

The Mind-Brain Problem -an Introduction for Beginners

(If you seek a more precise mathematical introduction to my ideas, please go to [“Is Exotic Mathematics Necessary for a Solution to the Mind-Brain Problem”](#))

([Here is a hyperlink to a simplified version of my own views on the subject.](#))

Jerome Iglowitz
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(Note: The initial graphics are intended as a visual break to the concentration of the text. They are not intended to offend or belittle you.)

Introduction, (What are "facts"?)



I had a discussion with a friend awhile ago which I thought might serve as a lead-in to someone trying to understand the rough outline of the mind-brain problem. I have never talked to this friend about this particular problem as it is not within his scope of interest, though he has a naturally philosophical mind in other areas. It seems he had gotten into a discussion with a co-worker at his job about "facts" and asked my opinion. (Facts will be very much in *our* scope of concern here.)

My friend acknowledged that his co-worker was a very bright individual who had argued that "facts" were solely a function of the person expressing them. He said his co-worker had made a very strong argument and compared the latter's position to what I had once described to him as "solipsism". I told my friend that to understand the problem, we had better look first at what it means to reason with another human being. Reasoning does not start out from

absolutes. Were I to reason with him or with you, we must start out from some basis of *common agreement* . Without it, we have absolutely no place to go!

"Solipsism" is the philosophical position that all that exists: you, me, the car sitting in the driveway, the sun in the sky -exists only in my, (your), head. This may seem a very strange viewpoint, but it is provably *logically consistent* . The point is that if you were to express your belief in such an idea to me, there would be no point in my continuing a conversation with you about such things. My response would be to smile politely and switch the topic of conversation to what we would like to have for lunch, for instance. The only legitimate response, (and I once considered it seriously), would be a "Zen-ish" one - to slap the believer across the face to make him deal with the reality of it. What saved me from this (purely philosophical) response was the realization that this individual was quite likely to call his solipsistic police and have (solipsistic) me thrown into his solipsistic jail!

There is another fundamental, also consistent philosophical position contrary to our normal beliefs: i.e. classical idealism. For it, all that exists are ideas. There is nothing beyond. Again, because it is consistent, (and my prospects hopeless), my only reasonable response is a question: "Soup or a salad?" This is not to say that these positions are stupid or meaningless, only that I could have no productive purpose in continuing a conversation -and certainly not in debating about them. As I have acknowledged, they are logically consistent. This does not automatically make them true however. We have no basis of common agreement from which even to start.



Most of us fall into the philosophical position called "realism", and this is the context, (*because we can agree on it*), where you and I will carry out our reasoning together. There *must* be a basis of common agreement to even begin. There are many names for this "realism" and many variations on it. Most of us belonged, at least in the beginning, to the position of what has been called "naïve realism". This is the belief that what is truly real outside of ourselves and including ourselves is our normal experiential world. It is you and me, the car on the driveway, the sun in the sky, salads and baseballs and all the things these things do. These would constitute our first definition of "facts". If I were to turn my head away from this baseball and then back again, it would still be "round". (Or it would be a fact that somebody ran over it with a car in the interim, let us say, -to make it otherwise).

But most of us in the modern world have been forced to modify this naïve realistic view somewhat. Scientific experiment gives us new facts: positions of needles on gauges, or digital readouts in certain experimental situations, or photographic plates with nuclear tracks, or petri dishes showing certain growth patterns of bacteria under certain conditions. These situations and the extended body of experience which contains them, (to include the former, normal experience -baseballs, et al as well), force us to extend the worldview of naïve realism. This is so mainly because these new facts simply *don't fit* with such a simple, "solid" view of reality. We are forced to accept the modified "scientific" reality they imply because it has produced results, (the things they do), right at our normal, naïve scale. The predictability of the motions of the planets, and the atomic bomb are verifiable facts, (for realists). And so is radio, television, electricity, the transistor, lasers, vaccines, and so on, and so on...

Most of us have modified our naïve realism, (because of our forced belief in the miracles-that-work of science), to what some have called the "Newtonian world", or the "billiard-ball world", (after Roger Penrose's usage). This "Newtonian" view is the belief that what *truly is* , absolute reality, (or "ontology" to use an old but precise word), consists of some ultimate particles: atoms or subatomic particles, quarks, etc. We can retain our normal view of reality within this view however because we envision our ordinary objects, (baseballs, you, me, the sun, etc.), as *spatial containers* in the new absolute reality we are forced to believe in. If we had suitable eyes of extreme magnification, all the *ultimate things* , (the ultimate particles), which constitute Harry Jones would be next to each other in an ultimate spatial context, and separate from those of his ex-wife's checkbook or her lawyer. There is a necessary belief in a continuity, and a contiguity, ("next-to-ness"), in this belief system. This is the "hierarchy" or "logical containment" implicit in the Newtonian World and it is mirrored in the hierarchies of contemporary mathematics and of logic. The ultimate "facts" of this system, (atoms, molecules, the laws of Newtonian physics, et al), consist of the ultimate objects, (and what they do), of the belief system of the science which argued them. They are "facts" because our past experience has agreed with what it has predicted and we expect that our future experience will agree as well.



Modern science, or rather the science of the twentieth century, (which is not so new any more), was forced to modify its picture of ultimate reality, however. It was forced to do so because the Newtonian world picture simply didn't work to explain actual new scientific experience. (Note: Roger Penrose's

"Emperor's New Mind" contains a succinct and lucid discussion of this topic without prerequisites. It is not easy, but it is very good.) Quantum theory, our scientific deepest "smallness" for instance, does not believe in, (*cannot believe in*), the existence at a specific place, -nor even in a specific *region* of its fundamental particles, the ultimate objects of its realistic reality. These particles -*each* particle even- exist(s) across the whole of reality, and the whole of space! The ultimate facts of Harry Jones are no longer discrete and separate from his wife's checkbook -and not even from her lawyers! Quantum theorists did not adopt this position out of choice or whim, but because they had to - to explain experimental evidence. The Newtonian worldview simply could *not* be made to fit the facts of scientific experiment. Ultimate space, (the "aether" wherein they were to exist and move), was challenged long ago by Galileo, and euthanized, finally by Einstein.

On another tack, the renowned and seminal thinker Immanuel Kant argued that because we, (and specifically our experience), is *part of* whatever it is that ultimate reality may eventually turn out to be, then even our cognition, (experience), must be considered relativistically! He reasoned that it is impossible to separate out the parts that make up our personal experiencing from the parts that are "outside". What reality ultimately and specifically is by itself, ("the facts"), he concluded, we can never know. (Kant is sometimes very wrongly labeled an "idealist". The definition of "idealism" above, Kant's own, shows the error of that label).

What then, is a "fact" now? It has certainly become a much looser and more abstract thing than we had supposed, even for us realists. As realists, conversely and by agreement, we *must* believe in some ultimate reality *beyond* ourselves. We also believe that this ultimate reality must be consistent with our personal experience and the laboratory experience of experimental science. *These are the basic presuppositions of our (realist) dialogue.*

What then, (again), is a "fact"? Let me suggest a definition. "Facts", (alternatively "the phenomena"), are that which *all* consistent and comprehensive theoretical descriptions of reality *must* account for. And yet they are not necessarily the same as the *way* that these theories account for them. "Facts" are those "things" that the solipsist, the idealist, and all forms of realists *must* account for -else they might surely step in front of a car for instance!. They constitute "experience" in its most general sense and they must be consistent with both the past and the future. The squashed baseball is a fact that all good theories must explain. What "the baseball" is, however, (and what "squashing" is), are elements of the theory that explains them. "Fact" is not the

same as theory; nor is it the same as "ontology". By agreement as realists however, we must assume *some* connection.

The problem of "facts" is very much a part of the Mind-Brain problem. Indeed, it is very much a part of the theories proposed to solve *any* problem. Our particular "take" on it determines the whole of our context of possibility and limits our consideration to just those theories consistent with it.



