

Review of I Am a Strange Loop by Douglas Hofstadter (2007) (review revised 2019)

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ABSTRACT

Latest Sermon from the Church of Fundamentalist Naturalism by Pastor Hofstadter. Like his much more famous (or infamous for its relentless philosophical errors) work *Gödel, Escher, Bach*, it has a superficial plausibility but if one understands that this is rampant scientism which mixes real scientific issues with philosophical ones (i.e., the only real issues are what language games we ought to play) then almost all its interest disappears. I provide a framework for analysis based in evolutionary psychology and the work of Wittgenstein (since updated in my more recent writings).

Those wishing a comprehensive up to date framework for human behavior from the modern two systems view may consult my book *'The Logical Structure of Philosophy, Psychology, Mind and Language in Ludwig Wittgenstein and John Searle'* 2nd ed (2019). Those interested in more of my writings may see *'Talking Monkeys--Philosophy, Psychology, Science, Religion and Politics on a Doomed Planet--Articles and Reviews 2006-2019'* 3rd ed (2019) and *Suicidal Utopian Delusions in the 21st Century* 4th ed (2019)

"It might justly be asked what importance Gödel's proof has for our work. For a piece of mathematics cannot solve problems of the sort that trouble us. --The answer is that the situation, into which such a proof brings us, is of interest to us. 'What are we to say now?'--That is our theme. However, queer it sounds, my task as far as concerns Gödel's proof seems merely to consist in making clear what such a proposition as: 'Suppose this could be proved' means in mathematics." Wittgenstein *"Remarks on the Foundations of Mathematics"* p337(1956) (written in 1937).

"My theorems only show that the mechanization of mathematics, i.e., the elimination of the mind and of abstract entities, is impossible, if one wants to have a satisfactory foundation and system of mathematics. I have not proved that there are mathematical questions that are undecidable for the human mind, but only that there is no machine (or blind formalism) that can decide all number- theoretic questions, (even of a very special kind) It is not the structure itself of the

deductive systems which is being threatened with a breakdown, but only a certain interpretation of it, namely its interpretation as a blind formalism." Gödel "Collected Works" Vol 5, p 176-177. (2003)

"All inference takes place a priori. The events of the future cannot be inferred from those of the present. Superstition is the belief in the causal nexus. The freedom of the will consists in the fact that future actions cannot be known now. We could only know them if causality were an inner necessity, like that of logical deduction. -- The connexion of knowledge and what is known is that of logical necessity. ("A knows that p is the case" is senseless if p is a tautology.) If from the fact that a proposition is obvious to us, it does not follow that it is true, then obviousness is no justification for belief in its truth." TLP 5.133--5.1363

"Now if it is not the causal connections which we are concerned with, then the activities of the mind lie open before us." Wittgenstein "The Blue Book" p6 (1933)

"We feel that even when all possible scientific questions have been answered, the problems of life remain completely untouched. Of course, there are then no questions left, and this itself is the answer." Wittgenstein TLP 6.52 (1922)

I have read some 50 reviews of this books (that by quantum physicist David Deutsch was perhaps the best) and none of them provide a satisfying framework, so I will try to give novel comments that will be useful, not only for this book but for any book in the behavioral sciences (which can include ANY book, if one grasps the ramifications).

Like his classic Gödel, Escher, Bach: The Eternal Golden Braid, and many of his other writings, this book by Hofstadter (H) tries to find correlations or connections or analogies that shed light on consciousness and all of human experience. As in GEB, he spends a great deal of time explaining and drawing analogies with the famous "incompleteness" theorems of Gödel, the "recursive" art of Escher and the "paradoxes" of language (though, as with most people, he does not see the need to put these terms in quotes, and this is the core of the problem). The idea is that their seemingly bizarre consequences are due to "strange loops" and that such loops are in some way operative in our brain. In particular, they may "give rise" to our self, which he seems roughly to equate with consciousness and thinking. As with everyone, when he starts to talk about how his mind works, he goes seriously astray. I suggest that it is in finding the reasons for this that the interest in this book, and most general commentary on behavior lies.

