

Preface to Chapter 2: The Logical Problem -and Realism Again

In a problem as complex as this one is and as complex as I propose its solution to be, it will be important to have signposts to look at periodically so that we can orient ourselves. These chapter prefaces are intended to serve as those signposts. So then, where have we gotten to at the end of Chapter 1?

In the first chapter I presented a concrete alternative to the representative model of cognition. It was not really intended to stand alone as an argument however, nor do I really expect anyone to be convinced at this point. (Those arguments are in chapter 3, 4, and 5 and in the Appendices.) Indeed, it goes against almost everything we know or believe and, at first blush, it is absurd. Chapter 1 was intended only to explain and to show a certain plausibility of the theme.

But discursive arguments would not serve *in any case* to change the minds of realists and practical scientists on the issues of our most fundamental paradigm –of our realistic worldview itself. Yet I speak to *none other* than those –realists and practical scientists! Realists question their most fundamental paradigm only when innovative perspectives illuminate vast new areas or simplify whole aspects of important problems leading to pragmatic results –and then only to the extent implicit in the gain. (The theories of Relativity and Quantum Mechanics are profound recent examples of just such a modification of the realist paradigm.) What realists will *never* question however, -nor will I as I stand with them- is *realism itself*.

But what is “realism”? To be a realist, does it mean that we must assume all the baggage that comes with the name at this particular moment in history? Was it not identical, *then*, with the realism of the Ptolemean/Aristotelians who stood against the counter-intuitive theories of Copernicus? Had Dr. Johnson lived then, might he not have kicked the nearest rock, rejoining Copernicus: “*Now it is moving!*”¹ But is it identical, now, with the realism of Pierce’s chalk, which he threatened to drop and break and thereby *prove* its reality? Does realism mean today that, besides an inviolate faith in the *existence* of an absolute ultimate reality, we must assume the possibility of *absolute knowledge* of that (ontic) reality as well –*even at some coarse scale*?

Physicists, (the penultimate realists), have been forced to embrace algorithmicity and epistemological uncertainty at the very small, the very large and the very fast scales. If our *middle scale* objects were taken as the objects of

¹ Johnson, of course, is famous for his demonstrative argument against idealism. He is said to have kicked a rock saying: “I refute it *thus!*”

a *biological* algorithm –prototypes¹ of biological logic² as well, then continuity would be reestablished to epistemology across the board. Was not even fundamental *epistemological* uncertainty, (i.e. the *general* case), as well as *physical* uncertainty *always* a possibility within the basic confines of realism?

Gerald Edelman, (following Putnam and Lakoff), lists the three essential tenets of what he calls “scientific realism”, (Lakoff calls it “basic realism”, Putnam “internal realism”): “(1) a real world (including humans but not depending on them); (2) a linkage between concepts and that world; and (3) a stable knowledge that is gained through that link.”³ The combination of my three themes will confirm Edelman’s first and second postulates,⁴ but the “knowledge” in his (3) will be argued as mathematically and scientifically *relativistic*⁵ in its significance and pragmatic, (i.e. algorithmic), in its justification. In Chapters 3 and 4 I will argue on biological and Kantian grounds for just *two* fundamental “axioms” of realism however: (1) the “axiom of externality”, (Chapter 3), and (2) the “axiom of experience”, (Chapter 4), which roughly correspond to Edelman’s first two requirements. Together they define the absolute minimum and necessity of the realist position. In Chapter 4, I will argue for a rigorous scientific relativism of knowledge in general, a *special kind* of relativism however, based (in seeming contradiction) on an absolute! It is based on an invariant -*the invariant of experience*. Invariants, the mathematical conception of *that which does not change* under varying (relativistic) perspectives, (coordinate systems for instance), are the basis of Einstein’s Special Relativity, of course. The *rigid*, i.e. unvarying and concrete *equations* of that theory supply an explicit illustration of the kind of relativism and stability⁶ I wish to argue, (following but modifying Cassirer), for knowledge in general. It is diametrically opposed to “capricious relativism”, “specious relativism”, “Whorfian relativism”, “cultural relativism”, or the relativism of Solipsism, for instance. Nor is it “idealism”. Anything does *not* go! Knowledge *must* be commensurate with *experience*, (to include the experience of the results of scientific experiment), but its *organization*, its “co-ordinate system”, (of which I argue “objects” are a part), is not innately fixed