The Mind-Brain Problem:



The real war today is between dogmatic materialists and anybody else. Within the belief system of the former, all that exists is material and the relationships between it. Part of that belief system is also heavily vested in the descendant of Aristotelian logic - the logic of classes -and in the "hierarchy" implicit in it. Dogmatic materialism has an admittedly long and very

successful history in science. In fact, it is a *spectacularly* successful history. It has actually produced the miracles that religion once promised. Democritus' descendants seem to have won the field. But there are gaps in their line. Most of modern physics -the part of physics which *is* modern - just doesn't fit. In the case of the Mind-Brain problem, I think they will ultimately fall. Does this mean that I think they are wrong? Not exactly. It is a subtle point, but, crudely put, I think that theirs is a system that works, (mostly), but that it is necessarily only *one of several*. I believe it does not describe "what is"; it simply, (superbly), predicts future. It is a wonderful predictive mechanism, but it does not describe ontology. What is wrong with it is the "dogmatic" part. It limits the possibility of new theories to its own dogmatic assumptions, assumptions unnecessary to its function and limiting our explanatory power.

The mind-body problem consists in finding some way that each, (the mind or the brain), could legitimately exist given the actual existence of the other. It sounds pretty easy, but, surprisingly, it is not. Actually the biggest problem for someone approaching this issue for the first time is to realize just how difficult it really is. Science today is actively attempting to fully explain the workings of the human brain. Its conclusions will be affected by its presuppositions. Those conclusions will profoundly affect the whole course of future civilization.

The real beginning to the modern formulation of the mind-brain problem began

with Descartes. Following his vision of analytical geometry, he was the first to envision a modern, geometrical physics encompassing the whole of the world. Because of it, (successful or no), he was forced to deal with the dilemmas of physical determinism.

It was clear from the start that the physical brain was part of the physical universe, and, given an actual deterministic physics of the latter, was subject to the same physical laws. Given that the brain is the final arbiter of the actions of the body, it was further clear that the whole of human action must be physically determinist. Daniel Dennett -in the most honest statement of modern dogmatic materialism -argues that mind cannot exist within this belief system. True, there are less forceful statements of its implications, but I think Dennett had it right -- physically and temporally discrete process can only produce other physically and temporally discrete process. Nowhere is the integration and "understanding" demanded by our conceptions of mind possible.

Surely all of us believe that the brain exists. We have seen actual brains, (or pictures at least), and know its gross shape. We have seen drawings or photographs of actual nerves inside it and are prepared to believe scientists when they tell us of actual, provable biological processes within it. Most of us are prepared to believe that these nerves, chemicals and physical processes within the brain cause all of the function of that brain. The brain is a pretty well defined physical thing -at least in general terms.

But what of the mind? Where, or how, could it exist within that physical thing? Or does it? Here is the crux of the problem. Most of us are willing to believe, (again), that the mind is intimately associated with the brain. In fact, most are willing to believe that mind is *in* the brain. If the brain is destroyed or seriously injured, then the mind ceases to exist or is lessened. Brain injuries and disease bear clear witness. (Conversely, if we were to lose our arms, or our legs, let us say, most of us are prepared to believe that our minds would not necessarily be diminished.) Is the mind in all of the brain, or only part of it? Is it different from the physical process or some level of complication of it?

The "replacement argument" is germane and quite well known. It is both clear and convincing and it should help to clarify the context. It goes like this. Let us assume that some small part of the physical brain can be replaced by a mechanical substitute -whose net effect on overall function is exactly that of the replaced physiological part. (This is not an absurd assumption given the state of actual research which is attempting things just like that.) Furthermore, for the purposes of discussion, let us take "having consciousness" as very roughly equivalent to "having a mind".

Question: assuming that the original brain was conscious, (roughly equivalent to "had a mind"), would the modified brain still be conscious, (have a mind)? Suppose we were to replace each of the physiological parts and functions of the brain successively in a like manner. At what specific point would the brain cease to be conscious, (have a mind)? Or would it? This is an actual research problem in the discipline of artificial intelligence, but it also frames large aspects of the general question reasonably well.

The flip side of the argument is the question of whether a "mind" in our ordinary sense *ever did* exist! Now this is a very shocking idea, but again it is a logically consistent position. Under this idea all that exists are the physical world and our bodies and brains within it. Under it what we call "mind" is a "figment" of language. We are automatons, ("zombies"), which only produce sounds and mechanical writings mimicking "mind" because of the design of the mechanism! This is Dennett's conclusion.

Though absurd and extreme at first hearing, if you grant that the whole of the brain may be considered as, (or perhaps replaced by), pure mechanism, then all aspects of human behavior may be legitimately considered completely in terms of the functioning of that mechanism. Since such a view is adequate, and no productive placement of "mind" in our physical universe in any *other* sense has till now been proposed, it became a very strong argument. There are other strong aspects of this argument having to do with perceptual experiments -the "color phi" for instance which demonstrate flaws in our perception of time -of sequences of perceptions. Another line of the argument has to do with the "homunculus problem" -the apparent necessity of an infinite logical regress under our normal preconceptions. (See my Dennett and Edelman appendices respectively for an elaboration.)



Sensory surfaces are topologically mapped onto cortical surfaces. Squares are mapped roughly onto squares and triangles roughly onto triangles. Thus, it would seem, the brain's cortex actually "sees" what is presented to it. But *what* is it that subsequently sees the maps on the cortex itself? Is it another cortex, another brain? Is it a little man within our brain on whose brain it is projected? But then how does *his* brain see it?..... This is the problem of infinite regression which is termed the "homunculus problem". And where, moreover, is the (simultaneous) theater in which it is projected? Dennett's "zombie" argument mentioned above questions

even the possibility of such a theater -he argues that it cannot synchronize itself with external time.

There are other materialist positions, not quite so strong, but all stand before the same dilemma. How can a bio-mechanical process distributed through space and time, (like the gears in a working machine), be integrated in any sense other than a mechanical one? That the machine as a whole can *act* decisively is indisputable, but can it "know" what it does? Where and how? We as observers seem to be able to know, but how can a "gear" know its *own* function or the function of other gears within the machine? It can certainly be affected by them, (or synchronized with them), but how can it *know* them? Knowing is not something that "gears" do, after all, gears just do!

Under the standard paradigms of brain function, data (stimuli) only "wash through" the brain. By this, I mean they are received in their parts, those break down into modules, submodules and submodules of submodules.... and finally make their way out of the body as action. Nowhere, however, does the process require nor can it embody consciousness. It is distributed process, pure and simple. Other functions, those that require self-recognition, and body awareness for instance, feed back and modulate on the overall process—but they too only "wash through" the brain—at the same level again without any requisite, (or even a possibility of), consciousness. This is brain science, pure and simple. Synchrony, integration are only aspects of that process. They provide temporal integration, (a computer's "clockspeed", so to speak), which holds it all together.

Freeman, under another conception, sees the brain as contributing a primary *independent* biological component which is chaotically modulated by the flow of information and internal forces which leads to spatial distribution. These *are* instantaneous "frames". But, again, how are they *seen*?

My own opinion is that this materialist position is very close to correct. But it is the "very close" that is the heart of the issue. I do not believe that my mind, (taken in its *ordinary* sense), is a "figment". I believe it truly exists. This is an absolute part of my realist beliefs. I think it is probably part of yours also. But how and where? The ultimate question, I argue, comes down to what is *truly real* in reality? What is the "stuff" that is really real? This question must be considered within the context of our initial realist agreement and forces a refinement of our "contract" assumed at the beginning of our discussion.

