

Immediate experience and existence

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Poster Presentation
Towards a Science of Consciousness
Tucson 2002

1 The essence of experience

Most of us intuitively recognize that the essence of our immediate experience can never be captured by a structural or functional explanation. This disconnect between structure and essence applies to more than conscious experience. It is universal in mathematics and the hard sciences. This divorce did not exist in older metaphysics such as that based on earth, air, fire and water. These fundamental elements had an essence or intrinsic nature and that determined the nature of things constructed from them. Contemporary physics has become completely mathematical and abstract. For example salt is made of the highly reactive metal sodium and the highly reactive gas chlorine. Salt is unlike the elements it is made of. The explanation of salt's properties involves complex probability densities in quantum mechanics. These have an abstract and convoluted connection to the properties of salt. Newtonian physics retained an essential nature in the billiard ball model of atoms. Quantum mechanics does not.

Mathematicians want to avoid making implicit assumptions like the parallel postulate in Euclidean Geometry. They accomplish this by removing all intrinsic properties from fundamental entities. The only fundamental entity in set theory is the empty set or nothing at all. All other objects are built up from the empty set. For example the number one is the set containing the empty set. Mathematics and mathematical physics are completely structural. Mass, energy, space and time are abstract mathematical concepts in contemporary physics. They connect with essence and experience only through experimental technique.

What is structured in the physical world? The one thing that we know is structured is immediate conscious experience. It is difficult to talk about immediate experience in a general way because we are so intimately con-

nected to our own experience. But immediate conscious experience could be as simple as a single point in the visual field. The continuum of human life from embryo to adult suggests a similar continuum of consciousness. The unremarkable nature of the matter, that the human brain is constructed of, suggests that immediate experience is universal in all matter.

The simplest possible assumption consistent with what we know to be true is that the essence and totality of the existence of physical structure is immediate conscious experience. The range of complexity of immediate experience is coextensive with the range of complexity in arbitrary mathematical structures that can be physically realized. Space and time do not exist in space and time they exist in conscious experience. We can hypothesize about a universe of zombies because we have a conscious awareness of what that would be like but in what sense could a totally unobserved universe exist?

In addition to being the simplest possible assumption it is hard to see how one could come up with evidence against this assumption. That an assumption is the simplest possible consistent with what we know and is not possible to disprove, does not make it true, but what more can we do to solve the problem of immediate experience?

2 Structure and essence

The distinction between structure and essence is unnatural. In normal discourse we take the merger of structure and essence as given. It is how we visualize the world and how we think. The problem is that the essence we attribute to external objects is from our own experience. A soft touch, sharp slap, beautiful sunset or ugly wound, are things created in us when we have particular experiences.

We are not perceiving external reality as it truly is nor are we dimly perceiving some ideal platonic reality. We are creating the world in our conscious experience. There is a causally connected external structure that exists as its own immediate experience. But the perception of color is for more a construction of our sensory and nervous system than it is an effect from light of a particular frequency.

The distinction between structure and essence is important because science and analysis only applies to structure and never to essence. We can use our understanding of the structure of vision to explain optical illusions. But we can never explain the experience of the color red. Structure can be analyzed and broken down into components. The essence of our immediate experience is an indivisible gestalt.

That science and mathematics deal only with structure is a conceptual leap. I reached this conclusion as an undergraduate. Computers were a comparative novelty in the late 60's and I was able to work with one of these extraordinary machines. I could program it to do complex tasks using simple instructions. The low level or "assembly language" for computers contains instructions like move the value stored in one place to a different place or add

the values stored at two locations together and put the result in a third place. The computer itself was constructed from simple operations. You could build all the logic that controlled the computer from three circuits: AND, OR and NOT. Every logic circuit in any computer no matter how complex can be built out of these three simple circuits.

I was struck by how much complexity could be constructed from such simple building blocks. My interest and wonder was further aroused by the idea of a Universal Turing Machine. This is a very simple computer that could simulate any program that any computer or other mechanistic process could ever possibly do.

