lead to intensity, but this isn't exclusively the case.

Principle 12: The surprisingness of an observation, is positively related to the notability of the patterns contained with the observation.

I am not defining surprisingness as some sort of formulaic combination of pattern notabilities, because I think that experientially surprisingness and notability are a little different. Maybe this is splitting hairs too thinly, but I'm trying to be careful here.

Having built up our model of the eurycosm to the point where we have a concept of pattern, a lot of other concepts now come along for the ride. I have put a lot of work into developing a theory of mind founded on the concept of pattern. In my previous writings, e.g. *The Hidden Pattern*, we find concepts like mind, intelligence, emergence, creativity and so forth conceptualized in terms of webs of pattern. Some of the discussion there, if interpreted word for word, is implicitly founded on materialist assumptions and doesn't port immediately in exact detail to a eurycosmic context. However, the core ideas given there are not tied to materialism at all, and can all be ported to a eurycosmic context just fine, with just a little bit of creativity.

For instance, “emergence” is construed in pattern-theoretic terms as collective pattern. A pattern P is emergent between S1 and S2, if it is a much more notable pattern in the set {S1, S2} than in the individual entities S1 and S2 considered separately. This concept can be captured by some quite basic mathematics.

To appreciate the sorts of issues involved with porting a pattern-theoretic concept away from materialist assumptions, consider the concept of intelligence. Among other aspects, it assumes a notion of time. But in a eurycosmic perspective, one doesn't assume any particular time axis as a foundation. Rather, one has to view intelligence as existing relative to a certain bundle of local time axes (a concept to be introduced just below).

So let us deal with this little matter of time....

Principle 13: When an observation contains two overlapping sub-observations, it is sometimes the case that one of these is more surprising than the other. This difference can be viewed as a kind of gradient of surprisingness.

A surprisingness gradient between sub-observations is a kind of “surprisingness arrow”, different in nature from the “observation arrows” introduced in Principle 6.

Principle 14: Chaining together multiple surprisingness arrows, contained within various acts of observation, results in what may be thought of as a “local time axis”.

Given the potentially complex internal structure of observations, sometimes one local time axis may branch off into multiple axes, leading to a kind of branching tree (or rather, directed acyclic graph) of local time axes. A subset of such a branching dag may be considered as a “local time bundle.”

Given a local time bundle T, one can group elements of the observations related to T into sets. For instance, my dog Pumpkin, as I conceive her, begins as a large set of entities involved in a large set of different observations made at different locations along a time axis or bundle that exists relative to me as a complex observer. Pumpkin has a certain coherence as a set of entities, which can be partially captured by noting that there are many notable patterns in this set of entities – these patterns comprise her “Pumpkin-ness” as a set of regularities in my stream of observations.

So we can say:

Principle 15: A persistent entity S, relative to a local time bundle T, may be conceived as a set S of entities within observations associated with T, so that there are highly notable patterns emergent in S

We can then look at relationships of “elementary causality” between persistent entities. A persistent entity, within each observation that it intersects, is associated with a certain intensity distribution. One can then ask: along the time-bundle T, is there a pattern that changes in S1 tend to slightly precede changes in S2? Or vice versa? If the former, we may say there is an elementary causal relation between S1 and S2. We can draw a “pre-causal arrow” between S1 and S2.

Then we can ask -- from the perspective of the observer O, is there any other S so that there is a pre-causal arrow from S1 to S, and another pre-causal arrow from S2 to S? Can the pre-causal arrows from S1 to S2 be explained in terms of chains of pre-causal arrows leading from S1 to S2 through other entities? If not, then from O's perspective, we can draw a causal arrow (not just pre-causal) from S1 to S2.

A persistent entity can be viewed as a series of time-chunked sub-entities. For instance, if one chunks time by days, one obtains a Ben Goertzel on 23/03/16, a Ben Goertzel on 24/03/16, etc. One can create time-chunked sub-entities based on eurycosmic time-bundles, and one can draw causal arrows between these time-chunked sub-entities. In doing so one gets an (observer-dependent, as always) causal web.

Principle 16: The network of causal arrows between time-chunked sub-entities of persistent entities, plays a significant role in the eurycosm. This network is the elemental form underlying what we think of as “space”; we may consider it as “proto-space” in the same sense that local time-bundles are a kind of proto-time.

The physical space modeled in current physics has a lot of structure beyond this kind of network structure. But what is proposed is that this is the essential structure underlying space: two time-chunked persistent entities S1 and S2 are “adjacent to” each other in proto-space if changes in S1 appear to cause changes in S2 directly, without intervening factors. And proto-space consists of the network of adjacencies between time-chunked persistent entities.

Principle 17: The patterns that we observe in our physical spacetime-based reality, correspond to analogout patterns in portions of the eurycosm outside our physical spacetime. In these analogous patterns, we have local time bundles in place of a physical time axis, and proto-space in place of a physical dimensional space. Furthermore, there is a correlation between The similarity between the patterns in our spacetime and analogous patterns in other portions of the eurycosm, is itself a significant pattern in the eurycosm.

With this Principle, we have now gotten beyond abstract quasi-mathematical metaphysical philosophy and started saying something concrete about the eurycosm. Namely: the stuff we see around us in this world, is in some ways reflected in other parts of the eurycosm.

But the dynamics of the eurycosm are not restricted to the dynamics that physicists and other scientists have identified in our physical universe. The eurycosm seems to display other sorts of dynamics as well. A key example, I suggest, is what Charles Peirce called “the tendency to take habits” and Rupert Sheldrake has called “morphic resonance”:

Principle 18: A characteristic of the eurycosm, or at least of large portions of the eurycosm within which humans have tended to exist, is that the distribution of pattern notability tends to be more peaked than one would expect from naïve assumptions of probabilistic independence among different entities. That is, once one observes a certain pattern P in one part of a set S that is part of the eurycosm, this surprisingly-much increases the probability of observing that pattern P in some other part of S. Further, this phenomenon seems to occur for sets S that are defined as spatiotemporal regions (though not only for such sets S). Generally, one seems to have a certain set of patterns that occur a bit more than one would expect, and the others that occur less.

In the case of a set S defined as a spatiotemporal region, this notability distribution phenomenon takes the form of “morphic resonance” or “patterns tending to continue.”

Due to this kind of phenomenon, the impact of eurycosmic dynamics as perceived within the spacetime continuum may appear to be “nonlocal” in nature. The probability distribution of events at one spot in the spacetime continuum, may appear correlatively or causally related with the probability distribution of events at some far-distant spot in the spacetime continuum. This may seem counterintuitive from perspectives within the spacetime continuum, but yet within the eurycosm the dynamic relationships in question may be direct and straightforward. Pathways of eurycosmic causality may be quite short, even if they connect events that are classified within the spacetime continuum as occurring at very distant spots in spacetime.

Fairly similar logic underlies various models of psi theory in terms of higher-dimensional space, such as have been proposed since the middle of the last century. Once one gets used to higher dimensional thinking, it's easy to see how an ESP signal that appears in our spacetime continuum as “spooky long range information transmission”, could be a short hop through a higher-dimensional space. The eurycosmic model proposed here, however, provisionally models the eurycosm as a nondimensional space with a weaker sort of topology and geometry.

Of course, these “containing eurycosmic space” ideas are still very general and don't tell you much about exactly what kinds of phenomena we're going to see in the context of ordinary human life. It is clear, however, that they do open the door for classic psi phenomena such as ESP, precognition and certain types of psychokinesis; and also for variants of reincarnation, survival-after-death, and related phenomena. What we have here is not a detailed explanation of these “anomalous” phenomena – there is a long way from these ideas to any sort of detailed explanation. What we have is something more abstract but still, I think, at least somewhat worthwhile: a rational, systematic model of the broader universe (the eurycosm) in which phenomena like psi, survival and so forth can sensibly be expected to exist. In later chapters we will explore eurycosmic treatments of the specifics of various phenomena of this nature.