I will contrast the ideas of ISL with those of the philosopher (descriptive psychologist of higher order thought) Ludwig Wittgenstein (W), whose commentaries on psychology, written from 1912 to 1951, have never been surpassed for their depth and clarity. He is an unacknowledged pioneer in evolutionary psychology (EP) and developer of the modern concept of intentionality. He noted that the fundamental problem in philosophy is that we do not see our automatic innate mental processes and how these generate our language games. He gave many illustrations (one can regard the entire 20,000 pages of his nachlass as an illustration), some of them for words like “is” and “this, and noted that all the really basic issues usually slip by without comment. A major point which he developed was that nearly all of our intentionality (roughly, our evolutionary psychology (EP), rationality or personality) is invisible to us and such parts as enter our consciousness are largely epiphenomenal (i.e., irrelevant to our behavior). The fact that nobody can describe their mental processes in any satisfying way, that this is universal, that these processes are rapid and automatic and very complex, tells us that they are part of the “hidden” cognitive modules (templates or inference engines) that have been gradually fixed in animal DNA over more than 500 million years. Please see my other writings for details.

As in virtually all writing which tries to explain behavior (philosophy, psychology, sociology, anthropology, history, politics, theology, and even, as with H, math and physics), I am a Strange Loop (ISL) commits this kind of error (oblivion to our automaticity) continually and this produces the puzzles which it then tries to solve. The title of ISL comprises words we all know, but as W noted, word uses can be seen as families of language games (grammar) which have many senses (uses or meanings), each with its own contexts. We know what these are in practice but if we try describing them or philosophizing (theorizing) about them, we nearly always go astray and say things that may appear to have sense but lack the context to give them sense.

It never crosses Hofstadter’s mind that both “strange” and “loop” are out of context and lack any clear sense (to say nothing about “I” and “am”!). If you go to Wikipedia, you find many uses (games as W often said) for these words and if you look around in ISL you will find them referred to as if they were all one. Likewise, for “consciousness”, “reality”, “paradox”, “recursive”, “self referential”, etc. So, we are hopelessly adrift from the very first page, as I expected from the title. A loop in a rope can have a very clear sense and likewise a diagram of a steam engine governor feedback loop, but what about loops in mathematics and the mind? H does not see the “strangest loop” of all—that we use our consciousness, self and will to deny themselves!

Regarding Gödel's famous theorems, in what sense can they be loops? What they are almost universally supposed to show is that certain basic kinds of mathematical systems are incomplete in the sense that there are "true" theorems of the system whose "truth" (the unfortunate word mathematicians commonly substitute for validity) or "falsity (invalidity) cannot be proven in the system. Though H does not tell you, these theorems are logically equivalent to Turing's "incompleteness" solution of the famous halting problem for computers performing some arbitrary calculation. He spends a lot of time explaining Gödel's original proof, but fails to mention that others subsequently found vastly shorter and simpler proofs of "incompleteness" in math and proved many related concepts. The one he does briefly mention is that of contemporary mathematician Gregory Chaitin—an originator with Kolmogorov and others of Algorithmic Information Theory-- who has shown that such "incompleteness" or "randomness" (Chaitin's term-- though this is another game), is much more extensive than long thought, but does not tell you that both Gödel's and Turing's results are corollaries to Chaitin's theorem and an instance of "algorithmic randomness". You should refer to Chaitin's more recent writings such as "The Omega Number (2005)", as Hofstadter's only ref. to Chaitin is 20 years old (though Chaitin has no more grasp of the larger issues here --i.e., innate intentionality as the source of the language games in math-- than does H and shares the 'Universe is a Computer' fantasy as well).

Hofstadter takes this "incompleteness" (another word (conceptual) game out of context) to mean that the system is self referential or "loopy" and "strange". It is not made clear why having theorems that seem to be (or are) true (i.e., valid) in the system, but not provable in it, makes it a loop nor why this qualifies as strange nor why this has any relationship to anything else.