I started to realize how everything at least in the world of computers was structure. The AND, OR and NOT circuits were so simple that they had no real content to them. The important thing was how they were put together to form more complex circuits. The programs that controlled these machines were a long sequence of ones and zeros. One did not write programs that way but it was clear how the symbolic names one typed were translated into a sequence of ones and zeros. The computer did this translation just as computers do today.

The sense that everything is structure was expanded when I studied set theory. All of mathematics was constructed with the single primitive entity of the empty set. Everything in computing is structure devoid of essence and the same is true in mathematics.

3 External and internal reality

The world seems objective. A chair, a tree, a glass of water all seem to be physical things that we can feel, sit on, climb or drink. We seldom if ever think of our immediate experience and how we translate it into a sense of external reality. We see a chair. We do not see a complex geometric shape and deduce that there must be a chair five feet in front of us.

There is an unconscious process of deciding a particular shape is a chair. The result enters consciousness when some part of our mind has decided that is a chair. We see the chair as a unity or gestalt and not a pattern of color. Only when that unconscious process is confused do we see a pattern that we cannot make out.

We construct a sense of objective reality for practical reasons. We interact with the external world to get what we want and need. We focus our conscious energy on novel or problematic events. We evolved ways to automatically deal with the routine and mundane. The external world of objective reality seems natural and necessary. We do not think about it much.

The objective external world and experiential inner world seem radically different, Connecting the two has been a deep problem in philosophy for centuries. Is there some special soul stuff that translates the physical processes of our body into the inner experience of making love?

All that we experience internally seems to be reflected in physical brain structures and dynamic neural processes. Experiments have shown that certain parts of the brain are active when we think about certain things without any external stimulus. Our internal states seem to have a measurable physical existence.

The brain is made of the same atoms and molecules as everything else. Our neurons are elegant but simple switches. They are more complex than the binary switches used to build computers but fully comprehensible as physical and chemical processes. So where does the magic inner world that makes up the ultimate and only reality for each of us come from?

Physical brain structures seem to be capable of fully reflecting the structure of our internal experience. As the devices we use to observe the functioning brain improve in sensitivity we should be able to establish this as a scientific fact. For now all the evidence points in this direction. So we assume that our conscious experience *is* the existence of structures in the brain. We further assume that there is nothing special about these physical structures. We assume that immediate conscious experience is not simply associated with physical structures but is the essence and totality of the existence of physical structures.

Man has long wondered about the existence of an unobserved universe. We see the entire universe as both the observer and the observed. We think of observation in terms of human consciousness but even that exists on a continuum. Think of the birth of consciousness in the human embryo and fetus and its apparent extinction in death or the slow deterioration of Alzheimer's disease. All of these changes mirror changes in physical brain structures. We assume these changes *are* changes in brain structure. Direct immediate experience never disappears but is only transformed as matter is transformed.

Adult consciousness involves a limited set of brain structures. Much of the brain operates below consciousness. We are not conscious of most of our body most of the time. Experiences enter consciousness when something notable happens like stubbing a toe. But why not assume all the unconscious activity is also conscious but with a limited connection to what we experience as stream of consciousness? What is left out is as important as what is present. The consciousness we experience is an executive control with a limited capacity to deal with information. So complex filters exist to insure only relevant experience gets through. There is nothing special about the neurons that make up this executive control. Why not assume *all* the structures in the brain correspond to a consciousness that not simply reflects but *is* their structure.

We are not denying our scientific understanding of physical structure. We are describing the context in which that structure has existence and meaning. The dynamic physical transformation of the universe over time is a transformation of consciousness and *nothing but* a transformation of consciousness.

4 The finite and the infinite

Immediate experience is always definite and finite. A defining property of an infinite set is that you can add something to it without changing it. For example you can map the even integers onto all integers. Both sets have the same number of elements. A defining property of immediate experience is that if you add something to it you change it. Conscious experience is a gestalt whole. Change it and you have a different experience.