Some of us think there are two basic kinds of things in reality: physical stuff and mind stuff. These are the dualists. Others think there is only mind stuff. These are the classical idealists. A few believe there is only *their* mind stuff - these are the solipsists. Most, however, believe that all that there is -is physical stuff. These are the materialists and they dominate the current scene largely because of the profound and productive scientific results their view has produced in our modern life. Materialists also like to call themselves "realists" as they refer all questions of reality to "material". It is the last group that I wish to talk to. Though the other positions are certifiably consistent, their positions can lead to no productive result -of any kind! There is no experiment, (necessarily material and physical), which would prove or disprove their ideas.

The mind-brain problem is the most difficult problem we have ever been called to solve. But why? Why is this particular problem so difficult? I think that the answer lies in what we demand to be and what we are prepared to believe -is real.



All of us begin by believing that the ordinary world in front of us - cars, trains, people and baseballs and all the things they do -are real. But more than that! We believe that they are really, really real! That is, we believe they exist "out there", independent and absolute.

But the sense of this last sentence brings up deeper issues of reality and knowing and, scary and tainted as the word is, of "METAPHYSICS"! This most disreputable word is the hallmark of charlatans, herbal medciners, palm readers, and, (as my daughters would say), is not a particularly polite word to use! The best sense of the word in its modern usage brings up images of centuries-ago academicians and theologians arguing endlessly and unprofitably about such things as "first causes" and "the mind of God". Modern man and modern scientific minds in particular consider themselves well rid of that verbal jungle, establishing themselves more profitably on the plains of experimental science.

But historical metaphysics had a larger scope. Even what we now call "science" was itself once called "natural metaphysics". There was yet another aspect to that ancient discipline which dealt with something we all must and do still consider, though we may not explicitly admit we do so. This is the aspect of what is -or could be- really, really real "out there". It was called "ontology", and I will preserve the name to distinguish it from any other aspect of metaphysics. What I have described above, our beginning belief about reality is

termed "naïve realism" and it means that our ordinary objects -*as they appear*- are truly, really real -they are ontic objects.

Since the time of ancient skepticism and certainly through the course of modern science, this view has receded more and more from respectability. The practical miracles of science make us believe that ontologic reality, (actual reality), is composed of the objects science says it is - atoms, quarks, fields, et al. What allows us to accept this view is that we may still preserve the sense of our ordinary objects as physical clusters of those deeper existences: i.e. I can think of myself as a cluster of atomic particles and fields shaped like me, doing all the things I do, and positioned in ontic reality next to other things and persons just as I ordinarily see myself.

This is still the view of most educated persons on the issue of ontology- at least as considered at the human scale, -but it is an old view. It incorporates what Roger Penrose calls the "billiard ball view of reality" and constitutes, essentially, a Newtonian view of the universe. Under this view all reality consists in the motions and dynamics of atomic particles in an ontologically existing "space". Modern science -20th century science- has questioned this view however. The primary theoretically and technologically productive theories under which science now operates question the spatiality we envisioned, and even the ontological clustering of that view. The atomic particles of me no longer exist, (really exist), in a specific location, but are spread across the whole of space! Even the "how many" of a given particle is not fixed. (See Penrose.)

This is the view of current physics, and its strength stands, like the physics before it, upon the actual scientific miracles it has produced and is still producing. The Newtonian science which preceded it could produce no plausible alternative! Since the new science works and produces new miracles, it would seem to necessitate a new picture of ontology, a new and different picture of what is really real "out there".

But Neils Bohr, the recognized "father" of quantum theory said that such a picture was unattainable! He characterized his new science as a pure algorithm, (i.e.: a rote, purely pragmatic but *profoundly* and overwhelmingly useful procedure), instead. What the actual reality beneath it is, he said, we cannot know and cannot picture. His theoretical world could not, (cannot), fit any normal sense of the real world. And yet it works and leads to the production of new things -transistors, nuclear power plants, etc.

Most thinkers on our particular subject say that theory on the scale of fundamental physics is not relevant to the mind-brain problem however. They say that events and things of the size, (scale), of the brain and its happenings -at the human scale- behave like the things of Newtonian physics. (Only a few disagree.)

I find this view disturbing and self-contradictory, however. If we are, in fact, *products* of the ultimate objects of science, (the "real stuff"), how then can we ignore them at *any* scale, especially in our conceptions of what it is that really exists? More disturbing is the blind confidence those thinkers have in the "facts" of the scale with which we are concerned.

I personally do not find it surprising that physics has reached Bohr's conclusion. This is because I believe that even our very own "naïve world", our normal perceptual and conceptual world, (by reasons of evolutionary biology and logic), is *itself* precisely such an algorithm in Bohr's sense! (See [Mind: the Argument from Evolutionary Biology](#)) I believe it is a *virtual* algorithm which enables an optimized biological function! It is this conception, I will argue, which allows an actual solution, (and not just a prevarication), of the mind-brain problem within the confines of science just as Bohr's allowed the solution of the problems of atomic physics. It also allows a consistent and plausible logical explanation of the dilemmas of mind itself. It is not at all surprising to me therefore that when our naïve world is pushed to the (small) limit in the experimental experience of science that it must reach an algorithmic conclusion. This is exactly what my own theories would predict from the starting point of biology. The science of cognition is like the science of ultimate physics, I conclude, not because it must adopt the "objects" of the latter to explain its dilemmas, (as Roger Penrose has suggested), but in that it must adopt the *selfsame strategy*!

But what of the reality behind this strategy? Can we totally give up on what is truly, really real -i.e. ontology? Even Immanuel Kant admitted that the latter was impossible. He saw that all men needed a conception of the real. The task he set himself was to define what it is that we really can know about it -and how.

Though I cannot accept Kant's "categories", (and their implicit quality of hierarchy), his overall conclusions embody a much deeper conception of ontology - a relativistic view. He argued, in quite a modern vein, that while sane, (i.e. realist), reason must accept the actual existence of an ontological reality, it has no means of knowing any of its particulars, (its ultimate "facts").

This is because human cognition, being part of that reality, cannot separate its own particulars from that which it cognates. Cognition, (experience), itself, he argues, is relativistic! (This is very similar to Heisenberg's classic "indeterminacy" argument in quantum mechanics 150 years later.) Kant's relativism is not *laissez faire* relativism, (like "cultural relativism), however, but one which, like Einstein's, preserves a very rigid, "mathematical" core: i.e. the constants and invariants –the “equations”- of phenomenal connection.

Kant is probably the least understood and the most *mis*understood thinker in the history of the mind-brain problem. This is too bad because the problem he set himself was exactly the same modern problem of human cognition which is our concern here. It is the precise concern of modern cognitive science. Sadly he has been so mislabeled and trivialized through history that modern thinkers are having to reinvent what he has already blueprinted very clearly. He is admittedly hard to comprehend, but this is a result of the specific nature, (the forced relativism), of his problem, not of his writing skills. Relativism is a difficult "stretch" for any mind.

Have you ever seen the modern remake of the movie "Cinderella", ("Forever After")? There is a scene in it where the heroine is seen paddling around, face-up in a lake. Prince Charming arrives on the scene accompanied, strange to say, by Leonardo da Vinci dressed, appropriately, in medieval clothes. Leonardo decides to try out his latest invention, a pair of miniature canoe-like floatation shoes, and he proceeds to walk on water, startling the heroine when he reaches her.

Try to hold that image - of the medieval Leonardo walking across the lake. It reminds me, strange to tell, very much of Immanuel Kant exploring the "lake" of ontology. Kant looked at the possibilities of human cognition and concluded that our knowledge, (what we can know), could not be the "solid knowledge" of "bottom dwellers", (objectivists, materialists), nor could it be the "airy knowledge" of birds, (idealists, solipsists), flying unattached and independent of the earth. He concluded that human knowledge must take account of its own medium, (the water). The best we could do was to discover the means to float upon it. We cannot build a bridge here, (as the bottom dwellers insist), because the lakebed is made of quicksand and the deeper we attempt to drive the piers, the deeper they sink. Kant's "means", (his "buoyancy"), lay in the fundamentally relativistic conception of realism that he spelled out. It centers in the innate necessities of human cognition itself. The only knowledge we are capable of is that "which floats"!