It was shown quite convincingly by Wittgenstein in the 1930's (i.e., shortly after Gödel's proof) that the best way to look at this situation is as a typical language game (though a new one for math at the time)—i.e., the "true but unprovable" theorems are "true" in a different sense (since they require new axioms to prove them). They belong to a different system, or as we ought now to say, to a different intentional context. No incompleteness, no loops, no self reference and definitely not strange! W: "Gödel's proposition, which asserts something about itself, does not mention itself" and "Could it be said: Gödel says that one must also be able to trust a mathematical proof when one wants to conceive it practically, as the proof that the propositional pattern can be constructed according to the rules of proof? Or: a mathematical proposition must be capable of being conceived as a proposition of a geometry which is actually applicable to itself. And if one does this it comes out that

in certain cases it is not possible to rely on a proof.” (RFM p336). These remarks barely give a hint at the depth of W’s insights into mathematical intentionality, which began with his first writings in 1912 but was most evident in his writings in the 30’s and 40’s. W is regarded as a difficult and opaque writer due to his aphoristic, telegraphic style and constant jumping about with seldom and notice that he has changed topics, nor indeed what the topic is, but if one starts with his only textbook style work—the Blue and Brown Books –and understands that he is explaining how our evolved higher order thought works, it will all become clear to the persistent.

W lectured on these issues in the 1930’s and this has been documented in several of his books. There are further comments in German in his nachlass (some of it formerly available only on a \$1000 cdrom but now, like nearly all his works, on p2p torrents, libgen.io and b-ok.org. Canadian philosopher Victor Rodych has recently written two articles on W and Gödel in the journal *Erkenntnis* and 4 others on W and math, which I believe constitute a definitive summary of W and the foundations of math. He lays to rest the previously popular notion that W did not understand incompleteness (and much else concerning the psychology of math). In fact, so far as I can see W is one of very few to this day who does (and NOT including Gödel! —though see his penetrating comment quoted above). Related forms of “paradox” which exercise H (and countless others) so much was extensively discussed by W with examples in math and language and seems to me a natural consequence of the piecemeal evolution of our symbolic abilities that extends also to music, art, games etc. Those who wish contrary views will find them everywhere and regarding W and math, they may consult Chihara in *Philosophical Review* V86, p365-81(1977). I have much respect for Chihara (I am one of few who have read his “A Structural Account of Mathematics” cover to cover) but he fails on many basic issues such as W’s explanations of paradoxes as unavoidable and almost always harmless facets of our EP.

Years after I did this original review I wrote one on Yanofsky’s ‘Beyond the Limits of Thought’ and in the next few paragraphs I repeat here the comments on incompleteness I made there. In fact that whole review is relevant, especially the remarks on Wolpert.

Regarding Godel and “incompleteness”, since our psychology as expressed in symbolic systems such as math and language is “random” or “incomplete” and full of tasks or situations (“problems”) that have been proven impossible (i.e., they have no solution-see below) or whose nature is unclear, it seems unavoidable that everything derived from it—e.g. physics and math) will be “incomplete” also. Afai

the first of these in what is now called Social Choice Theory or Decision Theory (which are continuous with the study of logic and reasoning and philosophy) was the famous theorem of Kenneth Arrow over 60 years ago, and there have been many since. Y notes a recent impossibility or incompleteness proof in two-person game theory. In these cases, a proof shows that what looks like a simple choice stated in plain English has no solution.

Although one cannot write a book about everything, I would have liked Yanofsky to at least mention such famous “paradoxes” as Sleeping Beauty (dissolved by Rupert Read), Newcomb’s problem (dissolved by Wolpert) and Doomsday, where what seems to be a very simple problem either has no one clear answer, or it proves exceptionally hard to find one. A mountain of literature exists on Godel’s two “incompleteness” theorems and Chaitin’s more recent work, but I think that W’s writings in the 30’s and 40’s are definitive. Although Shanker, Mancosu, Floyd, Marion, Rodych, Gefwert, Wright and others have done insightful work, it is only recently that W’s uniquely penetrating analysis of the language games being played in mathematics have been clarified by Floyd (e.g., ‘Wittgenstein’s Diagonal Argument—a Variation on Cantor and Turing’), Berto (e.g., ‘Godel’s Paradox and Wittgenstein’s Reasons’, and ‘Wittgenstein on Incompleteness makes Paraconsistent Sense’ and the book ‘There’s Something about Godel’, and Rodych (e.g., ‘Wittgenstein and Godel: the Newly Published Remarks’, ‘Misunderstanding Gödel: New Arguments about Wittgenstein’, ‘New Remarks by Wittgenstein’ and his article in the online Stanford Encyclopedia of Philosophy ‘Wittgenstein’s Philosophy of Mathematics’). Berto is one of the best recent philosophers, and those with time might wish to consult his many other articles and books including the volume he co-edited on paraconsistency (2013). Rodych’s work is indispensable, but only two of a dozen or so papers are free online with the usual search but of course it’s all free online if one knows where to look (e.g., libgen.io and b-ok.org).