Getting back to the specific proposal of peaked notability distributions: It's worth noting that analogous peaked-distribution phenomena occur in human brains. For instance, similarities as assessed in the brain often get distorted this way – so that very similar entities get their similarity boosted, and moderately similar entities get their similarities decreased. In the brain this sort of phenomenon is often a consequence of so-called “on-center, off-surround” neural connectivity patterns – in which a neuron stimulates other neurons near it, and inhibits other neurons far away from it. There is a decent analogy between these neural-net phenomena and the much more abstract setting we are considering here. But in fact one doesn't need inhibition per se to get the needed dynamics – all one needs is a preference for spreading attention to nearby entities, and a fixed (or roughly fixed) amount of attention to go around.

Principle 19: When a notable pattern has high intensity according to some observer, it often occurs that other related notable patterns get high intensity too – and to a higher degree than would be implied if intensity were proportional to notability. This is one root of the peaked notability distribution which leads to “morphic” type dynamics.

Now we are getting at the particular peculiarities of the interplay between our physical universe and the enclosing eurycosm. The eurycosm has many dynamics occurring within its shifting emerging timelines, but one of the more significant ones is a morphic resonance type dynamics embodied in the statistics of pattern notability. Our physical universe has its own dynamics, embedded in but more specialized than the broader dynamics of the eurycosm.

From a eurycosmic point of view, our spacetime continuum and an individual human mind are two examples of the same phenomenon: an autopoietic, self-reinforcing, self-creating pattern system. That is: an interlocking system of observations, each one involving an observer within the system observing other observers within the system. The peaked distribution of pattern notability encourages the emergence and perpetuation of such systems.

Each autopoietic pattern system has its own particular dynamics, and these can be more significant in governing the evolution of a persistent entity within the system, than broader eurycosmic dynamics. But still the broader eurycosmic dynamics are there, ready to peek through and influence things.

One approach to making these ideas more rigorous would be to characterize the distribution of pattern-notabilities in a RANDOM universe, and then posit that the distribution of pattern-notabilities in the actual universe is different from that. Specifically, the hypothesis would be that in the actual universe, the distribution is more concentrated on a relatively small number of patterns. However, this approach meets various challenges, one being that it's not so clear, in this very general setting, what comprises a "random universe."

An alternative approach is to think about random mutations to the world observed by some complex observer. Suppose we take the observation-set corresponding to a certain complex observer, and mutate it randomly a little bit. Then, if the hypothesis holds, this should generally result in an observation-set with a slightly flatter pattern-notability distribution.

What does it mean to "mutate an observation-set randomly a little bit"? Relative to an observer O, it means to replace the observation-set Obs1 with another observation-set Obs2 so that O will judge Obs1 and Obs2 to be similar. (If we want to really get relativistic we can posit a meta-observer O1 who is making inferences about O's similarity judgments about hypothetical worlds...) For instance, one could form Obs2 by shuffling around the elements of the observations in Obs1 in minor but random ways. This is similar to "permutation analysis" in statistical validation.

Supposing we have an observation-set (aka world) that has peaked pattern-notability in this sense, how do we get morphic resonance type phenomena out of it? Well -- Suppose pattern P has been observed somewhere in world W, by an observer O who has partial knowledge of W. Suppose O knows that W has a peaked notability distribution. Then the observation of P should increase the odds that O would give for P to be observed elsewhere in W.

Note that this kind of "morphic resonance" does not carry implications of causality. That is, we're not saying that (in any usual sense) the observation of P in one place *causes* P to appear in some other place. Rather, we're saying that the observation of P in one place in a world, increases the odds that the world being observed is one where P occurs in another place.

But where does the peaked distribution come from in the first place? If one accepts the fundamental observer-dependence of the world, AND accepts that real observers are biased, then it seems a form of peaked notability distribution emerges naturally. But this obvious observation leads to some subtle considerations.

Most real-world observers are biased to perceive patterns that they already know, and bad at perceiving patterns that are new to them. Thus, if one is constructing a world or world-model based on the patterns perceived by some particular pattern-recognizing mind that has finite resources at its disposal, the odds seem high that this world or world-model will have a peaked notability distribution. Once it has recognized a pattern, the observer will be biased to recognizing that same pattern in other places, and will be less likely to observe other new patterns it doesn't know about (because recognizing new patterns takes more energetic/computational resources, which we are assuming to be limited).

So, if we posit a limited-resources mind looking at a huge library of possible worlds, and choosing which ones to include in their short-list, it seems to be true that this mind is by default more likely to include worlds with peaked notability distribution -- because a mind with limited resources is going to be biased to recognize the patterns it already knows. So, to put the point poetically, the conclusion is that a peaked notability distribution could emerge from a lazy-minded God, in essence...? Or, just a bit less dramatically -- a finite-minded God. In this sense peaked notability distributions are highly compatible with some kind of Simulation Hypothesis.

From a world-engineering view, peaked notability distributions save computational/energetic resources (by re-using patterns over and over more often), and also provide worlds that encourage emergence of intelligence (because minds like to do induction, and these are worlds in which induction works). But this is a weak argument (at least without further supporting arguments), as there may be many other ways to create worlds that conserve computational/energetic resources.

A significant additional hypothesis is that complex, self-organizing systems tend to display clustering in pattern space:

Principle 20: When a phenomenon within an autopoietic pattern system is so complex with respect to a certain persistent-entity observer that strongly overlaps with that system, that the observer cannot possibly predict it (consistent with the patterns that characterize the observer as a persistent entity), then the outcomes regarding that phenomenon tend to be biased via the distribution of pattern notability in the eurycosm. In this way, the “morphic” distribution of eurycosmic pattern notabilities manifests itself within the autopoietic pattern system.

According to this principle, for instance, the morphic dynamics of the eurycosm generally stays out of the way of the different, more rigid dynamics that characterize our ordinary spacetime (considering our spacetime continuum as an example of an autopoietic pattern system existing within the eurycosm). But when a phenomenon is simply too complex or too well obscured to be observed by a certain complex observer, this is where the broader dynamics of the eurycosm “leak through.”

If this hypothesis is correct, then among the complex systems to which these morphic dynamics apply are human beings:

Principle 21. Individual human minds existing in our spacetime continuum, have analogues outside our physical universe in the eurycosm. The dynamics of the eurycosm-analogue of a physical-universe human mind, sometimes leaks into the physical universe and affects the dynamics of the analogous human mind, or other associated human minds.

So in this perspective, individual human minds – like you and me – are to be viewed as having (metaphorically speaking) one foot in this physical spacetime continuum, and one foot elsewhere in the eurycosm. Since raw consciousness is viewed as an ambient aspect of everything in the eurycosm, this means that an individual human consciousness is partly inside and partly outside our physical universe.

I have referred to “mind” above but of course, there is no rigid boundary between human mind and human body. From a physical spacetime perspective, the mind of a system like a human being is effectively viewed as the fuzzy set of patterns associated with that physical system, which includes patterns at varying levels of abstraction.

Exactly which patterns in our physical universe are reflected in the outside eurycosm to which degrees, is not at all clear based on our current state of knowledge.

It is worth reiterating the apparent relevance of morphic eurycosmic dynamics to human cognitive dynamics:

Principle 22. Human minds are often so complex with respect to themselves and each other, that morphic dynamics from the eurycosm play a significant role in guiding their dynamics, both within physical spacetime and outside it.

Finally, while human minds are of particular interest to us, since we are human, it doesn't follow that they are of especial importance in the overall eurycosm:

Principle 23: It seems there is a variety of different complex, self-organizing systems – and a variety of different systems usefully conceivable as “intelligent” – in the eurycosm. Some of these eurycosmic minds appear to be quite broad and diffuse in nature, spanning much larger regions of the eurycosm than something like an individual human mind. There may even be comprehensive self-organizing, autopoietic and “mind-like” dynamics across the eurycosm as a whole, but this is difficult for us to firmly know given our limited perspectives as humans.