¹ Cf Rosch, Lakoff, Edelman

² (process)

³ Edelman 1992, p.230

⁴ I argue that the “linkage” in Edelman’s second postulate is real *but blind* however. Cf Chapters 1, 3, 4, 5 and Appendices A & B.

⁵ see below

⁶ in agreement with Edelman’s third postulate of realism.

thereby. It is experience itself, i.e. *that which must be accounted for*,¹ and not any *particular organization* of that experience which is a necessary (second) *metaphysical*, (i.e. ontological), posit of realism.

Edelman, basing his arguments in Lakoff's, (and, ultimately, Putnam's), argues –as I will argue- against the further extension of the realist position into “metaphysical realism” –against its incorporation of “objectivism”. (I have used the name “Naturalism”):

“objectivism assumes, in addition to scientific realism, that the [actual] world has a definite structure made of entities, properties and their interrelationships....[that] the world is arranged in such a fashion that it can be completely modeled by what mathematicians and logicians would call set-theoretical models. ... Symbols in these models are made meaningful (or given semantic significance) in a unique fashion by assuming that they correspond to entities and categories” [which *themselves* exist] “*in the world*. Ibid, p.231-2, my emphasis

Edelman, like Lakoff and Putnam, argues against this “objectivism” – against a privileged “God's eye view of the world”. His arguments constitute a critique of logic –based in Lakoff's synthesis of extensive empirical studies of *actual* humans, *actual* cultures, and *actual* languages which challenge the classical theory of the category. Thereby they question classical logic, (of which it is the foundation), itself. Edelman's *motivation*, however, derives from his theory of neuronal group selection, (TNGS), -“Neural Darwinism”- wherein he argues that the brain is not informational but “*ex post facto selective*”.² Brains, Edelman argues, are not commensurate between individuals at the finest scale – even between *genetically identical* individuals. They are therefore not the sort of things that information or programs run on. He argues the human genome is *too small* to create such an “information machine”.³ Edelman's arguments are made in support of his theory of “Neural Darwinism”. While it is a very plausible theory, (and the sort of thing my thesis would suggest), it has yet to be confirmed. In chapter 3, I will base my arguments to the same end in Maturana and Varela's. Their arguments are made from the fundamental *principles* of biology, (and physical science in general), however and so carry a greater generality and force.

¹ In the sense of chapter 1 and which I will argue explicitly as the subject of chapter 4. See especially the “King of Petrolia” fable.

² i.e. brains select from pre-existing internal variation on pragmatic rather than informational grounds as the immune system does

³ Edelman, 1992, P. 224. His argument is very similar in form and purpose to my argument of Appendix. A.

In this second chapter I will show that my first thesis, in concert with my extension of Cassirer's logical hypothesis, does accomplish the kind of expansion and illumination –the explanatory power- that realists require to seriously re-examine their premises. For one, it allows a viable and natural theory of meaning for the first time.¹ More significantly it also supplies a *realistically* tenable theory of what, (were the word not pre-empted), I would be tempted to simply label “cognition”. By this I would mean not “performance” or “problem solving”, (in the sense used in Cognitive Science), but *knowing*!² How is it possible *to know*? How is it possible for one part of a physically and temporally separated process, (the process –or material- of the brain for instance), *to know*, (rather than merely interact with³), another part? How would it be possible for one part of even a *mental space* to know *another* part? This is the problem that Leibniz characterized as the problem of “the many and the one”. *How can the many be known to the one*? How can there be knowing without a homunculus? How can there be knowing without *a mystery*? How can there be a “Cartesian Theatre”?⁴ This is the target of Chapter 2.