The finiteness of direct experience leads to a second simplest possible assumption about the nature of existence. By giving essence to existence we give substance to the question of what it would mean for an infinite structure to exist. They cannot exist as gestalt wholes. This does not necessarily mean that there is a fixed fine limit to conscious gestalts. There may be two classes of existence. The first is immediate gestalt experience. The second is the collection of all such experiences. This collection may be infinite and is not itself an immediate gestalt experience. Mathematics already has such a distinction between sets and classes. This was necessary because of the contradictions that arise from assuming there can be a set that contains all sets. There is a class of all sets that cannot be a set. We are suggesting that this necessary boundary occurs between the finite and the infinite.

Conscious gestalts are what is. Each gestalt is finite but there may be no limit to the unfolding of gestalt experiences. What is a gestalt and where are its boundaries? In mathematics the unifying relationship is set membership. Everything is a set and all relationships are determined by set membership. A set is an arbitrary collection of other sets. Our conscious experience seems to follow a mathematical construction. Aspects of the physical mathematical structure of our brain seem to not simply mirror but are the structure of our conscious experience.

Mathematics studies all possible structures. The only constraint is logical consistency. The same constraint would seem to apply to a gestalt. When we have an immediate conscious experience it is a definite unique event. It may have many ambiguous interpretations but the experience itself is exactly what it is. A patch of color cannot be red and also not red. As mathematics is the study of all possible logical structures it is also the study of the structure of all possible gestalts.

Consciousness evolves. It changes over time. Reproducing molecules have become the human mind capable of the most incredible ecstasy and unspeakable horror. This evolutionary process need not have an end. We do not know if time and space have finite boundaries. We know from mathematics that there is no limit to fundamentally richer and deeper structures. If the universe is potentially infinite then the evolution of consciousness may expand forever. Could this be where our instincts are pointing when they lead us to a sense of the spiritual and divine? Does not creativity itself have survival value? Could we not evolve instincts that lead us to pursue unbounded creativity? Is that not where we get our desire to explore the world and the

universe?

5 Mathematics and physics

Mathematics

Mathematics can teach us about possible transformations of structure and thus consciousness. Through mathematics we can extrapolate from the experience that is the essence of the human mind to what life and conscious experience may evolve into.

The capacity for subtle self reflection is a defining characteristic of human consciousness. This capacity characterizes a level of conscious experience. In mathematics it is common to measure the power of a mathematical system by the level of self reflection or iteration that is definable within the system. Gödel's Incompleteness Theorem implies that there is no finite limit to the levels of subtle self reflection in finite systems.

At the beginning of the 20th century a famous mathematician, Hilbert, proposed the construction of a formula or mechanistic process for deciding all mathematical questions. Gödel proved this was impossible[3] .

Mathematics then and now is based on formal systems. In effect these are mechanistic processes or computer programs for enumerating theorems. Gödel proved that any consistent formal system powerful enough to define the primitive recursive functions had statements in the system that could not be decided within the system. The primitive recursive functions are a fragment of elementary mathematics powerful enough to define a Universal Turing Machine.

Expanding the level of self reflection seems to expand the nature of conscious experience as has happened in the evolutionary hierarchy culminating in human experience. Evolution creates such structures because they have survival value. They allow better prediction of the consequences of ones actions.

Gödel's theorem implies that unbounded evolution of self reflecting structures is possible only if diversity expands without limit. Evolution operates on itself. Competition and cooperation between branches on the tree of life provide the rich ecosystem from which a structure as sophisticated as the human mind has evolved. Through man the evolutionary process has become conscious of itself and is able to use mathematics to understand aspects of its structure. We can derive the boundary conditions that will allow us to take conscious control of evolution without stifling creativity.