Berto notes that W also denied the coherence of metamathematics—i.e., the use by Godel of a metatheorem to prove his theorem, likely accounting for his “notorious” interpretation of Godel’s theorem as a paradox, and if we accept his argument, I think we are forced to deny the intelligibility of metalanguages, metatheories and meta anything else. How can it be that such concepts (words) as metamathematics and incompleteness, accepted by millions (and even claimed by no less than Penrose, Hawking, Dyson et al to reveal fundamental truths about our mind or the universe) are just simple misunderstandings about how language works? Isn’t the proof in this pudding that, like so many “revelatory” philosophical notions (e.g., mind and will as illusions –Dennett, Carruthers, the Churchlands etc.), they have no practical impact whatsoever? Berto sums it up nicely: “Within this framework,

it is not possible that the very same sentence...turns out to be expressible, but undecidable, in a formal system... and demonstrably true (under the aforementioned consistency hypothesis) in a different system (the meta-system). If, as Wittgenstein maintained, the proof establishes the very meaning of the proved sentence, then it is not possible for the same sentence (that is, for a sentence with the same meaning) to be undecidable in a formal system, but decided in a different system (the meta-system) ... Wittgenstein had to reject both the idea that a formal system can be syntactically incomplete, and the Platonic consequence that no formal system proving only arithmetical truths can prove all arithmetical truths. If proofs establish the meaning of arithmetical sentences, then there cannot be incomplete systems, just as there cannot be incomplete meanings." And further "Inconsistent arithmetics, i.e., nonclassical arithmetics based on a paraconsistent logic, are nowadays a reality. What is more important, the theoretical features of such theories match precisely with some of the aforementioned Wittgensteinian intuitions... Their inconsistency allows them also to escape from Godel's First Theorem, and from Church's undecidability result: they are, that is, demonstrably complete and decidable. They therefore fulfil precisely Wittgenstein's request, according to which there cannot be mathematical problems that can be meaningfully formulated within the system, but which the rules of the system cannot decide. Hence, the decidability of paraconsistent arithmetics harmonizes with an opinion Wittgenstein maintained throughout his philosophical career."

W also demonstrated the fatal error in regarding mathematics or language or our behavior in general as a unitary coherent logical 'system,' rather than as a motley of pieces assembled by the random processes of natural selection. "Godel shows us an unclarity in the concept of 'mathematics', which is indicated by the fact that mathematics is taken to be a system" and we can say (contra nearly everyone) that is all that Godel and Chaitin show. W commented many times that 'truth' in math means axioms or the theorems derived from axioms, and 'false' means that one made a mistake in using the definitions, and this is utterly different from empirical matters where one applies a test. W often noted that to be acceptable as mathematics in the usual sense, it must be useable in other proofs and it must have real world applications, but neither is the case with Godel's Incompleteness. Since it cannot be proved in a consistent system (here Peano Arithmetic but a much wider arena for Chaitin), it cannot be used in proofs and, unlike all the 'rest' of PA it cannot be used in the real world either. As Rodych notes "...Wittgenstein holds that a formal calculus is only a mathematical calculus (i.e., a mathematical language-game) if it has an extra-systemic application in a system of contingent propositions (e.g., in ordinary counting and measuring or in physics) ...". Another way to say this is that one needs a warrant to apply our normal use of words like 'proof', 'proposition',

‘true’, ‘incomplete’, ‘number’, and ‘mathematics’ to a result in the tangle of games created with ‘numbers’ and ‘plus’ and ‘minus’ signs etc., and with ‘Incompleteness’ this warrant is lacking. Rodych sums it up admirably. “On Wittgenstein’s account, there is no such thing as an incomplete mathematical calculus because ‘in mathematics, everything is algorithm [and syntax] and nothing is meaning [semantics]...”

W has much the same to say of Cantor’s diagonalization and set theory. “Consideration of the diagonal procedure shews you that the concept of ‘real number’ has much less analogy with the concept ‘cardinal number’ than we, being misled by certain analogies, are inclined to believe” and many other comments (see Rodych and Floyd).