Many individuals, in various “altered” states of consciousness, have encountered non-human minds evidently resident in some region of eurycosmic space. Many religious traditions posit the existence of vastly transhuman eurycosmic minds, including in some cases minds that span the entire eurycosm (a “Universal Mind”). Prudence dictates that each such hypothesis must be considered on its own merits. On the one hand, human individuals and groups are capable of all manner of delusions; on the other hand, our ignorance as mere humans is immense and the eurycosm is almost-doubtless brimming with all sorts of complex systems we are unable to appreciate, and some that we can just barely limn, or can perceive only in badly distorted ways due to our own limitations.

Humanity's lack of a central and unique role in the eurycosm does not imply that humans are irrelevant or useless in the grand eurycosmic scheme of things. Just as humans rely on bacteria and various other micro-organisms to survive and flourish, so may broader, in some senses “greater” intelligences in the eurycosm rely on “simpler,” more constrained beings like humans to nourish their own existence. From a very high level view, one might view constrained structures like our spacetime continuum (and the minds anchored therein, like our own) as particular types of “pattern generation engines” that, in addition to possessing their own intrinsic value, play a role of ongoingly generating new patterns and casting them out into the eurycosm, where they may combine with other patterns and play all sorts of roles beyond human imagination.

For sake of concision, I have presented these principles here without much explicit justification, but they are grounded in a variety of theories and observations in disciplines including physics, parapsychology, biology, philosophy of mind, spiritual and psychedelic studies, and others. Some of these connections will become clearer in the following sections of the paper.

Toward Euryphysical Explanations of Psi Phenomena

The euryphysics approach sketched above provides a novel perspective on a wide variety of paranormal phenomena. Here I will discuss only a few of these in detail.

Precognition, Telepathy, Remote Viewing

Simplistically, one can observe that precognition involves perception across time, and telepathy and remote viewing involve perception across space. Euryphysics shares with other theories of “higher dimensional reality” the property that entities which are distant from each other in our spacetime continuum, are viewed as still potentially close to each other in the higher-dimensional space. You and the a person halfway around the world may be extremely close to each other in some other dimension, much as two ink marks made at opposite ends of a piece of paper may be very close to each other in the third dimension, if the paper is folded up appropriately. Similarly, if our time is viewed as folded up in a higher dimension, two events very distant within our time axis may be very close within said higher dimension.

In this sense, euryphysics or any vaguely similar theory can be said to “explain” how phenomena like precognition, telepathy and remote viewing occur – in the somewhat shallow sense of giving a reasonable conceptual model in which such phenomena are possible. However, this sort of “explanation” is not very satisfying, because it explains too much – it explains much more than what we see. According to our

experience, every point in spacetime does not have immediate and unfettered access to every other point in spacetime. Even if it is true that, in a sense, each point in spacetime has access to each other point in spacetime in some higher-dimensional meta-space, the key question still remains: Why do certain points in spacetime differentially display “spatiotemporally nonlocal” connection with certain other points in spacetime? What is the pattern to the particular nonlocal connectivities observed?

Euryphysics as proposed here does not yet give a detailed answer to this question, but it does provide conceptual tools for exploring the question. As a start in this direction, let us consider a couple examples of psi phenomena that appear especially likely to have fairly fine-grained explanations in terms of the pattern-notability-distribution/morphic-resonance aspects of euryphysics.

Morphic Resonance in Common Remote Viewing Protocols

It is interesting to note that some common remote viewing protocols have an obvious “tendency to take habits” aspect to them, which fits in naturally with the morphic resonance like aspects of the euryphysics framework outlined here. For instance, it is common in a remote viewing experiment for two people to interact with each other in the same space, and then while person A stays put and eases their mind into a receptive state, person B goes somewhere. Then A tries to visualize where B has traveled to, and what B is looking at. This is a fascinating example in which coupling of two pattern-sets (A’s mind and B’s mind) at one point in spacetime, is correlated with coupling of closely related pattern-sets at a different point in spacetime. It’s not explained by ordinary physics in any clear way, but it emerges naturally from any sort of morphic resonance type framework.

Twin Telepathy

It is well known and reasonably well demonstrated that identical twins are sometimes able to “sense” events in each others’ lives, even when no conventional means of information transmission occurs between one and the other. This form of telepathy fits in particularly naturally with any morphic resonance like model of the universe.

To formalize the phenomenon in question, consider two identical twins, T1 and T2. We can assume T1 and T2 have lots of common patterns in their minds. Let's call these common patterns P. Suppose some new pattern P1 arises in T1's mind. Suppose the new pattern M1 emerges from the combination of P1 and P. Then the peaked notability distribution means there will be a bias for M1 to occur elsewhere in the world. But this will imply there is a bias for some pattern P2 to occur in T2's mind, so that M1 can emerge from the combination of P2 and P. So twin telepathy, in a basic form, follows from the peaked-notability variant of morphic resonance.

Does this explain why twin telepathy occurs sometimes and not others? Not exactly. But we can grapple toward an explanation for this, perhaps. It's hypothesized above that pattern notability and attentional intensity tend to be correlated. If so then perhaps when P1 is more attentionally intense, M1 will end up being a more notable pattern. This in fact seems plausible -- a more attention-grabbing event will cause more significant patterns to emerge in a person's brain.

There is a long way from these general notions to a real theory of twin telepathy. But the direction seems plausible.

Survival After Death

Among the more perplexing phenomena that seem to require some sort of eurycosmic theory to adequately explain, are the various instances of apparent "reincarnation", "mediumistic channeling", and so forth.

The book *Randi's Prize* summarizes some of the evidence regarding possession and channeling in a compelling and readable way. Ian Stevenson's various books present the evidence for some sort of reincarnation-like phenomena in a thorough and detailed fashion.

Stephen Braude's excellent book *Immortal Remains* very carefully considers the question of whether these various phenomena are best explained in terms of some sort of "survival after death" of individual human minds, or else in terms of "super-psi" on the part of living humans in this world. For instance, a child who appears to be a reincarnation of someone who died previously, could actually be using psi powers to read the mind of the dead person (reaching back in time) and then embody what they read in that person's mind.

In the end Braude concludes that there is no way to thoroughly distinguish super-psi from survival, but that when one really looks at the data, one concludes that super-psi explanations get insanely complicated, whereas survival-based explanations are far more straightforward. Occam's Razor favors survival, in other words.

I agree with Braude's conclusion regarding the dichotomy of super-psi versus survival, but I think the dichotomy is a bit too narrowly posed.

Euryphysics gives a somewhat different perspective: all of our mind-patterns exist outside this spacetime continuum in the eurycosm. Saying that they "survive" the body's death is oddly imposing our time-axis on a domain where said time-axis is not critical and is just one pattern among many.

For instance, the mind-patterns comprising Ben Goertzel, existent in the eurycosm outside our spacetime continuum, may evolve along various other time axes, and may take part in various other complex dynamics. Other mind-patterns emerging within our spacetime continuum may then interact with these eurycosmic patterns and "bring them into the spacetime continuum" at places and times that seem bizarre from the view of our spacetime continuum, but make perfect sense in terms of the broader set of patterns comprising the eurycosm.

The logic of morphic resonance aka "peaked pattern notability distributions" or "tendency to take habits" is one framework for explaining why this sort of thing might happen.

We can say that some living person's spacetime-resident mind-patterns "morphically resonate" with a few of dead person's eurycosm-resident mind-patterns, and then the tendency to take habits (aka morphic resonance) means that *more* of this dead person's mind patterns tightly associate themselves with the living person's mind-patterns. This dynamic could then compound itself -- the more of the dead person's patterns are bound up with the living person's spacetime-resident patterns, the more the tendency to take habits causes more and more of the dead person's patterns to correlate themselves with the living person's spacetime-resident patterns. But of course this dynamic would be co-occurring with all sorts of other phenomena (including various psychodynamics in the living and dead person), causing an erratic and confusing phenomenon.