Physics

It always bothers me that, according to the laws as we understand them today, it takes a computing machine an infinite number of logical operations to figure out what goes on in no matter how

tiny a region of space, and no matter how tiny a region of time. How can all that be going on in that tiny space? Why should it take an infinite amount of logic to figure out what one tiny piece of space/time is going to do? So I have often made the hypotheses that ultimately physics will not require a mathematical statement, that in the end the machinery will be revealed, and the laws will turn out to be simple, like the chequer board with all its apparent complexities[4, p 57]..

Richard Feynman goes on to warn that one should not take such prejudices too seriously. But his intuition suggested to him that the universe may not have any infinite continuous structures even though such structures pervade our existing physical models.

I consider it quite possible that physics cannot be based on the field concept, i. e., on continuous structures. In that case *nothing* remains of my entire castle in the air gravitation theory included, [and of] the rest of modern physics[8].

Einstein reached this conclusion near the end of his life in spite of the obvious pain it caused him because of its implications for his beloved relativity.

If the all that exists are finite conscious gestalts then physics at its core must be finite. There are many reasons for thinking that this may be true and others besides Einstein that have suggested this[5] [10]. I give additional reasons to suspect this may be true and speculate about the possible structure of such models and the experiments that might lead to such a theory in *What is and what will be*[1].

6 Hierarchies of truth and decidability

We do not think of mathematics as creative. It gives absolute truths like $2 + 2 = 4$. However the search for logical absolutes uncovered a hierarchy of problems that are logically determined yet unsolvable.

Logically determined unsolvable problems exist because one can ask if a property is true for *any* or *all* integers. For example the Halting Problem asks if a computer program will halt at *any* future time.

Real computers halt when the power goes off. They have a limited amount of memory. The Halting Problem is about an abstract computer that runs forever and has no fixed limit on memory. It can keep asking for another disk and can ask to read and write on any disk it previously used.

Computers follow an exact set of rules. We always know what the next step is and thus what a computer will do at any time. But we cannot in general know if it will ever do something like halt. If we wait long enough and it does halt we will know this. But we can never know if we have waited long enough. To prove a computer never halts requires something more than following the steps the computer takes.

There is nothing special about halting. We get an equivalent problem when we ask if the computer program will ever accept more inputs. No doubt you have experienced this problem while waiting for a response from your computer. You never know if it requires rebooting or will eventually respond.

The halting problem is at the first level of an unlimited hierarchy of unsolvable problems. The next level asks if a computer program has an infinite number of outputs.

For higher levels in the hierarchy one must interpret a program's output as a new computer program. This is possible because all computer programs can be interpreted as numbers. Programs are stored in computer memory as a very long sequence of digits. Computers translate programming instructions in a language that programmers use to the numeric code of the computer.

One can interpret any number generated by a computer program as another computer program. Most numbers will not correspond to a meaningful program for a particular computer but some will. Every program for a specific computer has a number that encodes it.

The next level in the hierarchy of unsolvable problems asks if a program has an infinite number of outputs an infinite subset of which encode a computer program that itself has an infinite number of outputs. This method of defining higher levels of unsolvable problems can be iterated and generalized in obvious and very complex non obvious ways.

There is a second hierarchy that solves these problems. Every Halting Problem can be solved at some level in this hierarchy, but no single level can solve all Halting Problems. In formal mathematics these hierarchies are implicitly extended by adding axioms that assert the existence of 'large' infinite sets. Since the unsolvable problems refer to mechanistic processes (what will a program do *eventually*?) it is possible to extend the hierarchies by adding axioms about such processes.

7 The mathematics of creativity

The most remarkable thing about conscious experience is its evolution to every increasing richness and complexity. Through Gödel's Incompleteness Theorem we know that the creative evolution of structure can never be captured in finite form. It is an open ended ever expanding process. There is a hierarchy of mathematical truth that characterizes levels of abstraction or self reflection such as the self reflection that is a defining characteristic of human consciousness. Gödel proved that this hierarchy cannot be finitely described However it can be fully developed by exploring an every increasing number of paths without selecting a best or correct path as biological evolution has done in creating the human mathematical mind.