Meaning

The adoption of my first thesis enables the utilization of perhaps the most profound proposal ever suggested for the problem of meaning: Hilbert's “implicit definition”. (It is very important that this not be confused with mathematical “formalism” –a theory of proof- of which he was also the author.)⁵ Hilbert

¹ Putnam and Lakoff argue against even the *logical consistency* of the standard solution – a truth-functional mapping from a formal system to a model.

² There is, of course, a definitional problem here. “Knowing”, “awareness”, “cognition” +are all often understood as referential, operational, et al. But the *other* sense: i.e. *conscious knowing, conscious awareness, conscious cognition*, is precisely the problem we are here to solve. It does not consist in showing how an automaton, a “zombie”, a Turing machine –or even a biological organism- can be constructed to be indistinguishable from a human respondent. Dennett, and almost every other *realist* writer on the subject, (even Edelman sidesteps the problem), thinks that our ordinary sense of these words is impossible. The “homunculus”, the “color phi”, etc. argue against a “Cartesian theatre”. It is the subject of this chapter to show how just such a “theatre” can be constructed, consistent with scientific logic.

³ “Interaction” is process/doing; it is not “knowing”.

⁴ After Dennett's usage

⁵ This is not a superfluous caution considering, for instance, Lakoff's treatment of formal systems and meaning, (nor Edelman's cavalier dismissal of axiom systems). It is in the assignment of a truth function from a formal system to a model wherein he challenges the logical validity of the objectivist theory of meaning based on Putnam's argument. “Implicit definition” must be strongly distinguished from “formalism” which was conceived by Hilbert

proposed that the “things” of mathematics –*for mathematics*- are solely a function of the laws, (axioms), in which they are framed and that their “meaning” is exactly their role (function) in those laws. Its “objects” are “*implicitly defined*” by its axioms.¹ They are *logical* objects!

My first hypothesis enables Hilbert’s “implicit definition” to function as a *general* theory of meaning however as opposed to its present limited usage as a theory of *specifically mathematical* meaning. If our (human) model is internal and algorithmic rather than referential, (the first hypothesis), if our “objects” are metaphors of process, if even our *very logic* is taken as a biological rule of function vis a vis environment, (as a “constitutive logic” in Kant’s terminology), rather than as transcendent² revelation, (as I will argue in this chapter), then the meaning of its (now) “*bio-logical*” objects may reasonably be understood as their implicitly defined role in that process. (This is the “metaphor” I referred to previously.) This is very close to our ordinary, naïve sense of “meaning”³ and quite different from its proposed formalistic and counterintuitive definition as “reference” or truth functional mapping.

Knowing:

The first hypothesis, in combination with an extension of Cassirer’s logical hypothesis and Hilbert’s mathematical conception, also enables “knowing”. It allows a solution of the problem of the “many in the one” / the “Cartesian Theatre” without magic by extending the very logic within which we conceive it. This is a *logical* problem for which I will propose a concrete logical solution as the subject of this chapter.

Anthropological and Linguistic, and Logical Commensurability

I have mentioned the commensurability of my first hypothesis with existing empirical findings reported by Rosch, Lakoff, et al., and will go into the subject further in the “Afterward: Lakoff, Edelman and Hierarchy”, so I will not belabor

as a theory of *proof*. Implicit definition”, however, was conceived *specifically* as a theory of meaning. It derives instead, I think, from his background as the “king of invariants”. The “things” are the logical invariants of the axioms.

¹ I.e. They are specified from primitive operations rather than from primitive properties.

² In Kant’s sense of the word

³ “Meaning”, normally understood, has to do with connectivity to *other meanings*.

the point. I submit that it is a pretty good fit with the whole of these extensive studies.