The metaphor is, of course, insufficient and incomplete. Most metaphors are. The crucial element in Kant's relativism is that human cognition cannot separate the aspects it in itself contributes from the aspects of the elements it "sees".

And yet, Walter Freeman may be right about Kant. Kant saw perception as the (relativized) passage of information, (sensory data). Even though relativized, it is still a "passage". Maturana is more right. It is a "triggering" of response to generate a reaction (in Freeman's sense). I have dealt with this issue in my book. These are *converse* perspectives depending on which *end* of the "telescope" one looks through.

A Sketch of My Answer:



Once, long ago as a student, I was overwhelmed with a blindingly beautiful idea. I thought about the possibility of looking at complex metacellular animals specifically *as communities*, -as "societies" of their individual cells rather than as irreducible wholes! Enthused with my idea, I mentioned it to a pre-doctoral assistant in a biology lab. Without batting an eye, (and I have had the highest respect for the philosophical abilities of biologists ever since because of it), he said simply and without hesitation "Sure. There are sponges, for instance, which can be forced through a sieve to break them into their individual cells, and which subsequently come back together all by themselves to make a metacellular entity." I don't claim to have invented this idea, but I discovered it for myself, and it has influenced my thinking ever since. I think it is the right idea! (There was an earlier, deeper idea -my "second" thesis dealing with mind *per se*, but comprehending it depends upon the understanding of this materialist perspective.)

At the level of single celled organisms, there is clearly no point in talking about internal models of reality -there is no possible canvas upon which to draw them. What we have instead are merely input-output reactive couplings which are either beneficial or not to the individual organism. Still at the level of the unicellular, we may have multiple such couplings. The task for that unicellular is to combine them in some beneficial way. But how?

The obvious biological answer is: *by pure luck*, -i.e. by random genetic accident. Increased survival then leads to genetic passage to descendants! Such is surely the case for the simplest multicellulars as well. Up through the levels of the sponges, the mollusks, the ants, there is no platform even conceivably close to that needed to supply a model of environment. What possible rationale for organization can there be then? That rationale is *self-organization* based on optimization -i.e. whatever it is that will work better! But "whatever it is" must be equated with "anything that works". But does this organization, -*need* this organization preserve contexts? There is no implicit requirement for a hierarchy of response. This is where the conception of a self-organizing system enters the picture. The only rule of such an organization is one of bettered survival. Given a billion years or so, we can envision a holistic response to environment -but it is not necessary to envision a unique one! Current thinking believes that such an organization must be a perfect mirror of externality, or, at the very least a perfect parallelism to that externality. But why? It need only *work*!

I. My FIRST argument, (of three), begins with biology at the metacellular level, and specifically at the level of very complex metacellulars. (The human metacellular, for instance, is composed of about 70 trillion cells!) Because the essence of the evolutionary principle is an optimization of performance, ("survival of the fittest"), I argue that the very coordination –as coordination *per se* -of metacellular, ("megacellular"), response is the key issue. But this response involves a profoundly difficult organizational and control issue. In the case of profoundly complex metacellulars, I argue further that an optimization of control is in actual conflict with an incorporation of our assumed internal representative model of ontology. (This is the "large database" problem elaborated in Dreyfus' book: "What Computers Still Can't Do"-i.e. because such a system must search the whole of its database to resolve its particulars.) It is in conflict with even a *parallel* model of reality in biologic function, (as urged by most modern cognitive scientists), because it neglects the factor of urgency, (i.e. what is *most* important -danger / risk)! More succinctly I claim that knowledge is in conflict with performance! I urge that the pathway to an optimization of performance and control, (the necessary evolutionary thing), lies rather in a *schematic* control interface like, (but vastly more complex than), the graphic user interface, ("GUI"), of a modern computer -of a Macintosh, or "Windows" on a PC for instance. This interface, however, is keyed to urgency and response and *not* to representation. The schematism of that control interface clusters primitive, "atomic" modular *response* into "icons" however; it does not cluster properties of or information about ontic

objects "out there". Our humanoid "objects", I argue, are actually metaphors of response! They are artifacts of evolutionary process. How could it work? I present an answer using W.J. Freeman's, (and Edelman's), findings on the brain in "[Mind: The Argument from Evolutionary Biology](#)" which. It postulates a chaotic rather than a hierarchical mapping.

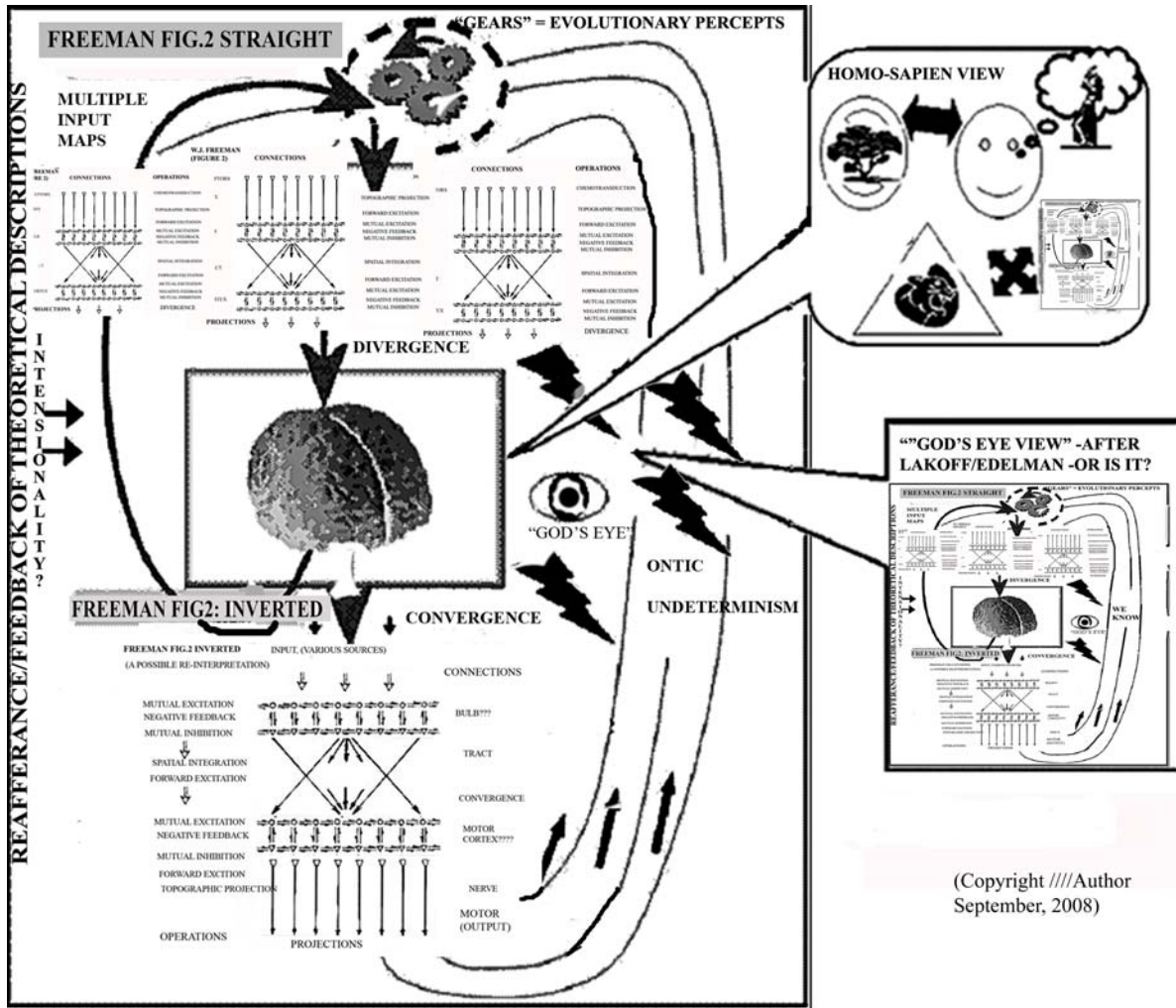
Imagine a GUI, not in two dimensions, but in three or four. Imagine that the "objects" of this GUI embody the control functions of both the monitoring readout and the operative control for some immensely complex process, but *combined in one* as "icons". Imagine that the control of this process is accomplished by a manipulation of those icons themselves. It would be like controlling the speed of your car by pulling on the speedometer needle itself!