The diversity of exploring all possible paths need not be a blind exploration of everything. One can prune the search tree without limiting the richness of structure that can be explored. For example one does not need to

explore extensions of a system that contradict that system. Exploring more complex systems requires more resources and there is an inevitable trade-off between allocating resources to the paths that seem most promising and widening the search of alternatives. This is not just an abstraction but is central to creative development in science, mathematics, technology and the economy.

It is possible to develop the mathematics that sets boundary conditions for creativity. These cannot optimize creativity but they can establish regions outside of which creativity is certain to be suboptimal. A trivial example is the necessity for continually increasing both the number of paths explored and the resources devoted to the most promising paths. This suggests that concentration of resources at the expense of diversity in an expanding economy will be suboptimal in the long run.

In spite of Gödel's Incompleteness Theorem most mathematicians do not see the development of mathematics as an inherently divergent creative process. They most commonly try to extend mathematics through axioms of infinity. These are simple assumptions about infinite sets that have powerful combinatorial implications. Mathematicians strive for results that can be directly apprehended by the human mind and this limits their ability to develop direct intuition about combinatorially complex structures that can only be effectively dealt with using computers.

Mathematics plays an important role in the study of evolution including evolutionary psychology. But that analysis focuses on steady state solutions. For example mathematics is often used to compute the expected frequency of different mutations. The much more difficult problem of evolutionary creativity is poorly understood. There is a lot of interest in the emergence of complexity but little work that I know of tries to connect this with the hierarchies of mathematical truth and complexity.

Number is the mediator between the reality of here and now and our deeper existence as part of the unbounded creative process of evolving consciousness as Carl Jung believed[6, par 778][9]. If we survive as a species, the future not just of our species but of the entire evolutionary process will fall into our hands.

8 Intuition and intellect

This paper connects disparate existing ideas. It does not follow a logical deductive path. It starts in many places and leads many places to paint a picture of reality that is consistent with what we know, internally coherent and extraordinary in its implications. Our two fundamental assumptions are a crossroads where these paths meet and diverge. There are many reasons for adopting these assumptions and many implications of them. The journey across this terrain is more intuitive than intellectual but it is an intuition firmly rooted in intellect.

Western academia knows how to develop and foster intellect but not intuition. Those in the creative arts are more aware of what intuition is and how it can be developed. This is ironic since many of the greatest scientists such as the physicists Einstein, Bohr and Feynman were more intuitive geniuses than intellectual ones.

Intuition is a pattern recognition process. It senses when many pieces fit together to form a coherent whole not unlike facial recognition in which many features combine to form the face of someone familiar. Carl Jung saw intuition and sensation as opposite sides of the same coin[7]. These are Jung's two 'irrational functions'. The former is focused on immediate experience and the latter on where the experience came from or may lead too. Intuitive people can be blind to the stone that is right in front of them and sensation types can be blind to the implications of what they see.

Intuition was crucial in developing these ideas and is crucial in comprehending them. Intuitive talent is becoming increasingly important. Intuition has always led the way in creating the new idea or seeing the new possibility that intellect could develop. As we have mastered the territory that is well defined enough for intellect to deal with more of the major issues we confront fall outside of that domain.

Intuition is not as quick as intellect but it is deeper. Intellect can easily grasp things as a series of complex operations. This is impossible for intuition. Intuition must know how the operations relate to each other and to existing understanding. Intuition tries to make as many connections as it can. It easily makes connections with little or no meaning or relevance. Intuition tends to see too many connections or possibilities and intellect too few. Creativity often requires a difficult union between these two.

Intuition takes time. That is why it often helps after thoroughly exploring and understanding a problem to shift ones attention elsewhere. There seems to be an unconscious process of making connections that can often solve otherwise intractable problems. Of course there is no intuitive only or intellectual only learning. All learning involves sequences of steps, playing with ideas and relating new ideas to old ones.