In any case, it would seem that the fact that Gödel’s result has had zero impact on math (except to stop people from trying to prove completeness!) should have alerted H to its triviality and the “strangeness” of trying to make it a basis for anything. I suggest that it be regarded as another conceptual game that shows us the boundaries of our psychology. Of course, all of math, physics, and human behavior can usefully be taken this way.

While on the topic of W, we should note that another work which H spends a lot of time on is Whitehead and Russell’s classic of mathematical logic “Principia Mathematica”, primarily since it was at least partly responsible for Gödel’s work leading to his theorems. W had gone from Russell’s beginning logic student to his teacher in about a year, and Russell had picked him to rewrite the Principia. But W had major misgivings about the whole project (and all of philosophy as it turned out) and, when he returned to philosophy in the 30’s, he showed that the idea of founding math (or rationality) on logic was a profound mistake. W is one of the world’s most famous philosophers and made extensive commentaries on Gödel and the foundations of mathematics and the mind; is a pioneer in EP (though nobody seems to realize this); the discoverer of the basic outline and functioning of higher order thought and much else, and it is amazing that Dennett & H, after half a century of study, are completely oblivious to the thoughts of the greatest intuitive psychologist of all time (though they have almost 8 billion for company). There is, as some have remarked, a collective amnesia regarding W not only in psychology (for which his works should be in universal service as texts and lab manuals) but in all the behavioral sciences including, amazingly, philosophy.

H’s association with Daniel Dennett (D), another famously confused writer on the mind, has certainly done nothing to help him learn new perspectives in the nearly

30 years since GEB. In spite of the fact that D has written a book on intentionality (a field which, in its modern version, was essentially created by W), H seems to have no acquaintance with it at all. Perceptions leading to memories, feeding into dispositions (inclinations)(W's terms, also used by Searle, but called "propositional attitudes by others) such as believing and supposing, which are not mental states and have no precise duration etc/, are momentous advances in understanding how our mind works, which W discovered in the 20's, but with threads going back to his writings before the first worldwar.

The Eternal Golden Braid is not realized by H to be our innate Evolutionary Psychology, now, 150 years later (i.e., since Darwin), becoming a burgeoning field that is fusing psychology, cognitive science, economics, sociology, anthropology, political science, religion, music (e.g., G. Mazzola's "The Topos of Music" —topos are substitutes for sets, one of the great science (psychology) books of the 21st century, though he is clueless about W and most of the points in this review), art, math, physics and literature. H has ignored or rejected many persons one might regard as our greatest teachers in the realm of the mind—W, Buddha, John Lilly, John Searle, Osho, Adi Da (see his "The Knee of Listening"), Alexander Shulgin and countless others. The vast majority of the insights from philosophy, as well as those from quantum physics, probability, meditation, EP, cognitive psychology and psychedelics do not rate even a passing reference here (nor in most philosophical writings of scientists).

Though there are some good books in his bibliography, there are many I would regard as standard references and hundreds of major works in cognitive science, EP, math and probability, and philosophy of mind and science that are not there (nor in his other writings). His sniping at Searle is petty and pointless—the frustration of someone who has no grasp of the real issues. In my estimation, neither H nor anyone else has provided a convincing reason to reject the Chinese room argument (the most famous article in this field) that computers don't think (NOT that they cannot ever do something that we might want to call thinking— which Searle admits is possible). And Searle has (in my view) organized and extended W's work in books such as "The Construction of Social Reality" and "Rationality in Action"— brilliant summations of the organization of HOT (higher order thought— i.e., intentionality)—rare philosophy books you can even make perfect sense of once you translate a little jargon into English! H, D and countless others in cognitive science and AI are incensed with Searle because he had the temerity to challenge (destroy- I would say) their core philosophy —the Computational Theory of Mind (CTM) almost 30 years ago and continues to point this out (though one can say that W destroyed it before it existed). Of course, they (nearly) all reject the Chinese room

or simply ignore it, but the argument is, in the view of many, unanswerable. The recent article by Shani (Minds and Machines V15, p207- 228(2005)) is a nice summary of the situation with references to the excellent work of Bickhard on this issue. Bickhard has also developed a seemingly more realistic theory of mind that uses nonequilibrium thermodynamics, in place of Hofstadter's concepts of intentional psychology used outside the contexts necessary to give them sense.