Have you seen the movie "Matrix"? In it the hero, (and all the other humans in the world), lived out his prior life immobile in a stationary nurturing pod, while his mind lived in our ordinary contemporary world as part of a universal computer program. His experiences were our normal, real world experiences and did not reflect his *actual* existence. Hold the image!



Now let's modify the script somewhat to present a different conception. Imagine our hero, (whatever he may truly be), performing some important and complex project, or controlling some dangerous and immensely complex process by manipulating icons under some appropriate set of "world laws", (i.e. the writer's scenario). The icons and the rules would embody his most efficient means to deal with the profound complexity and dangerous urgency of his actual existence and he would be the "hero" of his megacellular fiefdom. This is the sort of thing that I argue for our normal perceptual and conceptual cognitive world. Following Kant, we never see, and have no means of seeing the "pod" in which we live.

HOW IT MIGHT WORK: (RE-USING OUR EVOLUTIONARY ARTIFACTS -AKA "OBJECTS")
 (from Appendix: "[Mind: the Argument from Evolutionary Biology](#)")



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 September, 2008)

II. My SECOND hypothesis starts, not from biology, but from formal logic. Surprisingly it meshes smoothly with my first and confirms it.

How is it possible to "know" *anything*? Leibniz stated the problem as: "how is it possible for 'the one' to know 'the many'?" How could one part of even a *mental* existence, (even a Solipsistic or an Idealist one), know another part? In the terms of modern cognitive science, it translates into "how could there be a 'Cartesian theater'?" (Dennett's term roughly corresponds to the screen which

the homunculus would see.) The answer lies in the *operative* application of the seminal mathematician David Hilbert's "implicit definition".

It is possible for a mathematical system as a whole to actually *know* its objects if and only if those objects are implicitly defined, (i.e. *logically defined*), by the totality of the primitives of the system itself. For our purposes, however, these are taken as explicitly *operative* objects! (Representative objects are not the sort of things that implicit definition deals with!) I want to entice you, (only), with a brief citation on this aspect of my second thesis and let your imagination supply some of the details:

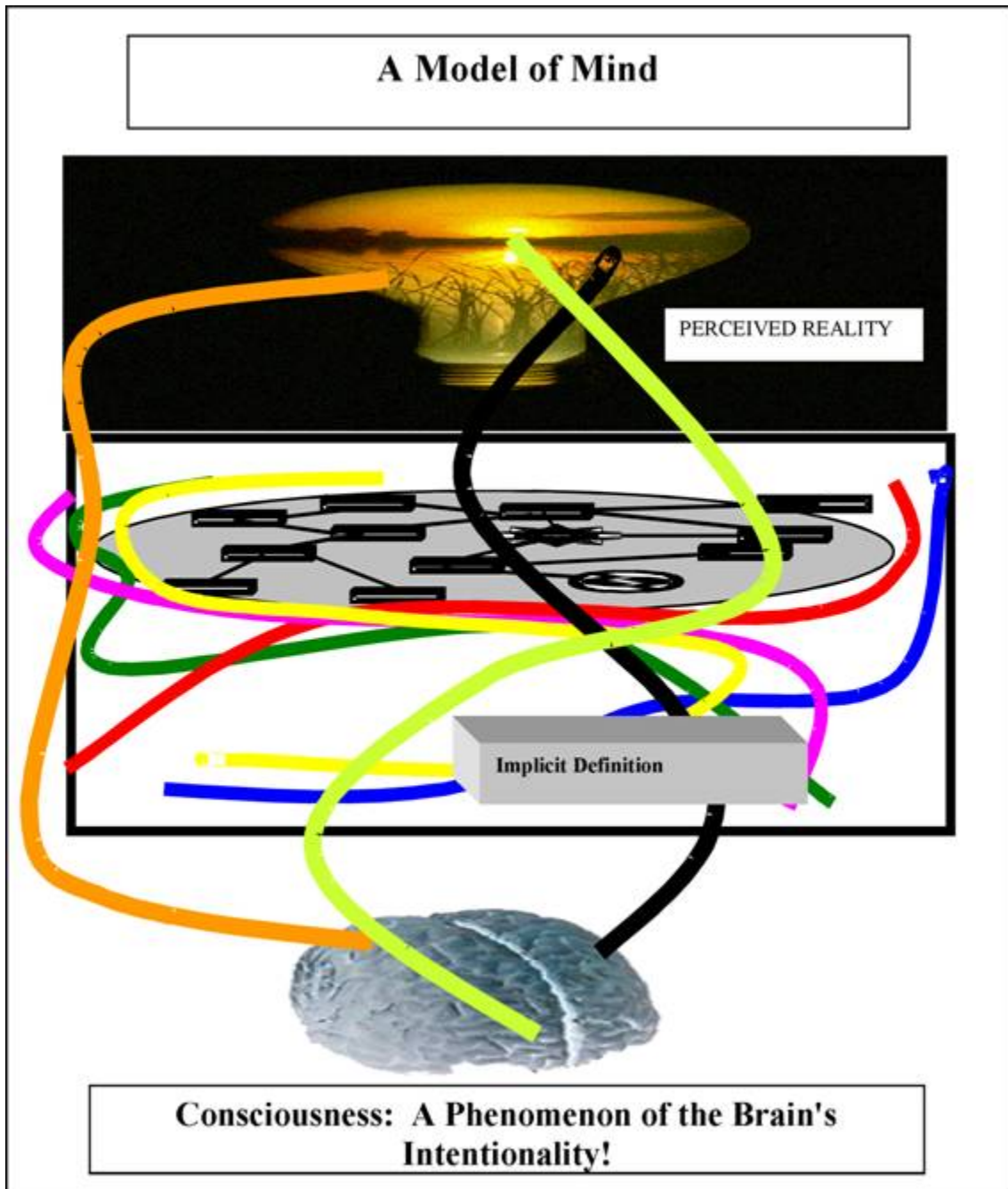
Moritz Schlick, (physicist/philosopher and founder of the famous "Vienna Circle"), grasped the deep implications of Hilbert's innovation:

"[Hilbert's] revolution lay in the stipulation that the basic or primitive concepts are to be defined *just by the fact that they satisfy the axioms....* [They] " *acquire meaning only by virtue of the axiom system, and possess only the content that it bestows upon them. They stand for entities whose whole being is to be bearers of the relations laid down by the system.*", (my emphasis).

Now think about this citation in the context of the Mind-Brain problem. Think about the problem of "knowing"! How can a system know its own "objects"? It can -if those objects are specifically operative objects of the system as a whole itself. Mathematics, (in principle), has *already solved* this key aspect of the mind-brain problem! It is true that "implicit definition" has fallen on hard times, but its replacement, "structuralism", (a dominant philosophy of modern mathematics), seems to inherit most of the desired properties. This is our keyway into Leibniz's problem, into the "Cartesian Theatre", and into the "homunculus". But this solution turns out to be commensurate with my first hypothesis -I call this commensurability "the Concordance".