9 Evolution of structure and Consciousness

Almost every spiritual tradition has fantasies that most people not immersed in the tradition consider implausible. Fantasy creation often has roots in instincts that move us in ways we do not understand. Taken literally the fantasy is nonsense but metaphorically it touches on a deeper truth. It is important to keep an open mind about the depth of our ignorance. This requires a respect for the subtlety and depth of our instincts. They can be leading us in ways we cannot comprehend. It equally requires that we do not make of those instincts a literal fantasy that we can comprehend. For then the fantasy can displace the deeper reality the instincts are striving for. This is not so easy to do. We like to have good clear reasons for our decisions. To

go with what feels right without understanding why can be difficult. So we invent some nonsense to explain what we do not understand. Truth is an art that we are learning slowly and painfully.

Understanding the connection between mathematics and consciousness can help refine this art. It can give insight into practical problems. For example in *Guns, Germs and Steel*[2]. Jared Diamond investigates why certain cultures came to dominate the planet while others remained relatively stagnant. There were a variety of reasons but two essential ones were diversity and concentration of resources. One needed a dynamic tradeoff between these two for modern civilization to arise. A culture dominated by a single ruling elite like China inevitably failed to pursue possibilities essential to future development. Similarly a region like Africa with so many small communities could never marshal the resources needed for certain kinds of progress. Europe presented the ideal combination of diversity and concentration of resources.

Ignorance of the boundary conditions for creativity leads to limits on the evolution of consciousness. For it is all too easy to stray outside of the region where creativity is unlimited. The current bias towards megacorporations is potentially dangerous. It focuses on concentration of resources at the price of diversity. Everyone wants the biggest guns for competing in the global free for all. As we are increasingly dominated by global institutions we must incorporate the boundary conditions for creativity in the structure of those institutions. We need some way to objectively determine the structures that enhance creative potential.

Evolution is a profoundly creative process. It creates meaning. Human experience is not just richer than that of say insects but the nature of that experience is completely beyond the comprehension of insects. The creative nature of evolution and the hierarchy of mathematical structures suggests that this process of creating values is an ever expanding one. We can evolve into beings as far beyond us as we are beyond insects and *all* of our descendants can do the same no matter how far beyond us they are.

10 A wider sense of self

We can understand aspects of the evolution of structure. We cannot even begin to imagine the evolution of experience that manifests that structure. The universe is truly and deeply creative in ways that transcend any attempts to comprehend it. God as this creative process is beyond anything any being will ever be able to imagine. For God is becoming and not being.

Man naturally thinks of himself as being at the center of the universe and the focal point of creation. But that arrogance has repeatedly been proven mistaken. We may represent the leading edge of evolution on one minute planet in one solar system in one galaxy. We are an incomprehensibly tiny speck in the universe. It is likely that we are far from being at the leading edge of evolution in our galaxy let alone the universe. Mathematics teaches

us a lesson similar to astronomy. In the grand scheme of what will be we are not even at the beginning. The levels of consciousness that may evolve are beyond anything we can imagine.

One might object to identifying conscious experience with physical structure by arguing that spirituality transcend space and time. Spirituality takes us outside of ourselves to a deeper and wider identity. It sees our oneness with our fellow humans, with all sentient creatures and with the creative process itself. Identifying conscious experience with physical structure is not in conflict with this ancient wisdom. On the contrary it deepens our understanding of these spiritual realities.

For it shows how artificial our sense of self is. It is created for practical reasons as a baby learns the difference between self (that which responds directly to ones wishes and can hurt) and not self (everything else). It is not the result of some unique soul each of us is infused with. We create our sense of identity and we can expand it as widely as we choose. We are the universe becoming conscious of itself. As we begin to feel that this is true we literally become who we truly are.