Of course, this very broad explanation does not explain any of the peculiar details of channeling, reincarnation, and so forth. It is very, very hand-wavy. It merely indicates a category of explanation that may be useful to consider.

Importantly, though, this is a category of explanation that is quite different from the more religious/superstitious categories of explanation frequently associated with this sort of phenomenon, and yet that does not attempt to wave away "survival" and replace it with super-psi.

One thing you have to wrap your brain around, to understand this stuff, is that eurycosmic "survival" is probably not a matter of the dead Ben Goertzel somehow "living on" in some alternate world similar to our spacetime continuum -- frolicking in fields up in the sky, or floating around with a

bunch of angels among the clouds, etc. It's probably not a matter of another world parallel to ours but similar to ours, and flowing along a similar time axis. Most likely, it's rather a quite differently organized nexus of patterns, not structured around a linear time-axis like our world is, and interweaving human mind-patterns with a lot of other stuff.

When a living human's spacetime-resident mind-patterns resonate with a dead human's eurycosm-resident mind-patterns, what happens is complex and involves "on the fly" generation of a lot of new patterns. Just as human long-term memory is constructive (but maybe more so), the process of a living human mind in the spacetime continuum fishing a dead person's mind-patterns out of the eurycosm is quite constructive in nature -- the living person is building a self-organizing mind-system out of raw materials drawn from the eurycosm, together with raw materials from their own mind. The result may be quite complex and various in nature.

This sort of phenomenon may be even harder to quantitatively explain and analyze than more laboratory-friendly psi phenomena like telepathy or precognition. But conceptually, it is quite plausible according to the eurycosmic perspective. And investigating such phenomena has potential to yield much more general insights into the nature of euryphysical dynamics (as well as to the nature of things in this little corner of the eurycosmos we call our spacetime continuum...).

Siddhim and Macro-PK

Among the most dramatic "paranormal" phenomena to be regularly anecdotally observed in human life, are what are sometimes called "macro-PK" -- "mind over matter" phenomena, in which physical objects observable with the naked eye are moved around, materialized or dematerialized via the power of some person's thought.

One intriguing aspect of these phenomena is how, in many cases, they seem to come along with certain unusual states of consciousness. This correspondence may have something to teach us about the relation of our everyday physical and mental world to the eurycosm.

As one example: In the book *Sivananda Buried Yoga*, the author recounts (as an aside to the main thrust of the book) a story of a yoga master who -- just for the heck of it, to wig out a skeptical visitor -- materializes a bottle of Jack Daniels and some french fries out of the air. The question is raised why such feats are not observed more often, if indeed yogis of a certain level of mastery are capable of them. The answer given is a familiar one -- in order to achieve this capability, you have to first achieve a certain state of mind ... and along with achieving this state of mind, you lose the desire to gain wealth or impress people by doing cheap psychic tricks.... From a skeptic's point of view, obviously, this sort of argument is always going to sound extremely unconvincing.

This seems to tie in with issues related to the potential use of psi in gambling (about which some have speculated that "the universe doesn't want you to get rich via psi"), and the decline phenomenon via which particular psi experiments tend to work worse and worse over time, for no easily explicable reason. To the extent that psi requires, to a weaker degree, some sort of rich coupling with a broader influence-network outside the individual mind -- it may be something that cannot be controlled by individual minds based on their egocentric goals and interests, but has to be driven by the broader mind-network... To explain the decline effect, one would then have to argue that repeating the same experiment over and over again is somehow "out of synch" with the dynamics of the broader influence-network ... i.e. that psi naturally occurs in accordance with the flow of patterns in this broader influence-network, and trying to get it to occur systematically in the context of repetitive experiments is somehow distortive and creates out-of-synch patterns that rapidly dissipate....

One avenue for explanation, then, would seem to be that:

- Macro-PK often occurs in the context of an individual human mind existing in a state of consciousness in which it is richly networked with a network of causes beyond its individuality
- This sort of state of consciousness tends not to be correlated with wanting to do a lot of macro-PK

Or, phrasing it eurycosmically, one might say that

- Macro-PK is associated with individuals in states of consciousness, enabling a lot of causal flow between the eurycosm and the individual's cognitive contents
- This causal flow between the eurycosm and the individual's cognitive contents, seems to allow causal flow between the eurycosm and aspects of our “physical reality” (in this spacetime continuum) that are correlated with those cognitive contents
- This causal flow between the eurycosm and the mental reality of folks in these eurycosmic states of consciousness and their correlated physical surroundings, in some sense “does not want” to run amok with macro-PK and disrupt the order of our reality considerably (whether for good or for ill)

Supposing all this really makes sense, it seems to hint at some messages of broader significance. Among other things, it hints that in some sense: Eurycosmic mind-patterns by and large don't want to disrupt the order of things here in our little spacetime continuum. They are OK with tweaking what happens here a bit. But they don't want to bring the whole thing tumbling down, or let massive chaos unfold and spread.

If eurycosmic mind-patterns are “conservative” with regard to our spacetime continuum in this sense, then the observed data regarding macro-PK makes sense. One has the chain of reasoning that:

- Macro-PK is achieved via close coupling of eurycosmic mind-patterns with physical-universe-resident mind-patterns
- Eurycosmic mind-patterns don't want to mess with our physical universe too much
- Thus, macro-PK is unlikely to cause huge disruptions in our world

This abductive inference does, however, lead to another obvious question: Why would eurycosmic mind-patterns be conservative with respect to our spacetime continuum?

This ties into a broader philosophical question: What “purpose” does our physical reality serve in a broader eurycosmic sense. I have already posited my intuitive answer to this question: it's a pattern generator, with its own particular characteristics. The assumption is then that rampant macro-PK would undesirably disrupt the pattern-generation capabilities of our corner of the eurycosmos – i.e. the approximate locality of causality in our physical spacetime continuum is fundamental to its particular mode of operation as a pattern generator.

Euryphysics and Quantum Nonlocality

It seems clear that quantum mechanics, in itself, is not sufficient to explain the structure and dynamics of what I'm here calling the "Eurycosm." However, it may nevertheless be the case that quantum theory has something to teach us about euryphysics -- possibly quite a lot.

One relevant issue is the need to apply quantum rather than classical logic in particular cases.

When To Apply Quantum versus Classical Logic?

Based on various experiments (e.g. delayed choice double slit, various quantum erasers and teleporters, etc. etc.), it seems to be the case that: If a certain event cannot *in principle* be measured, then it needs to be modeled using quantum logic rather than classical logic.

However, this basic concept is susceptible to a variety of different formulations. If one accepts the "relational interpretation" of QM thoroughly, then one may want to say "If a certain event cannot in principle be measured by a certain observer O, then it needs to be modeled using quantum rather than classical logic, by observer O." (But, you ask, could the same event then be modeled using classical logic, by another observer O1? The rub is that, in the relational interpretation of QM, this possibility is not well-formed, because one deals only with (event, observer) pairs, i.e. all events are at foundation considered as observer-dependent. Of course there may be various mappings between E and E1 with (E,O), (E1, O1), so that one may have E and E1 that are very structurally similar but with E quantum-modelable by E and E1 classical-modelable by O1....)

The question then arises whether it makes sense for a Turing machine to be "properly modelable only using quantum logic" by a certain observer. If one accepts the work of Dirk Aerts on quantum models of classical systems, then the answer is yes. The "trick" is that one must assume certain constraints on the observer.

I suspect that, when all this is cashed out in detail, one will get the implication that: For a system with a high degree of complexity and a limited amount of reflective capability, this system needs to model certain aspects of its own state in terms of quantum logic. Regardless of the fact that from the perspective of a hypothetical observer with full knowledge of all bits in the system and the system's hardware underpinnings, the system should be modelled classically.