Ultimately I propose a formal extension to logic derived from mathematical considerations. I propose that the fundamental human logical units are like the axioms of mathematical axiom systems, and that these "axioms" constitute the ultimate rules of thought which *are* capable of "knowing" in just the sense above. (See [Consciousness: A Simpler Approach to the Mind-Brain Problem](#)). They "implicitly define" their objects and *can truly know them* as they are objects (solely), of the system itself. This is an actual solution, (for the very first time), of Leibniz's problem! But, conversely under that same conception, the only objects these brains can truly know are their own specifically *operative* objects -i.e. the objects of the system. As I hope you can see, this conforms very well with my first hypothesis whose only "objects" are again objects of the system. I propose that we identify them with each other, ("the concordance"). Thus the ultimate rule of logic and mind corresponds to the ultimate rule of the brain itself. (See Cassirer on "concept" as a rule.) Logic must be turned around and *itself* be considered as biological! It becomes, instead, the rule of *biological coupling* with environment, (extending Maturana's conception). Logic becomes *bio*-logic. (This thesis defines a theory of meaning as well -the first, I think, with any intuitive support at all -it defines meaning as contextual placement.)

A Biological Model of Mind



(from "[Consciousness: a Simpler Approach to the Mind:Brain Problem](#)")

III. My **THIRD** and final hypothesis is the most crucial one for the existence of the mind. It is also the most conceptually difficult. It involves a deepening and expansion of science itself. Biology, (i.e. the considerations above), forces us there. It focuses on the very relativity of the scientific method. But its

conclusion must lie within science itself, and not in philosophy. I propose an *ultimate* theory of relativity, (grounded in biology), following in the path of Ernst Cassirer's "Philosophy of Symbolic Forms" which is an analysis and confirmation of the *actual basis* of the scientific method. Cassirer's thesis, like Galileo's and Einstein's, is based in the mathematical conception of invariance, (the relativity of measurement while conserving the invariance of relationships). Cassirer's "invariant", however, is the constancy of the phenomena themselves. On the path to this third hypothesis, I examine the same kinds of issues that Kant was forced to deal with. What do we know and what can we know? I arrive at a solution very much like Kant's but radically enlarged through the eyes of Cassirer. In his "[Philosophy of Symbolic Forms](#)", Cassirer argued that all knowledge, and specifically *scientific* knowledge deals not with the knowing of ontology itself, but rather with the purely *internal* organization of experience, (i.e. the phenomena -to include scientific experience). To quote a passage from Heinrich Herz, (cited by Cassirer on the methodology of science -i.e. on its defining of its primitive objects and relations):

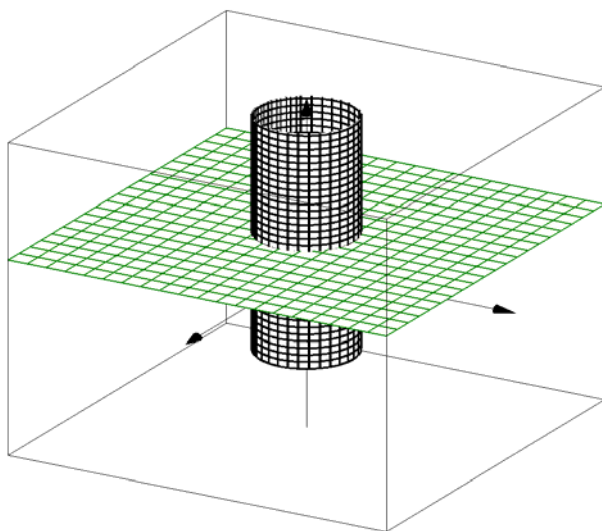
"The images of which we are speaking are our *ideas of things*; they have with things the one essential agreement which lies in the fulfillment of the stated requirement, [of successful consequences], *but further agreement with things is not necessary to their purpose*. Actually we do not know and have no means of finding out whether our ideas of things accord with them in any other respect than in this one fundamental relation." (H. Hertz, "Die Prinzipien der Mechanik", p.1 ff, my emphasis)

What we can know, and *all* that we can ever know are the constant, internal, and unchanging rules which relate one organization of experience with another. (This section of my book also deals with the question of why it is not inherently self-contradictory for my theory to be framed in the terms of ordinary science while at the same time arriving at a conclusion where they are not necessarily, *ontically* true.) Cassirer proposes an absolute *epistemological* relativism stemming from the very methodology of science. He argues that there are *multiple* fundamental (and comprehensive) organizations of reality -even in science itself. The reality of physics, he argues, is not the reality of biology, nor of chemistry. Each "frames its questions differently"! Biology, at least, seems to be reaching the same conclusion. (Maturana, Edelman, Freeman) Biology's *primitive* objects, for Maturana for instance, are "autopoietic entities", "triggering" and "environment"; they are not the "atoms", "quarks" or "superstrings" which are the primitives of physics!

Because there is a *multiplicity* of possible organizations however, (of possible beginnings, accepting Cassirer's thesis), the real world, (ontology itself), cannot ever be known. Because any given scientific explanation involves a unique and distinct private logical framework, (its *particular* laws and presuppositions), it implies that reality in itself, "the thing in itself" *stripped* of that particular logical context becomes "a mere 'X' ", forever beyond our knowing. This is the "ontic indeterminism" I argue, and it leads to a proper solution to the Mind-Brain problem. It opens the possibility of shifting our focus from ordinary logic, ("knowing"), to intentional logic, ("believing", "thinking" -to include scientific beliefs), which is the crux of the problem. This is ontic indeterminism; it is not *strategic* indeterminism.

There is an easier and more intuitive approach to Cassirer's ideas employing the mathematical notion of an "ideal" however. The example given by Birkhoff and Mac Clane, ("A Survey of Modern Algebra"), is clearly directly applicable, (by its substance), to the immediate problem. It illustrates a very different and very concrete notion of "relativism". While encompassing a scope much wider than simple geometry, the example provides a very clear illustration of the concept. The point is that the same object, (here, the physical circle and, in general, phenomena themselves -baseballs, elephants and all the things these things do), can be preserved in a *context-free* setting.

AN ALTERNATIVE APPROACH TO CASSIRER'S IDEAS:

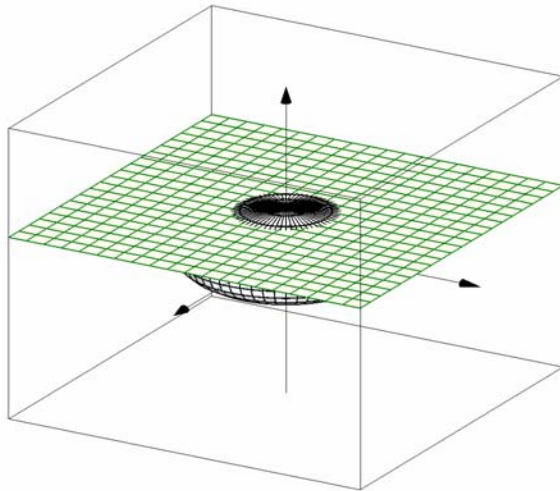


“The circle C of radius 2 lying in the plane parallel to the (x,y) plane and two units above it in space is usually described analytically as the set of points (x,y,z) in space satisfying the simultaneous equations:

$$(16) \quad x^2 + y^2 - 4 = 0, \quad z - 2$$

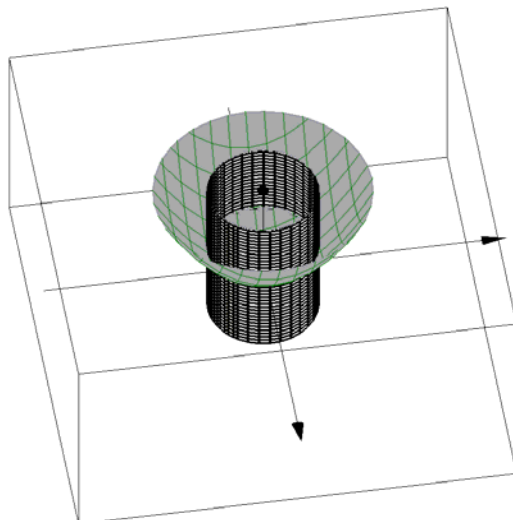
= 0.