Have you ever become so taken by a book that the experience described was more real than your everyday life? Sandburg's Lincoln had that effect for me. The people the poet described lived again in the writing and live over and over in the reading. Our consciousness is not individual and unique but universal and all encompassing. For it to exist at all it must be specific but the boundaries that make it specific are not limits on our experience put pathways to unbounded consciousness. Each movement in time leads to the next. Each experience leads to other places other people and ultimately the creative evolution of the universe.

11 An objective spirituality

In many religious traditions God is seen as infinite, all powerful, perfect and beyond change and growth. In stark contrast the universe is evolving an ever expanding consciousness often through excruciatingly painful struggles. Our mathematical and scientific understanding suggest God is an unfolding creative process that may expand without limit. We are the evolution of consciousness becoming aware of itself and beginning to acquire the power to take conscious control of evolution.

Science divorced itself from religious prejudices and used experiments as the ultimate arbiter of scientific validity. With objectivity as its guide science has laid the groundwork for the technological achievements that empower us. Spirituality and values have developed much more slowly. We lack the wisdom and spiritual insight to use the enormous power that science is creating. By integrating spirituality and science it is possible to construct an objective spirituality. This can support development of our values and spirituality at a pace comparable with the achievements of science and technology. It can

help lead to the wisdom we desperately need in this extraordinarily dangerous moment of evolutionary transition.

From this standpoint God is not a completed being but an ever expanding process of evolving consciousness. We, as the highest form of consciousness on this planet, are the eyes of God with the power to create the world through conscious control of future evolution. We cannot make decisions about this based on religious or spiritual feeling alone. History teaches us how badly our feelings and instincts can lead us astray without objective tests. Science has shown what miraculous progress is possible with the guiding star of objectivity.

Equating the existence of physical structure with conscious experience is the starting point of an objective spirituality. It establishes a framework for reconnecting scientific understanding to values by connecting structure to essence.

It implies that we are and always will be the merest hint of a shadow of what will be. Precisely because there is no ultimate or final goal but only an ever expanding horizon we must always value the experience of the moment for that is all that will ever exist.

12 What is and what will be

Who are we? Why are we here? What is this place? These questions cry out over the centuries. They cannot be answered like we address other issues because there is no context in which to answer them. They are questions about the context in which everything occurs.

A similar situation exists with the fundamental laws of physics. We can explain why a chemical reaction occurs using quantum mechanics and the properties of fundamental particles. Some day we may be able to explain the properties of fundamental particles by a deeper yet to be discovered theory but for now we simply take them as given as we do the laws of quantum mechanics. We discover these laws by looking for the simplest explanation that accounts for as wide a range of experimental results as possible.

We do this because it works. Much of the world including some extraordinarily complex things can be explained by simple laws. Once we understand such laws we often gain enormous power to control and manipulate the phenomena the laws describe. There are also aesthetic reasons. Simple laws can be profoundly beautiful. But in the end it is utility that carries the day. That which works is adopted. Those that refuse to do so are less effective and over time their influence and power diminish.

The same approach can be applied to the fundamental philosophical questions. We can search for the simplest description of what we know to be true. That is the approach we have taken. What exists is immediate experience and nothing but immediate experience. We assume not just our fellow humans or higher animals but all of creation is conscious. Our consciousness is not

just individual. It is a part of the universal transformation of consciousness. This is a transformation that may be without limits.

The unlimited potential for evolution in a potentially infinite universe does not exist on our planet. Its future is limited in time and resources and thus creative potential. If we avoid self destruction on a massive scale we will almost certainly within this millennium begin to travel between the stars. We will do so on unmanned ships equipped with our knowledge and with biological material and machines that are capable of colonizing planets on which life could not develop spontaneously. We will reproduce and evolve not as individuals but as entire worlds. We will probably evolve as a combination of biological and manufactured components. Over time the manufacturing processes and biological processes may merge as the former become more subtle and efficient and the latter are more controlled and directed. The goal is the never ending expansion of conscious experience. We will grow more capable of pleasure, happiness, joy and ecstasy. The goal is the never ending journey of God becoming ever more deeply conscious of herself in her unbounded glory.

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