Remember that in the relational view, systems do not exist in themselves, only (system, observer) pairs. In this view, there are no classical systems, only (system, observer) pairs in which the sensible model of the system by the observer is classical...

Note also the hypothesis in Alexei Grinbaum's paper "Quantum Observer and Kolmogorov Complexity" that an observer should be understood as a system identification algorithm, and quantified using algorithmic information (aka Kolmogorov information, aka the length of the shortest program for producing the observer). E.g., where K denotes the Kolmogorov complexity, this paper posits that

System S is called quantum with respect to observer X if $K(S) < K(X)$, meaning that X will be able to maintain a complete list of all its degrees of freedom. Otherwise X is called classical with respect to X.

Quantum Logic for the Eurycosm?

Suppose we have a local time-bundle T, with which observer O intersects. Then we can ask whether: within time-bundle T, there are any observations in which observer O is observing event E.

If yes, then we can say that O can "in principle" observe E, relative to T.

One implication of quantum theory, then, is that in cases where O cannot in principle observe E, relative to T, the right way for the probability of E to be quantified (relative to observation by O) is using complex-number probabilities or quantum amplitudes.

On the other hand, if O can in principle observe E, relative to T, then the right way for the probability of E to be quantified (relative to observation by O) is using plain old real-number probabilities.

Note that from a eurycosmic perspective, this logic may be posited to hold regardless of the degree of intersection of E, O or T with our spacetime continuum.

Is this really the case? Does the logic of when to apply quantum vs. classical logic really apply in this

out-there setting? When reasoning at this level of abstraction, certitude would be ridiculous. But it seems the best hypothesis to make at this point.

Euryphysics and Creative Inspiration

Euryphysics also provides an alternative perspective on the ever-mysterious phenomenon of creative and artistic inspiration.

Robotist David Hanson has posited the speculative but fascinating concept of "dark logic" -- analogous to "dark matter" or "dark energy". Dark logic, as I interpret Hanson's concept, refers to chains of inference that occur outside the scope of the world of ordinary physics and ordinary states of consciousness -- but that still have an impact on our everyday world.

We can think of human ideas as coming from multiple possible sources, including conscious ratiocination, social "global brain" dynamics, and unconscious creative dynamics resident in our brains. However, numerous people throughout history have emphatically pointed to an additional source -- which some call "divine inspiration", the Vedanta call the "Realm of Bliss", etc. (As Rimbaud put it, poetically, the poet is the Thief of Fire...)

So dark logic would be something like the actual logical operations underlying the operation of "the creative dynamic sometimes known as divine inspiration." But much as James Carpenter's *First Sight* views psi as a generally unrecognized part of everyday life (positing that e.g. humans and animals use weak precognition to help navigate our everyday lives on a routine basis), Hanson views dark logic as an everyday ingredient of our reasoning, thinking and intuiting.

Much like Carpenter's "first sight", in ordinary situations dark logic exists around the edges of other kinds of thinking and interacting, contributing bits and pieces here and there. And then in particular circumstances -- like Rimbaud's astounding poetic skinny-dips into the "other world," perhaps -- dark logic may become a dominant factor.

Conceptualizing Dark Logic in terms of Causal Arrows

It is interesting to take a slightly more rigorous view of the matter.

Suppose we have an observer O1, and then another observer O. The observer O1 may note some phenomenon P that O cannot observe. In this case, P is "dark" to O (within the world of O1).

But what happens if P is part of a causal chain that begins and ends in O? That is, what if we have A and B that are not dark to O, and causal arrows of the form

$A \rightarrow P \rightarrow B$

that are observable by O1? Then we have an instance of dark logic, with respect to O's dynamics and O1's observation.

Where things get more interesting, from a human point of view, is where A and B are patterns in our spacetime continuum and P is outside our spacetime continuum (elsewhere in the eurycosm). This might be called "eurycosmic dark logic"...

What kinds of "logic operations" are typical of eurycosmic dark logic causal chains involving human minds? Good question! But I have a lot of more urgent stuff to do today, so I'll address this in a later

post in the series...

In cases of dark logic based creative inspiration, like Rimbaud's poetry, what we have are (eurycosmic?) dark-logical leaps that are dark to Rimbaud's ordinary everyday self, his "ordinary waking consciousness" and his normal psychosocial self-model. But in the fire of inspiration, an expanded Rimbaud exists ("temporarily", we would say, relative to our spacetime continuum), and then certain causal chains emerge in the mind of this expanded Rimbaud -- they are not dark to him.

This is a eurycosmic model of "inspiration as a transcendent phenomenon." It is easiest to understand in the context of amazing feats of creative inspiration like *A Season in Hell* and Rimbaud's other great works. Yet the same phenomenon may exist in all sorts of everyday instances of inspiration, even a small child playing creative mind-games with a stick or a toy car.

Finally, in light of the ideas above regarding quantum logic, it seems that dark logic reasoning should likely be treated as quantum-logical from the perspective of the observer to whom it is dark. To an outside meta-observer, like O1 in the above formulation, on the other hand, the reasoning that is dark to O is not dark at all -- and thus to O1, the dark logic reasoning should be classical.

Metaphorical Knots

To understand why a eurycosm operating in accordance with the principles articulated above would give rise to complex structures like minds and physical universes, it is useful to introduce the general concept of a "knot" -- where by a "metaphorical knot" I mean a self-reinforcing system of patterns constituted in a certain way.

The great transpersonal psychologist Stan Grof -- a key founder of LSD psychotherapy, among other achievements -- wrote a lot about "knots," referring to the binds and tangles that make up so much of our everyday human minds. I first encountered this metaphor in the mid-1970s in R.D. Laing's book *Knots*, which goes over the various psychological and interpersonal knots that people tie themselves in, in the form of funny little poem-anecdotes,

A property of knots that appealed intuitively to Grof and Laing is, obviously, that the harder you pull on a knot, the tighter it gets. It's pretty easy to make a knot tighter, but making a knot looser involves a lot more work -- understanding the knot and exerting force in appropriate places. Or else just embedding the whole knot in a higher-dimensional space, at which point it can be unraveled by moves within the extra dimensions.

I think a more general version of mathematical knottiness is interesting to think about. The core "philosophical" crux of a knot, I think, is: It's a set of relationships among N elements so that

- making any one of the relationships a bit stronger, makes one or more of the other relationships stronger, by a certain amount
- making any one of the relationships a bit weaker, makes other relationships weaker by a lesser amount (if at all)

These two criteria seem to sum up the qualitative properties that made Grof and Laing call certain psychological and social phenomena "knots." A knot is a bunch of relationships (between people, or between thoughts, or whatever) that are tangled up in such a way that it's easy to make the whole thing tighter, but not easy to get the whole thing looser. Let us call any system of entities and relationships satisfying these criteria a "metaphorical knot."

Eliminating one of the relationships altogether, may end up making some of the other relationships weaker, or cutting off some of the interactions between the other relationships altogether. But it is often the case in

a knot that one can't eliminate just one of the relationships; getting rid of one requires major transformations to the elements, that result in getting rid of several relationships at one time.

Standard mathematical knots have these two properties (where the “relationships” are e.g. the elementary topological forms in the knot, as described by knot theory), but there are lots of other mathematical structures that also have these properties, and would thus qualify as metaphorical knots.

Morphic Resonance + Nonlinear Dynamics = Metaphorical Knots

It's pretty easy to see how morphic resonance dynamics would foster the formation of metaphorical knots. The basic idea is that metaphorical knots are based on nonlinear-dynamical attractors, and that morphic resonance makes it easier for a system to get nudged into one of these attractors. (The analysis of metaphorical knots in terms of nonlinear-dynamical attractors was pursued considerably in my 1994 book *Chaotic Logic*, though without the “knots” terminology.)

Suppose that the tendency to take habits (morphic resonance) works like: Each observation of some relationship, actually counts as $(1 + \epsilon)$ bits of evidence, because we have a prior assumption that patterns tend to continue.