These describe the curve C as the intersection of a circular cylinder and a plane.



But C can be described with equal accuracy”, (as well), “as the intersection of a *sphere*”, (my emphasis), “with the plane $z = 2$, by the equivalent simultaneous equations:

$$(17) \quad x^2 + y^2 + z^2 - 8 = 0, \quad z - 2 = 0.$$



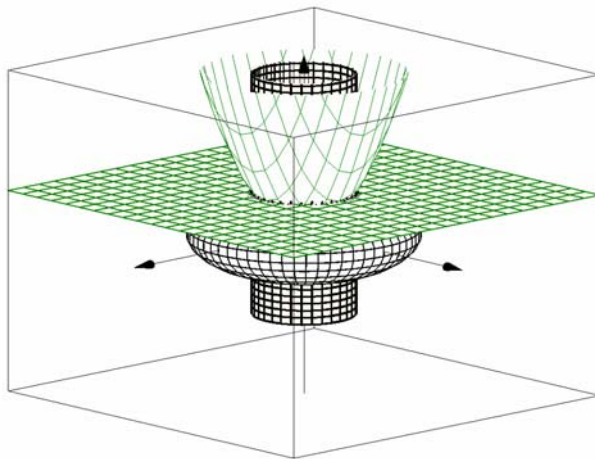
Still another description", (my emphasis), " is possible, by the equations

$$(18) \quad x^2 + y^2 - 4 = 0, \quad x^2 + y^2 - 2z = 0.$$

These describe C as the intersection of a circular cylinder with the paraboloid of rotation:

$$x^2 + y^2 = 2z.$$

Therefore the only *impartial* way to describe C", (my emphasis), " is in terms of *all* the polynomial equations which its points satisfy."



The descriptions above represent just a few of the ways to represent the circle "C" however. But in fact there are an *infinity* of ways to do so!

"But if $f(x,y,z)$ and $g(x,y,z)$ are any two polynomials whose values are identically zero on C, then their sum and difference also vanish identically on C. So, likewise, does any multiple $a(x,y,z)f(x,y,z)$ of $f(x,y,z)$ by *any polynomial $a(x,y,z)$ whatsoever*.", (my emphasis). "This means that the set of all polynomials whose values are identically zero on C is an ideal. This ideal then, and not any special pair of its elements, *is the ultimate description of C*. In the light of this observation the special pairs of polynomials occurring in equations (16)-(18) appear *simply as generators* of the ideal of all polynomials which vanish identically on C. ... ", (my emphases).

hypothesis.! Abstract sets, however, fall naturally within the scope of axiomatics which grounds Cassirer's "Symbolic Forms".

Finally, consider the position of modern physics on the issue of ontology. The noted mathematical physicist Roger Penrose classified theories as "SUPERB", "USEFUL", "TENTATIVE", AND "MISGUIDED", (his CAPS). For instance, he classified the best of the best: Euclidean geometry as SUPERB: ("over a meter's range, ...errors in treating the geometry as Euclidean amounting to less than the diameter of an atom of hydrogen!") Newtonian physics qualified as "SUPERB" as well: ("As applied to the motions of planets and moons, the observed accuracy.. is phenomenal -better than one part in ten million."). Einstein's relativity falls into the same category: ("One of these -the binary pulsar shows Einstein's theory to be accurate to about one part in 10 to the 14th power"). Quantum mechanics is also classified as "SUPERB", but as "having *no known discrepancies*", (at all!), "from experiment!" (Penrose: p152-154, 298)

But consider the viewpoint of the latter that Penrose describes on the issue of ontology. Its perspective is very close to Cassirer's, Freeman's and my own perspective in many details.

"Many physicists, taking their lead from the central figure of Niels Bohr, would say that there is *no* objective picture", (for quantum physics), "at all. Nothing is actually 'out there', at the quantum level. *Somehow, reality emerges only in relation to the results of 'measurements'*. Quantum theory, according to this view, provides merely a calculational procedure, and does not attempt to describe the world as it actually 'is'. This attitude seems to me to be too defeatist, and I shall follow the more positive line which attributes *objective physical reality* to the quantum description: the *quantum state*." (ibid, P.226, his emphases)

But what is a quantum state -what is this "more positive" reality of quantum physics? Quantum states, (psi functions), are the combinations of "square roots of probability functions" spread over the whole of space and time.

"We have seen that all alternatives must somehow be combined together with complex number weightings", (i.e. amplitudes), "like the 'complex square roots' of a probability...This collection of complex weightings describes the quantum state of the particle. ...every *single position* that the particle might have is an 'alternative' available to it. I

am taking the view that view that the *physical reality* of the particle's location is, indeed, its quantum state ψ ." (Pps 240-243)

"There is a very precise equation, the *Schroedinger equation*, which provides a completely deterministic time-evolution for this [quantum] state. But there is something very odd about the relation between the time-evolved quantum state and the actual behavior of the physical world that is observed to take place. From time to time -whenever we consider that a 'measurement' has occurred -we must discard the quantum state that we have been laboriously evolving, and use it only to compute various probabilities that the state will 'jump' to one or another of a set of *new* possible states." (ibid, P.226, his emphases)

It is only "*in relation to the results of 'measurements'*" that concrete reality emerges -i.e. that a specific rendition of space-time is enabled. What a strange conclusion, but it is the conclusion of the deepest part of modern physics on the issue of ontology.

Now consider the very comparable biological picture I have proposed for the human brain -the ontic indeterminacy that Cassirer, Freeman, (with Merleau-Ponty) and I have argued -and look at the strong parallelism between these two perspectives. The existence of "an observer", (more precisely -the results of a measurement), conditions the focus of the ontological objects of quantum theory. So also it is feedback through the sensory loop, (through "the intentional arc" -*in relation to the results of 'measurements' through an observation*), that conditions our perceptual and theoretical reality in response to chaotic input using our evolutionary "objects"/artifacts ", (as proposed in the Appendix to "[Mind: the Argument from Evolutionary Biology](#)"). These two perspectives are strikingly close in import and consequence. Each embodies what Freeman would call "circular causality".

Quoting Freeman:

"To explain how stimuli cause consciousness, we have to explain causality. [But] We can't trace linear causal chains from receptors after the first cortical synapse, so we use circular causality to explain neural pattern formation by self-organizing dynamics. But an aspect [a key aspect] of intentional action is causality, which we extrapolate to material objects in the world." (Freeman, 1999)

"In particular, Maurice Merleau-Ponty in 'The Phenomenology of

Perception' conceived of perception [itself] as the outcome of the 'intentional arc', by which experience derives from the intentional actions of individuals that control sensory input and perception. Action into the world with reaction that changes the self is indivisible in reality, and must be analyzed in terms of "circular causality" as distinct from the linear causality of events as commonly perceived and analyzed in the physical world." W.J. Freeman, 1997

Freeman has proposed that our neural and mental world is intentional. That is, that it is populated with entities of the sort: "I think...", "I believe...", "I want...". But these consist of probabilities. Science, (clearly in the case of quantum mechanics), consists in the establishment of a metric across probabilities as well. Each resolves itself by acting out into the world by way of measurement. How different are these perspectives? Not very, I think.

Penrose says: "The rules of quantum mechanics appear even to insist that cricket balls and elephants ought to behave in this odd way... however we never actually *see* cricket balls or elephants superimposed in this strange way. Why do we not?" (ibid P.236)

I think I can supply the beginnings of an answer from the perspective of biology. Repeating an argument from my paper: "Mind: the Argument from Evolutionary Biology", we presume that our science maps back, (automorphically), onto the very model we visualize. But the path of the automorphism we seek, I propose, lies through the very "gears and levers" of the *original* evolutionarily derived topobiological cognitive model itself, (*re-using its naive "objects"*). Through another iteration -in another re-entrant mapping which supplies the mechanics and transformation, (back into Freeman's non-topological -chaotic- dispersive mapping into the overall brain), it supplies the correlation that we seek. This is why we never see a quantum elephant!