Few realize that W again anticipated everyone on these issues with numerous comments on what we now call CTM, AI or machine intelligence, and even did thought experiments with persons doing "translations" into Chinese. I had noticed this (and countless other close parallels with Searle's work) when I came upon Diane Proudfoot's paper on W and the Chinese Room in the book "Views into the Chinese Room" (2005). One can also find many gems related to these issues in Cora Diamond's edition of the notes taken in W's early lectures on math "Wittgenstein's Lectures on the Foundations of Mathematics, Cambridge 1934(1976). W's own "Remarks on the Foundations of Mathematics" covers similar ground. One of the very few who has surveyed W's views on this in detail is Christopher Gewert, whose excellent pioneering book "Wittgenstein on Minds, Machines and Mathematics" (1995), is almost universally ignored. Though he was writing before there was any serious thought concerning electronic computers or robots, W realized that the basic issue here is very simple---computers lack a psychology (and even 70 years later we have barely a clue how to give them one), and it is only in the context of a being with a fully developed intentionality that dispositional terms like thinking, believing etc. make sense (have a meaning or clear COS), and as usual he summed it all up in his unique aphoristic way "But a machine surely cannot think! --Is that an empirical statement? No. We only say of a human being and what is like one that it thinks. We also say it of dolls and no doubt of spirits too. Look at the word "to think" as a tool." (Philosophical Investigations p113). Out of context, many of W's comments may appear insipid or just wrong, but the perspicacious will find that they usually repay prolonged reflection—he was nobody's fool.

Hofstadter, in all his writings, follows the common trend and makes much of "paradoxes", which he regards as self references, recursions or loops, but there are many "inconsistencies" in intentional psychology (math, language, perception, art etc.) and they have no effect, as our psychology evolved to ignore them. Thus, "paradoxes" such as "this sentence is false" only tell us that "this" does not refer to itself or if you prefer that this is one of infinitely many arrangements of words lacking a clear sense. Any symbolic system we have (i.e., language, math, art, music, games etc.) will always have areas of conflict, insoluble or counterintuitive problems or unclear definitions. Hence, we have Gödel's theorems, the liar's

paradox, inconsistencies in set theory, prisoner's dilemmas, Schrodinger's dead/live cat, Newcomb's problem, Anthropic principles, Bayesian statistics, notes you can't sound together or colors you can't mix together and rules that can't be used in the same game. A set of subindustries within Decision Theory, Behavioral Economics, Game Theory, Philosophy, Psychology and Sociology, Law, Political Science etc. and even the Foundations of Physics and Math (where it is commonly disguised as Philosophy of Science) has arisen which deals with endless variations on "real" (e.g., quantum mechanics) or contrived ((e.g., Newcomb's problem—see Analysis V64, p187- 89(2004)) situations where our psychology –evolved only to get food, find mates and avoid becoming lunch—gives ambivalent results, or just breaks down.

Virtually none of those writing the hundreds of articles and countless books on these issues which appear yearly seem aware they are studying the limits of our innate psychology and that Wittgenstein usually anticipated them by over half a century. Typically, he took the issue of paradox to the limit, pointing to the common occurrence of paradox in our thinking, and insisted that even inconsistencies were not a problem (though Turing, attending his classes, disagreed), and predicted the appearance of inconsistent logical systems. Decades later, dialetheic logics were invented and Priest in his recent book on them has called W's views prescient. If you want a good recent review of some of the many types of language paradoxes (though with no awareness that W pioneered this in the 1930's and largely innocent of any grasp of intentional context) see Rosenkranz and Sarkohi's "Platitudes Against Paradox" in *Erkenntnis* V65, p319-41(2006). Appearance of many W related articles in this journal is most appropriate as it was founded in the 30's by logical positivists whose bible was W's *Tractus Logico Philosophicus*. Of course, there is also a journal devoted to W and named after his most famous work—"Philosophical Investigations".