Realism Again:

But are the *retrodictive* solutions of these admittedly profound problems sufficient to cause a realist to accept such a distasteful diminution of his supposed powers? My answer, (as I would expect yours to be), is “no”! These kinds of answers –*however good they may be*¹– are at best only hints to the progress of science.² This is why I argue my answer only as a tentative one. It is the *future* of science which will answer this question. It is only in broad new consequences –pragmatic consequences– that a compelling case could be made. But to conceive consequences, we must first entertain the premise.³

As a realist then –talking to other realists–, I ask only that you truly practice your own realism at its strongest. But realism is ruthless. It is concerned, ultimately, only with what works –no matter how painful that may be to our cherished prejudices. I ask that your realism be a ruthless –and honest– one therefore, both for and against my hypothesis!

This next chapter will be difficult and technical. For this, I apologize. It will be necessary to examine the technical foundations of logic itself because the implications of classical logic and its modern embodiment, (taken as a *necessary and sufficient* tool rather than as a special case), force us to abandon an important part of our realism, i.e., *ourselves*, (normally taken)! Formal logic also provides an important and specific clue to the nature of mind itself.

The foundations of logic are also especially relevant to the mind-brain problem because ultimately, (I will argue), logic is itself a biological and evolutionary phenomenon, and not, (following Kant’s usage), “transcendent”. *Logic is not God-given!* I will propose a reformulation of classical logic based in the proposals of Ernst Cassirer who questioned its adequacy and proposed an extension three quarters of a century ago. I will extend Cassirer’s thesis, and then

¹ And I think they are *very* good!

² Conversely, however, these are the kinds of things that we would like any viable theory to explicate. They are strong and viable clues to any *acceptable* theory and no proposed realist theory before this has done other than to deny them.

³ I will discuss this issue further in the “Lakoff/Edelman appendix. My thesis has direct implications for neuroscience, but it also has implications for the foundations of mathematics and logic and thereby for the whole of hard science itself. It challenges the adequacy, (*but not the validity*), of even that lynchpin of modern thought –the mathematical set! In the “Dennett” appendix, I have also sketched what I believe could be the beginnings of a first scientific psychiatry.

marry it to my first, biological hypothesis to arrive at what I propose as an actual solution of the problems of the “homunculus” and the “Cartesian Theatre”, (the problem of “knowing”), a solution absolutely consistent with the dictates of modern biology. My logical answer superficially resembles the conclusions of Edelman and Lakoff, but is of a greater generality and depth. That greater generality will be necessary for the resolution of the obvious epistemological contradictions¹ in which those authors embroil themselves. It is necessary for the resolution of the logical paradoxes of sentience.

Cassirer’s logical thesis was in many respects driven by the same forces as Lakoff’s, but it was a more rigorous, realistically plausible and cogent solution I believe. The problem with Lakoff’s proposed solution² is that concepts/categories³ can be *anything at all!* They are arbitrary and dependent on history. How, then, can a logic, (or a worldview), *based* on categories be formed? Lakoff’s conception is considerably better than this,⁴ I admit, in that it is grounded in empirical considerations –in anthropological and linguistic findings. But at the base –*wherein are we to ground and evaluate these findings?* There is no possibility of a formalism. If *anything* is provable, then it is a triviality that *nothing* is provable! We stand on quicksand.

Cassirer’s extension of the classical concept/category however was grounded firmly in the history of the successful advance of mathematics and physical science but it was *not* arbitrary. He, like Wittgenstein, Lakoff and Edelman, challenged the set-theoretic foundation of logic. He argued that our concepts, (categories), in the most general case –and *especially* in the case of mathematics and science- are *not* grounded in a commonality, (an intersection), of properties of the members. The *concept* of “metal”, he argued for instance, does not *ignore*, (or exclude), the element of “color” even though there is no color *common* to all metals. Even though gold is yellow, and steel is silver and copper, well, “copper-colored”, the *concept* of “metal” does not *exclude* color thereby,

¹ They both emphatically disclaim the possibility of a “God’s eye view” of the world, and then both proceed to supply exactly that –a (sophisticated) “naïve realistic”, (i.e. “objectivist”), answer in a “naïve realistic”, (“objectivist”), world! Both embed their answers precisely inside the *particular* “container” schema! Maturana and Varela encounter the same difficulty.