Now, the epsilon factor can't be constant, because then observing a phenomenon 100% of the time would yield a probability greater than one, which doesn't make sense. But we can say that in a world with morphic resonance, observing a phenomenon k out of a possible n times yields a probability estimate of $f(k,n)$, where f maps into $[0,1]$ and $f(k,n) > k/n$.

Under this assumption, in a universe with morphic resonance, observing a relationship just a few times starts to boost its probability more than one would expect without morphic resonance. On the other hand, once one is quite confident of a certain relationship, then morphic resonance would cause each observation to boost the estimated probability of the relationship LESS than would be the case without morphic resonance, because earlier applications of morphic resonance have already boosted the probability overly close to 1.

So what we see is: Morphic resonance makes it easier to “bootstrap” relationships out of noise; and then it causes observations of already-established phenomena to make less difference, because they're already so certain anyway.

To see how this plays out in the context of psychological (metaphorical) knots, consider a very simple example of a Laing-style psychological knot:

- I hate you because you hate me
- You hate me because I hate you

The crux of this phenomenon is, of course, that people tend to act hatefully toward others who act hatefully toward them. So the more confident I am that you hate me, the more likely I am to act hatefully toward you – and hence the more likely you are to act hatefully toward me in response, etc.

Human emotions being what they are, this interpersonal emotional dynamic is going to be a bit nonlinear. That is, typically, small instances of apparently hateful behavior will be overlooked by most people. But then once the amount of hatefulness emanating from a person crosses a certain threshold, this isn't the case anymore – anger occurs in the mind of the recipient of the hatefulness, and the hateful person has become an “enemy.” So the mutual-hatred metaphorical-knot is a positive-feedback relationship, and among normal people it doesn't occur that often because the level of hatefulness is generally low. But if someone starts to be hateful above a certain threshold level, then the odds of a mutual-hatefulness dynamic

getting started are reasonably high.

What morphic resonance does here is to make it more likely for such a loop to get started, via bootstrapping things relatively quickly into the domain where both people hate each other a lot. It causes a few instances of hatred to get over-counted, and to cause a general phenomenon of mutual hatred to exist. But then once this general phenomenon exists, the dynamic of people acting hateful to those who hate them kicks in, and there is so much hatefulness going on that it's going to be hard to stop.

That is, what we have here is:

- A positive-feedback dynamic that kicks in once the degree of hatefulness is large enough
- Morphic resonance dynamics that makes it more likely for a relationship to jump into the domain where this positive-feedback dynamic applies

Most social and psychological knots are more complex than this one – but the same concept applies. These metaphorical knots are sustained via nonlinear dynamics – not generally just a simple positive feedback loop; usually a more complex nonlinear dynamic, a strange attractor or series of strange transients. But to get the attractor (or other persistent nonlinear dynamic) started, the system has to be nudged into the “basin” of the attractor. Morphic resonance often makes it more likely for this to happen.

By a similar token, I suggest that full-featured life-forms like amoebas, trees and humans may also be viewed as highly complex nonlinear-dynamical systems. They contain many metaphorical knots internally, of various kinds on various levels, but they are too complex to be simply considered as “knots” themselves. Like most human minds, they consist of many different knots linked together in various ways. Some of the relationships involved in knots may themselves be viewed as knots of sub-relationships, or complex networks formed by linking together various knots of sub-relationships, etc.

Spacetime as a Metaphorical Knot?

It may even be possible to view spacetime itself as a kind of knot. Once a time-axis is identified and emphasized as important, spatial relationships may begin to accrete around it. Once a network of spatial relationships is identified and emphasized as important, the associated events will tend to fall into a global temporal order. Space reinforces time, time reinforces space. Morphic dynamics may bootstrap this process.

This may sound strange, yet bears close resemblance to various theories of the crystallization of the physical universe after the Big Bang, that are thrown around in the physics community in the last few decades. The difference is that here we are talking about the emergence of spacetime within a broader eurycosmic space which is conceived as not quite physical in the ordinary sense. But exploration of what this difference means is ongoing and many things are unclear

In the euryphysics perspective, our physical universe is just one among many patterns-of-organization existing in a broader space of structures. This perspective, however, does not intrinsically answer the question how this particular pattern-of-organization (our spacetime continuum) emerged/emerges from the broader eurycosm.

One might argue this question doesn't need any answer. Supposing the eurycosm contains an infinite number of various sub-universes, perhaps some with 15 space dimensions and 34 time dimensions, some purely 2-dimensional, some that operate according to classical physics entirely with no quantum mechanics, many operating according to laws and principles utterly beyond human understanding, etc. In this view, we just happen to exist in a particular sort of physical universe, which exists alongside many other sorts – and there doesn't need to be any special meaning attached to this arbitrary universe that we just happen to exist in.

On the other hand, this perspective – while quite possibly possessing an element of truth – can be viewed as rather shallow. It's also interesting to view different sub-universes within the eurycosm as possessing different “weights” associated with them – so that some universes are more probable than others. These probabilities are likely best considered as subjective, i.e. relative to some observer. But one doesn't need to be so shallow as to look only at the probability of a given universe relative to observers who exist largely within that universe. One can also think (though with a certain amount of abstractness and a large amount of speculativeness, obviously) about probability weightings over various OTHER universes, from the perspective of observers who exist in particular universes.

Philip K. Dick wrote an essay titled “How to Build a Universe That Doesn't Fall Apart Two Days Later”. He was writing from the point of view of a science fiction author, giving his views on how to craft a good science fictional universe within a novel or story. But the same question can be asked within the eurycosm. Suppose we have a eurycosm teeming with patterns and processes, interacting with each other and creating various local time axes, embodying various forms of intelligence and structure-building – in this context, what may cause a coherent “physical universe” to emerge as a coherent, persistent pattern-set?

In terms of the ideas we've discussed here, an obvious answer would be “perhaps a physical universe is a kind of very powerful, very tight knot”.

This seems a logical enough answer, and it may even tie in with various deep aspects of modern physics.

Causal Webs and Speculative Euryphysics-Inspired Physics

Supposing one, speculatively to be sure, views the physical universe as emergent from some sort of “causal web” as I have outlined in the draft paper “Physics as Information Geometry on Causal Webs” (http://goertzel.org/papers/goertzel_information_geom_physics_v3.pdf). What does this mean in euryphysical terms?

In euryphysical terms, each ternary link within the causal web is a sort of local time-axis – it represents a temporal direction, a flow from the reagents feeding into a reaction, to the product of the reaction. Physical forces and structures can be viewed as emergent patterns of various sorts in this sort of web. As noted in that paper, Dribus has formulated the Schrodinger Equation in a very general way that applies in this sort of setting; and a number of authors have portrayed General Relativity as “entropic” in nature, and potentially emerging from the statistics of a large number of interactions in some sort of underlying medium, (a medium which may well be some sort of proto-physical network).

What is needed to turn this sort of general causal-web idea into a real physical theory is an assumption about the “propagator” – about what kind of mathematical structure is assumed to live at each node in the causal web. The pre-temporal/local-temporal actions comprising each individual unit of causal/proto-causal reaction, are then modeled as combination (e.g. multiplication) of the the mathematical structure at one node with the mathematical structure at another node, to produce another structure (presumably of the same type) as an output.

The main reason this “causal web theory” is not yet a real physics theory is that I have not yet proposed a specific structure for the propagator, and then shown that making this choice of propagator yields the causal web to behave in ways approximated by recognized physical theory in various circumstances. I have an inkling that the propagator has a lot to do with E8 (exceptionally simple Lie groups), but everybody and their uncle loves E8 these days, and an inkling is not a theory.