H, in line with nearly universal practice, refers often to our "beliefs" for "explanations" of behavior, but our shared psychology does not rest on belief—we just have awareness and pains and know from infancy that animals are conscious, self-propelled agents that are different from trees and rocks. Our mother does not teach us that any more than a dog's mother does and could not teach us! And, if this is something we learn, then we might teach a child (or a dog) that a bird and a rock are really the same kind of thing (i.e., to ignore innate intentional psychology).

W clearly and repeatedly noted the underdetermination of all our concepts (e.g., see his comments on addition and the completion of series in *Remarks on the Foundations of Mathematics*), which mandated their becoming innate (ie, evolution

had to solve this problem by sacrificing countless quadrillions of creatures whose genes did not make the right choices).

Nowadays this is commonly called the problem of combinatorial explosion and often pointed to by evolutionary psychologists as compelling evidence for innateness, unaware that W anticipated them by over 50 years.

Our innate psychology does not rest on “beliefs” when it is clearly not subject to test or doubt or revision (e.g., try to give a sense to “I believe I am reading this review” and mean (i.e., find a real use in our normal life for) something different from “I am reading this review”). Yes, there are always derivative uses of any sentence including this one, but these are parasitic on the normal use. Before any “explanations” (really just clear descriptions, as W noted) are possible, it has to be clear that the origins of our behavior lie in the axioms of our innate psychology, which are the basis for all understanding, and that philosophy, math, literature, science, and society are their cultural extensions.

Dennett (and anyone who is tempted to follow him—i.e., everyone) is forced into even more bizarre claims by his skepticism (for I claim it is a thinly veiled secret of all reductionists that they are skeptics at heart—i.e., they must deny the “reality” of everything). In his book “The Intentional Stance” and other writings he tries to eliminate this bothersome psychology that puts animals in a different class from computers and the ‘physical universe’ by including our innate evolved intentionality with the derived intentionality of our cultural creations (i.e., thermometers, pc’s and airplanes) by noting that it’s our genes, and so ultimately nature (i.e., the universe), and not we that “really” has intentionality, and so it’s all “derived”. Clearly something is gravely amiss here! One thinks immediately that it must then also be true that since nature and genes produce our physiology, there must be no substantive difference between our heart and an artificial one we make from plastic. For the grandest reductionist comedy in recent years see Wolfram’s “A New Kind of Science” which shows us how the universe and all its processes and objects are really just “computers” and “computation” (which he does not realize are intentional concepts having no meaning apart from our psychology and that he has NO TEST to distinguish a computation from a noncomputation—i.e., he eliminates psychology by definition).

One sees that Dennett does not grasp the basic issues of intentionality by the title of his book. Our psychology is not a stance or attribution or posit about ourself, or other being’s mental lives, any more than it’s a “stance” that they possess bodies. A young child or a dog does not guess or suppose and does not and could not learn

that people and animals are agents with minds and desires and that they are fundamentally different from trees and rocks and lakes. They know (live) these concepts (shared psychology) from birth and if they weaken, death or madness supervene.

This brings us again to W who saw that reductionist attempts to base understanding on logic or math or physics were incoherent. We can only see from the standpoint of our innate psychology, of which they are all extensions. Our psychology is arbitrary only in the sense that one can imagine ways in which it might be different, and this is the point of W inventing odd examples of language games (i.e., alternative concepts (grammars) or forms of life). In doing so, we see the boundaries of our psychology. The best discussion I have seen on W's imaginary scenarios is that of Andrew Peach in PI 24: p299-327(2004).

It seems to me that W was the first one to understand in detail (with due respects to Kant) that our life is based on our evolved psychology, which cannot be challenged without losing meaning. If one denies the axioms of math, one cannot play the game. One can place a question mark after every axiom and every theorem derived from them but what is the point? Philosophers, theologians and the common person can play at this game as long as they don't take it seriously. Injury, death, jail or madness will come quickly to those who do. Try to deny that you are reading this page or that these are your two hands or there is a world outside your window. The attempt to enter into a conceptual game in which these things can be doubted presupposes the game of knowing them—and there cannot be a test for the axioms of our psychology—any more than for those of math (derived, as W showed, from our intuitive concepts) --they just are what they are. In order to jump there must be some place to stand. This is the most basic fact of existence, and yet, it is a remarkable consequence of our psychology being automated that it is the hardest thing for us to see.