² Cf Afterword: Lakoff / Edelman

³ I will use these interchangeably

⁴ More accurately, it is based in ICM’s, (“idealized cognitive models”), derived from bodily function. But *all* of these ICM’s are *defined* precisely within the particular “container schema”, (the set-theoretic ICM), of the body in space! It supplies therefore the very “God’s eye view” whose possibility he disclaims. Lakoff’s relativism does not satisfy the paradox he creates. cf “Lakoff/Edelman Appendix”

(as set-theoretic abstraction would suggest), but retains it *as a function*.¹ This function assumes the value yellow for gold, silver for steel, etc. $X(\text{gold}) = \text{yellow}$, $X(\text{steel}) = \text{silver}$. There is, of course, no “metal” *without* a color. The case is identical for conductivity, (Y), specific gravity,(Z), etc. The legitimate concept of “metal” is then *the function*, $M(X,Y,Z,\dots)$. The actual logical and *scientific* concept, (category), in general is then, (Cassirer plausibly argues), a rule of rules, a function of functions which assume definite values and fully encompasses its extension. It is only in the special case, *the limit case* of the concept that the classical definition obtains. That is the case where the rule is specifically “identity”, e.g. the concept of all men whose hair is (=) blond,² or the series, 3,3,3... rather than 2,4,8.... It is the simplest case of the functional rule: where all the elements of a series are the same.

But limit cases in mathematics have a privileged place and a strict rationale. In general, they are not ad hoc definitions or artificial impositions. In general, they are the result of taking a general case at the limit –but only in the special and particular instance where that action results in a plausible and fruitful continuity of concept. (A “circle”, for instance, can be taken as the natural limit case of the “ellipse” -wherein the foci are the same.) The study of limits provides an abundance of examples where that is not the case however.

Usually, (and preferentially), that process results in a quantum *simplification* of the discipline wherein it is adopted. The “zero” case in integer arithmetic, (how “many” is zero, after all?), allows the whole spectrum of the integers, (positive, negative and zero), and the possibility of free computation beyond the simple counting or aggregation of the positive integers. Cassirer’s is alike a natural and plausible extension of classical logic. It retains classical logic as its truly *natural* limit case³ in just this sense of the limit cases of mathematics. It is neither ad hoc nor arbitrary. Cassirer’s general concept/category, (“the functional concept of” [i.e. derived from] “mathematics”), is a function of functions, a rule. I will postulate a further but still natural extension of Cassirer’s logical hypothesis in this chapter: “the Concept, (category), of Implicit Definition”. It too is rule-based, but it is based in the unified rule of an axiom system, (i.e. the conjunction of the axioms). It too is a *lawful* conception.

I will conclude this chapter with an assertion of “concordance” which I argue is the strongest present argument for my hypotheses.⁴ The form of the

¹ defined on a series

² [blond, blond, blond,...]

³ Classical logic represents the special case of a rule of series wherein the rule is identity.

⁴ There are other strong grounds as well. In line with the “productivity requirement” I referred to above, it yields new insights into the foundations of mathematics and logic. These

solution attained by my biological argument for the brain, (chapter 1 and argued in chapter 3 and the appendices), and the form of the solution for mind, (attained independently on purely logical grounds in chapter 2), are *perfectly commensurate*! Mind, I will argue therefore, is the *unified rule* of behavior¹ –but that rule, (as I will argue for my logical hypothesis in this chapter), *knows its “objects”* –they are implicitly defined! Leibniz’s problem is solved.

At this point, (at the conclusion of Chapter 2), I will have satisfied the logical and organizational requirements of mind-brain problem. I will not at that point have provided an answer to the “substance” of mind however. That requirement will be addressed in my third and final hypothesis, the subject of chapters 3, 4 and 5.