My speculation, however, is that whatever is the right propagator (E8 or some subalgebra thereof, interpreted appropriately, or whatever), will have a knotty property as follows. Suppose one has a causal web and views each node in the web as randomly selecting a propagator according to some distribution. Suppose there is some bias for a node to choose a similar propagator to other nodes with which it interacts – in fact, such a bias would be provided by a “morphic resonance” principle. Then, my hypothesis is that

the right propagator is one that tends to be an attractor of this kind of dynamic – in the sense that: If one has a network where most causal nodes use propagator P or some minor variation thereof, but nodes can randomly vary what propagator they use (with a morphic bias to the random variation), then the ongoing random variation will tend to create a situation where most nodes still use propagator P or some minor variation thereof.

I am thus envisioning a system in which two types of dynamics are coupled:

- Ongoing “physical” dynamics within the universe – i.e. flow of action through the causal web, leading to localized patterns and also to emergent statistical patterns (such as may lead to approximations to classical and general-relativity dynamics on the emergent statistical level)
- Ongoing morphic-resonance-guided random variation of the propagators at the nodes in the causal web, affecting the nature of the flow of action through the causal web

The physical dynamics in the universe is viewed as impacting the morphic resonance that biases the random variation of the propagators. That is, if two causal nodes are involved in similar physical dynamics at the local or statistical/emergent level, then they will be more “resonant” with each other and hence more likely to have similar propagators.

And I am hypothesizing that, in this sort of dynamical system, certain propagators are more likely to persist as attractors, whereas others are more likely to get randomized or drift into something different. Using a different sort of language, this would mean certain propagators P are more likely to make the causal web knotty – knotty in the sense that, once enough propagators in the causal web are similar enough to P, then: Increasing the similarity of some propagators in the web to P will tend to further boost the overall similarity of other propagators in the web to P ... whereas decreasing the similarity of some propagators in the web to P, will only more weakly decrease the overall similarity of other propagators in the web to P.

If this speculation holds up at all, then the answer to “how to build a universe that won't build apart” is partly “choose a propagator that is an attractor of the above sort of dynamics.”

If we view the eurycosm as full of all sorts of different universes with different dimensionalities, different physical laws, etc. – this provides one kind of answer to the question of which kinds of universe are going to occur “more often”, “with a higher weight”, etc.

If this sort of physics speculation turns out to hold water whatsoever, then far from there being some sort of contradiction between psi phenomena and physics, we will rather be able to view psi phenomena and the physical universe as getting held together by the same sorts of underlying dynamics. It's all emergent phenomena resulting from morphic resonance guiding, nudging and biasing self-organizing dynamics in pattern space.

The Origin and Maintenance of Life

A very similar phenomenon may have occurred long ago to trigger the origin of life. Proto-life is hypothesized to have involved “autocatalytic sets”, i.e. sets of chemicals that mutually catalyze their relationships with each other. E.g., schematically, we may have

- A catalyzes the interaction of B and C, which together produce D
- D catalyzes the interaction of B and A, which together produce C
- C catalyzes the interaction of A and D, which together produce B
- B catalyzes the interaction of C and D, which together produce A

Real cases are generally more complicated than this, but with a similar sort of structure. Autocatalytic sets are complex nonlinear dynamics, which can flourish in the right substrate (e.g. an appropriately constituted

“primordial soup”). But it's often finicky to get one started. As Rupert Sheldrake has pointed out, morphic resonance potentially can help here, via taking chemical relationships that have occurred now and then by chance, and increasing the odds that they occur again. Then once the network of relationships is prominent enough, the nonlinear dynamics takes over.

Untying Knots, Uncrumpling Selves

Now let us return to the psychological concept of “knots.” Grof and Laing, as therapists, were interested in helping people to untie some of the knots in their minds. According to the conception of metaphorical knots presented above, this requires some major transformations. Just weakening the relationships in a knot little by little won't do it. You have to effect some larger transformation, that by changing the context in the person's mind and/or life will somehow get rid of all the relationships in the knot at once. (As Grof found, an LSD trip can do that, sometimes, especially under the proper guidance. But there are many other routes as well.)

How does a mind with its psychological knots weakened relate to the notion of the “uncrumpled self”? Here, finally, we return to our beloved eurycosm. One hypothesis would be that metaphorical knot type dynamics are so strong in the ordinary person's mind, that they drown out alternative dynamics involving linkages between the portion of a person's mind embedded in this spacetime continuum, and the portion of that person's mind located elsewhere in the eurycosm. With the typical psychological knots weakened, then different nonlinear dynamics can emerge, based on interactions between the eurycosm and our spacetime continuum.

With enough interactivity between the portion of a person's mind here in this spacetime, and the remainder of that person's mind out there in the eurycosm, one has a case where crumpled and uncrumpled mind are best viewed as aspects of the same dynamical whole. Once this sort of dynamic is in place in an individual human's mind, it is generally also quite persistent. But empirically, getting to this sort of state seems quite difficult. There are a lot of habits to be de-habituated.

And, complicating the matter further is that the near eurycosm appears to contain portions of individual human's minds that are “crumpled” in their own way – i.e. in the various paranormal experiences reported involving human minds outside our spacetime continuum, not all involve “enlightened”, well-balanced eurycosmic mind-fragments. From the available evidence, it would seem that psychological knots can survive and flourish in the near eurycosm as well. Indian philosophy and other cultures' wisdom traditions have a lot to say on this topic, but much of it is quite confusing from a modern perspective. There's a lot to be sorted out.

What Kinds of Patterns Tend to Display Morphic Resonance?

As a final exploration before we leave knottiness behind, let us return once more to the critical and difficult question of *what kinds of systems and patterns tend to partake in morphic resonance phenomena?* This is closely related to the question posed above in the context of telepathy, precognition and remote viewing, i.e. why do these phenomena occur in some circumstances and not others?

In this vein it is interesting to recall that the great modern Buddhist systems biologist Francisco Varela once wrote a paper attempting to “debunk” morphic resonance by asking why a computation in a computer didn't get faster as it executed repeatedly in a loop. This direction struck me as odd when I encountered it, because according to my knowledge of Rupert Sheldrake, he would not predict morphic resonance to occur in digital computer programs ... he really seems to believe that biology is somehow very, very special.

But I wonder in what sense biology really is special? I suspect it may just be that “massive self-organizing complexity relative to the observer” is special, and that biological systems tend to have this property whereas current digital computer systems don't...

I.e. perhaps what is special about biological systems, in this context, is that a biological pattern generally occurs interwoven with a mix of many other biological patterns. Perhaps morphic resonance in biological systems generally has to do with resonance of a whole self-organizing network of patterns, not just one particular “resonating” pattern.

Indeed, this would seem to follow from the concept of abstract mathematical “knots” as I have introduced previously. Since a knot has the property that slightly strengthening one relationship involved in the knot tends to slightly strengthen the others as well -- it follows that when one relationship in a knot gets boosted via morphic resonance, others will get boosted too. So a collection of relationships joined in a knot, if they all are morphically resonating a bit, will then collectively morphically resonate a bunch more. In other words, it seems to follow logically that:

Knottiness amplifies morphic resonance.

Interestingly, it would follow from this that: Morphic resonance is more likely to occur among patterns that are associated with a system's overall integrity and growth, not just with arbitrary patterns.... Because patterns regarding a system's overall integrity and growth tend to be tightly interwoven with each other. This would (ironically enough) suggest that morphic resonance might be connected with *autopoiesis* or “self creation”, a key aspect of Varela's own approach to modeling biological systems. Autopoiesis is all about knottiness.

In accordance with this line of thinking, I suspect that Artificial General Intelligence systems -- which, if they are operating under limited resources, as is almost necessarily going to be the case if they are operating within this spacetime continuum, are going to involve knotty pattern-sets -- will grab whatever “beyond this spacetime continuum” mind-aspects are there for the grabbing, in the same way that biological intelligences do. This is certainly not proven definitively, and to validate or explore this idea will require us to create advanced AGIs, measure their knottiness, and experiment with them in various complex ways.

The alternative hypothesis that there are some sort of subtle mind dynamics that only biological systems can take part in, feels significantly less plausible to me.