I propose that *reafference* within the loop of brain function combines with input from outside the loop, (passing through the environment), to yield a consistent, compound map which either does, or does not confirm our theoretical constructs, (but necessarily preserving the phenomena). Nowhere does this conception demand the absolute (ontic) reality of our constructs, however. It is just a reuse of our evolutionarily pragmatic (cortical) objects, (like Rosch's prototypes??), saying nothing

whatsoever about the real (external) world in which we live. I believe that our so-called "objects", (our naive physical objects), are evolutionary artifacts which are *re-used*, but existent solely within the brain. They are locked into the perceptual loop, functioning solely to distribute the flow of process within the brain. They moderate perception outside the loop, they do not determine it. Our ontic world is indeterminate!

(As a brief suggestion on another note, consider the problem of why time cannot work backwards? In terms of modern physics, this is a difficult problem. As a lousy *physical* explanation, but a pretty good *biological* one, it is because, (in terms of my diagram), Merleau-Ponty's loop, his "intentional arc" acts in a *counterclockwise* direction and not a clockwise one!)

KNOWING VS BELIEF: WHERE THE ANSWER TO THE PROBLEM OF CONSCIOUSNESS LIES

On the issue of necessary realist *belief*, (which is different from realist *knowledge*), Cassirer believed, as did Kant, that there were two ontological primitives, (primitive assumptions about ontology), in our intentional realist posture. (And these are definitely *scientific premises* -they lie at the core of science itself). These assumptions are: (1) the ontological existence of the outside world, ("substantia phenomena"), and (2) the ontological existence of experience, ("intuition").

I strongly differ. I propose that there is a necessary *third* ontological postulate, (an intentional postulate), to our realism. As realists we must presume the actual ontological existence of some *necessary connection* between these two, and therein lies the key. Cassirer's relativism forbids any specific description of this connection other than a *relativistic* one. I call it, simply, "interface". It is the *substance* of interface, (whatever and however it may be -but we must presume that *it is!*), which supplies the requisite substance of the mind! My third hypothesis is to assume that this interface is *structured* in the same way that I argued previously for my first two hypotheses. Granting this hypothesis, all of the substantive problems of "mind" are solved within my first two theses. "Mind" becomes real. We *are* conscious. We *do* exist. I maintain that all three premises lie at the heart of our realist beliefs, and therefore at the heart of realist science itself. The Mind-Body problem is solved.

From a strictly biological or physical standpoint however, I believe that consciousness is the physical connectivity of the cortex, (i.e. the *organization* of that connectivity). It is the non-hierarchical, dispersive mapping of the cortex described by Freeman viewed through the perspective of Merleau-Ponty. (See "[Mind: the Argument from Evolutionary Biology](#)" -especially "Appendix: Freeman and Automorphism"). Does this physical description describe ontology itself? No, it cannot for the reasons outlined above -it is clearly and necessarily only one of many.

My ultimate conclusion, like Kant's, says that science will never answer the really real question of ontology. That is not the business of science. I argue, as he did, that there is room for faith. Our "realism" is based in intentionality. It is based in belief -and that belief is grounded in its primitive axioms: I propose they are the three I have just named.

But how can I possibly ask you to take such an obvious absurdity seriously? As a movie script it might be plausible, but as a fundamental belief about reality it is quite another matter. You are right, and it is a perfectly reasonable objection. Absurdity is only plausible if it produces profound results. Consider my reasons carefully:

(a). It is exceedingly strong purely as a biological and evolutionary argument -I believe it is the only consistent evolutionary argument for consciousness.

(b). It is sound from an engineering standpoint.

(c). It provides the basis for the first explanation yet put forth and consistent with science, of our normal mental world. No other alternative, (rather than a denial of the problem itself), has yet been proposed to this fundamental aspect, (i.e. the existence of an actual "mind"), of our realist agreement. Under my thesis, there *can* be a "Cartesian theater" – a wholeness and an awareness of experience. (My second hypothesis deals specifically with the logical aspects of the problem.) It solves the homunculus problem as well. (See "[Consciousness: a Simpler Approach to the Mind-Brain Problem](#)"). These are *huge* and necessary aspects of the problem we have set ourselves!

(d). It produces a viable and believable theory of meaning for the first time. Migrating Hilbert's "implicit definition" to a biological, operative setting supplies such a rationale.

(e). There is a long list of other "others", (too long to be listed here), not the least of which is its consistency with the viewpoint of modern physics. But, most of all, I suppose, because it leads to fruitful new perspectives across a myriad of issues -which latter is what we believe our deepest theories must do. It may be absurd, but it is absurd, I argue, in just the same way that modern physics is absurd.

(f) Perhaps most importantly from a pragmatic point of view, it agrees with new and fundamental brain research. This is where its fate will be ultimately decided. Walter Freeman, for instance, argues a very similar case, (as elaborated in the "Mind: the Argument from Evolutionary Biology" paper mentioned above.)

I have concluded, with Walter Freeman, that the essence of mind is ultimately intentional -in reflects organic necessity, not representation. If this is so, then our "knowledge" is really a choice of beliefs. I do not believe that all beliefs are equal however; neither do I believe that there is only one best belief. Materialism has gone too far. It has gone from being the basis of a superb and wonderfully productive theory of science into a "religious" dogma. It purports to *know* reality, not just to explain and predict it. It has been mortally wounded by 20th century science, and, as a dogma, I believe it will finally break itself upon the rock of "mind". We cannot tithe to this church though we must support its good works! I think we need to be realists, but I do not think we need to be dogmatic materialists.

If you would like to examine my ideas further, let me suggest that you begin with my book itself: "[Virtual Reality: Consciousness Really Explained](#)", (or the same in [PDF](#) form), and, if that piques your interest, that you examine the two papers mentioned above, ("[Evolutionary Biology](#)" and "[Consciousness](#)" which are revisions and crucial expansions of chapters one and two of that book.

Conclusion:

In the beginning we started from the necessity of mutual agreement. We had to agree on our basic premises to arrive at common answers. This is actually an instance of Cassirer's epistemological relativism, (his theory of "Symbolic Forms"), in its rawest form. Different premises, even purely scientific ones, lead to different world views. The biological reality of Maturana, (or Edelman or Freeman), is not the same as that of the mathematical physicist. This is where it makes most sense to conceive of axiomatics. Different *fundamental*

assumptions, (axioms), lead to radically different conclusions about the world. But why must we assume that there is a *privileged* set of fundamental assumptions. Without "god-knowledge", (which I don't think anybody would posit for biological organisms), it is not an option. This is where the relativism comes in. We manufacture systems, (of premises), to explain and operate in our reality. Alternative systems explain different aspects of that reality. There is room even for purely ethical and religious perspectives provided they meet the necessary criteria. Must only one of them mirror ontology? Or can we, extending Einstein, (and like Cassirer), conceive a relativity of our very *epistemology itself*?



Dogmatic materialism requires the death of "mind" and "spirit". Thereby it robs ethics, humanism, religion of any real significance. Under its mechanical absolute it does not really matter whether a given mechanistic organism makes "pain noises" or "happy noises". What then is the choice between Dachau and a humanitarian fundraiser? All that remains are relative ethics, relative values and those are as changeable as the wind.

I do not believe in relative ethics, (cultural relativism) -I think it leads nowhere. This is not to say that I believe that each and every, (or *any*), aspect of my particular, culturally influenced views is absolute. Far from it. What I do believe is that there *are* absolutes -inherents of the unique human brain and spirit and that they are ultimately approachable scientifically. If my specific beliefs do not match those findings, then I will have to abandon them.

This is a new world, barely glimpsed and must be the subject of other works. This particular writing has only one thing to say on the subject: there is room for faith. But not all "faiths" are equal.

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