As realists, we require an assumption of externality roughly equivalent to Edelman’s first tenet of scientific realism, but as just the *same* sort of realists we require an assumption of self *and knowing* as well. If we kick a stone, (with Johnson), or drop a piece of chalk and expect it to shatter, (with Pierce), we expect to *know* these things. (We also fear the possibility of a broken toe or the inability to continue our lecture!) The *specifically metaphysical*, (ontic), existence of our *experience* is part of that selfsame realist demand. *How else* do we, (as realists), judge the viability of theories of that externality *except by their compliance with experience?*

As a realist, and if a choice were forced between the two, I suppose my tendencies would tend, (barely), toward “externality”. But this is precisely the kind of choice, forced by logic, which would make me, (*also as a realist*), question logic itself. It is probably the *only* situation, moreover, -wherein a *crucial* aspect of our realism is challenged –where such a suggestion would be entertained seriously at all. Discursive arguments, logical antinomies, mathematical anomalies, “cats on mats”², anthropological and linguistic research, ... –all these, (to the extent they are plausible or even compelling), would be, (and have been), walled off and isolated from our basic realism and the logic in which we conceive it. Who *cares* who shaves the hypothetical barber, after all?

The predominant Naturalist school of neuroscience feels that it has been forced to make the very choice I have described –and with very compelling (logical) arguments.³ It feels it must choose between “externality” and self. Best and most frankly framed by Dennett, it concludes that we are physical

are not trivial concerns in light of the acknowledged discordances in set theory and logic. Rosch’s and Lakoff’s empirical findings are a strong fit as well.

¹ In a more general sense, (using the terminology of Maturana), of “ontogenic coupling”

² see Lakoff re: Putnam

³ Cf P.S. Churchland, or Dennett for instance

automatons, “zombies”.¹ But the context –the comprehensive worldview- in which we, (you and I), are right here enmeshed in considering this problem *does not exist* according to Dennett! This “Cartesian theatre” is not a part of these zombies –you or I or Dennett himself. The only place it *might* exist –and Dennett makes explicit mention of the fact- is in logic itself, (in the robot Shakey’s program²). Dennett's worldview which contains his solution to the mind-brain problem does not, (for Dennett), exist *in Dennett!* It exists, (as a particular draft), in the logic of his book! This is *linguistic* idealism.

Naturalists cannot admit even the *possibility* of a “mind”³, (Dennett calls it a “figment”), because they cannot solve the problems of the homunculus and the Cartesian Theatre. Specifically they cannot solve the *logical* problems inherent therein. For there to be a whole, (“a one”), there must be a “little man” inside who sees it as such. But for *him* to see it, there must be *another* little man inside... This infinite regression, and the framing of the problem which generates its necessity –as well as the logical difficulties of the “Cartesian Theatre” are the result of the limitations of the classical, set-theoretic (“container”⁴) logic in which they are conceived. And yet, as I think Dennett conclusively shows, they are the *necessary* result of applying that logic to the mind-brain problem. If, as realists, we accept the adequacy of classical logic, and of the Aristotelian concept/category which is its foundation, then the “self”, and the “experience”, (normally and not behaviorally and mechanistically taken), which are profound parts of our selfsame realism *must die!*

I consider Dennett’s, Churchland’s, ... arguments convincing. In fact, I consider them as conclusive *when taken in conjunction with the classical logic within which they are framed.* But this conclusion was *always* implicit within classical materialism –which I also take very seriously. Simply put, and to repeat myself, there is, (under the presuppositions), no way that *part* of a spatially and temporally separated process –or material- can “know” another part. If ordinary classical logic is definitive, then my form of realism, (ours?), is dead. I choose, however, to question the premise. I, *as a realist*, choose to question logic.

¹ My apologies to Dennett, but, as I reflect in a later footnote, his “unfair to quote this out of context” prohibition does not refute the fact that after several hundred pages, he says just that.

² Cf Dennett 1991, P.130

³ normally taken

⁴ In Lakoff’s terminology, it is a hierarchical “container schema”.