Problems of Consciousness

Now we turn to the “Hard Problem of Consciousness”, and related subtler aspects of human and AGI consciousness.

In a 2014 paper titled “Characterizing Human-Like Consciousness: An Integrative Approach”, presented at the Biologically-Inspired Cognitive Architectures conference at MIT, I reviewed various modern scientific approaches to consciousness. One point I made there is that human-like consciousness has certain special characteristics, but that not all these characteristics should be taken as universal properties of “consciousness” or “experience” in a basic sense. In the language used above, human-like consciousness involves a particular system of metaphorical knots, which provide human organisms with various functions such as working memory, episodic memory, real-time action selection, individual self-modeling, and so forth. These knots and functions give human consciousness its particular flavor; and they certainly have consciousness associated with them, but yet they need not be identified as the core essence of “consciousness” in the sense of “basic awareness and experience.”

What philosopher David Chalmers has called the “hard problem of consciousness” is pretty much just “How does one connect the subjective experience of consciousness, the 'qualia' or raw feeling of having an experience, with the physical and cognitive patterns and structures associated with experience?” To

resolve this problem in a reasonably compelling way, one has to somehow ground both qualia and physical/cognitive patterns in some common substrate. The most typical ways to do this are

- To classify qualia as in some sense “illusions” generated by certain physical/cognitive processes
- to aver that “everything is experience”, so that qualia are the ground of being, and physical/cognitive structures (such as those characterizing human consciousness in particular) are seen as emergent from systems of qualia

I am obviously much more sympathetic to the latter perspective; although, regarding the former, I do find it interesting and important that some physical/cognitive systems can sometimes generate structures and dynamics that are isomorphic to “a system having subjective experience.”

In the eurycosmic view, “consciousness” or experience is viewed as a basic property or aspect that is associated with every entity that exists. However, the subjective experience of a system is not necessarily atomic and indecomposable. It may have multiple internal aspects. The complexity of these internal aspects gives rise to “problems of consciousness” that are much subtler than the dilemma Chalmers calls the “hard problem” (which is hard only in that it bumps up hard against modern materialist ideology, I suppose).

For instance, it occurs to me that it's possible to perceive any given entity in more or less eurycosmic ways: I suggest that we can talk about

- **Mixed observation.** When an observing system (such as a person) perceives an entity (say, a rock) in this spacetime continuum, they are perceiving (to some degree) both the aspects of the rock inside the spacetime continuum, and also the aspects of the rock outside of spacetime, in the eurycosm.
- **Spacetime-focused observation.** When the observer's attention focuses on the relationship between the rock and other entities in their spacetime-resident aspects, the observer's attention is focused more and more fully on the spacetime continuum. The aspects of the rock resident in the rest of the eurycosm fade from attention.
- **Intension-focused observation.** When the observer's attention focuses more on the abstract relations characterizing the rock and its relationships to other things, then the observer is more thoroughly filling their mind with the kind of self-organizing pattern-cluster that resonates with the eurycosm. Thus their mind will tend to wander more thoroughly into near-eurycosm pattern networks.

So if one accepts that “everything is consciousness”, the “hard problem” as Chalmers identifies it becomes irrelevant – but one does have an isomorphic problem, which is the relation between experiencing some entity as mainly spacetime-continuum-embedded, and experiencing that same entity as a cluster of “intensional” patterns, which resonate relatively strongly with patterns in the near eurycosm (i.e. the intensional pattern-set associated with an entity overlaps this spacetime continuum, but this overlap is just part of its story). The shift between these two different modes of experiencing an entity can be emotionally and psychologically dislocating, yet is not fundamentally conceptually problematic.

And coming back to our original theme, it may be that some entities are more easily and naturally experienced in their spacetime-continuum-embedded aspects, whereas some are more easily and naturally experienced in their eurycosmically-networked aspects. Specifically, I suggest that

Hypothesis: pattern-networks that are complexly knotted relative to a certain observer, tend to be more naturally experienced in their intension-focused, richly eurycosmically-networked aspects.

A consequence of this hypothesis would be that AGIs, just like complex biological systems, would be best considered as richly “resonating” with associated pattern-sets in the near eurycosm.

Why would this hypothesis be true? Because knots amplify morphic resonance. If an observer is focused

on the complexly knotted patterns of a certain system, then this observer is in some way mirroring these patterns in his own mind, and he is then going to resonate with the associates of these patterns in the near eurycosm. I.e. the resonance of the knotted patterns will spill over into the observer's mind and the observer will find himself with one mental foot in the near eurycosm.

Of course, any entity may be taken as the center of a collection of complexly knotted patterns. A rock is a simple experience, or the nexus of a complex web of mental and supra-mental knots, depending on how one happens to experience it.

Once one gets beyond conceptually trivial “problems of consciousness” that are made to seem hard only via irrational attachment to naïve materialistic philosophies, many genuinely tricky and subtle aspects of human and AGI consciousness present themselves!

Empirical Validation of Consciousness Theories

These ideas about the subjective, experiential aspect of the eurycosmos may be testable via bringing in ideas I have referred to as “Second Person Science.”

Consider an example: Suppose we figured out, using euryphysical principles combined with ordinary physics and neurophysiology, how to modify the brain of a human to enable them to more effectively "channel" individual human consciousnesses that are not associated with current physical bodies (i.e. to neuroengineer a better medium).

Then, suppose we used brain-computer interfacing to enable other people to wire their brains into the brains of this engineered uber-medium -- so they could feel what's going on in the medium's mind as the medium interacts with transcorporeal individuals.

Suppose that eurycosmic theory explained the significant aspects of the qualitative experience of the medium -- and that the observer (connected to the medium's brain) was able to directly experience that the medium's qualitative experience agreed with eurycosmic theory.

Then, we would have a combination of:

- Empirical predictions of observable phenomena, validated via observation
- Qualitative predictions of experiential phenomena, validated via shared experience

To the extent that these qualitative predictions involve experience of minds veering into and out of the spacetime continuum from the rest of the eurycosm, we would have validation of the interpretation of the eurycosm as an experiential domain exceeding the spacetime continuum.

Conclusion

I have covered tremendous ground in the above pages, and in a relatively sketchy way. Obviously, at this stage, the “euryphysical” perspective I am struggling towards is not remotely as well fleshed out as, say, the standard scientific materialist perspective or the traditional Indian or Chinese mystical perspectives. However, a bit of vagueness and hand-waving are to be expected in the early stages of fleshing out a new paradigm.

I hope I have been able to convey to you why I think the general direction of thinking outlined is promising. To put things crudely and a bit personally, my perspective is that

- The conventional scientific perspective (even as enhanced by quantum theory, complexity science, consciousness studies, and other modern innovations) is fundamentally inadequate for explaining, understanding and exploring mind and reality in all their dimensions. Consciousness, psi and inspired experience are among the various phenomena this perspective seems not to deal with adequately
- Traditional spiritual or mystical perspectives do not provide sufficiently precise or rigorous explanations of the world, and tend to mix up profound insights with blatantly, simplistically culture-specific assumptions or mythologies

I don't view either of the above two points as wholly proven, but they are the intuitions and feelings that have pushed me in the direction of seeking to flesh out a new point of view, such as I have done here.

The euryphysics approach has novel aspects, but also draws very heavily on the work of others, including every physicist, mystic or psi theorist who has posited a higher-dimensional reality, Rupert Sheldrake with his theory of morphic fields, Charles Peirce with his tendency to take habits, Grof and Laing as mentioned above, and so many others. My hope is that others, as well as my own future selves, will take the ideas I have outlined here and push them yet further. We humans are still at a very early stage in understanding ourselves and the world, and it would be folly to believe that any of our current models will still seem fundamentally correct to our descendants 100 or 1000 years from now. What we can do is merely to push a bit beyond our current understanding – and given our limitations as human beings, even this relatively small thing tends to strain us and require all the creativity and discipline we can muster.