It is an amusing sight indeed to watch people (everyone, not just philosophers) trying to use their intuitive psychology (the only tool we have) to break out of the bounds of our intuitive psychology. How is this going to be possible? How will we find some vantage point that lets us see our mind at work and by what test will we know we have it? We think that if we just think hard enough or acquire enough facts we can get a view of "reality" that others do not have. But there is good reason to think that such attempts are incoherent and only take us further away from clarity and sanity. W said many times in many ways that we must overcome this craving for "clarity", the idea of thought underlaid by "crystalline logic", the discovery of which will "explain" our behavior and our world and change our view

of what it is to be human.

"The more narrowly we examine actual language, the sharper becomes the conflict between it and our requirement. (For the crystalline purity of logic was, of course, not a result of investigation: it was a requirement.)" PI 107

On his return to philosophy in 1930 he said:

"The wrong conception which I want to object to in this connexion is the following, that we can discover something wholly new. That is a mistake. The truth of the matter is that we have already got everything, and that we have got it actually present; we need not wait for anything. We make our moves in the realm of the grammar of our ordinary language, and this grammar is already there. Thus, we have already got everything and need not wait for the future." (Waismann "Ludwig Wittgenstein and the Vienna Circle (1979) p183 and in his Zettel P 312-314

"Here we come up against a remarkable and characteristic phenomenon in philosophical investigation: the difficulty---I might say---is not that of finding the solution but rather that of recognizing as the solution something that looks as if it were only a preliminary to it. 'We have already said everything. ---Not anything that follows from this, no this itself is the solution!'"

"This is connected, I believe, with our wrongly expecting an explanation, whereas the solution of the difficulty is a description, if we give it the right place in our considerations. If we dwell upon it, and do not try to get beyond it."

Some might also find it useful to read "Why there is no deductive logic of practical reason" in Searle's superb "Rationality in Action" (2001). Just substitute his infelicitous phrases "impose conditions of satisfaction on conditions of satisfaction" by "relate mental states to the world by moving muscles" —i.e., talking, writing and doing, and his "mind to world" and "world to mind directions of fit" by "cause originates in the world" and "cause originates in the mind".

Another basic flaw in H (and throughout scientific discourse, which includes philosophy, since it is armchair psychology) concerns the notions of explanations or causes. We have few problems understanding how these concepts work in their normal contexts, but philosophy is not a normal context. They are just other families of concepts (often called grammar or language games by W and roughly equivalent to cognitive modules, inference engines, templates or algorithms) comprising our EP (roughly, our intentionality) but, out of context, we feel compelled to project

them onto the world and see “cause” as a universal law of nature that determines events. As W said, we need to recognize clear descriptions as answers which terminate the search for ultimate “explanations”.

This gets us back to my comment on WHY people go astray when they try to “explain” things. Again, this connects intimately with judgements, decision theory, subjective probability, logic, quantum mechanics, uncertainty, information theory, Bayesian reasoning, the Wason test, the Anthropic principle ((Bostrum “The Anthropic Principle” (2002)) and behavioral economics, to name a few. There is no space here to get into this rat’s nest of tightly linked aspects of our innate psychology, but one might recall that even in his pre-Tractatus writings, Wittgenstein commented that the idea of causal necessity is not *a* superstition but the *source* of superstition. I suggest that this seemingly trite remark is one of his most profound –W was not given to platitude nor to carelessness. What is the “cause” of the Big Bang or an electron being at a particular “place” or of “randomness” or chaos or the “law” of gravitation? But there are descriptions which can serve as answers. Thus, H feels all actions must be caused and “material” and so, with his pal D and the merry band of reductionist materialists, denies will, self and consciousness. D denies that he denies them, but the facts speak for themselves. His book “Consciousness Explained” is commonly referred to as “Consciousness Denied” and was famously reviewed by Searle as “Consciousness Explained Away”.

This is especially odd in H’s case as he started out a physicist and his father won the Nobel prize in physics, so one might think he would be aware of the famous papers of Einstein, Podolsky and Rosen and of von Neumann in the 20’s and 30’s, in which they explained how quantum mechanics did not make sense without human consciousness (and a digital abstraction won’t do at all). In this same period others including Jeffreys and de Finetti showed that probability only made sense as a subjective (i.e., psychological) method and Wittgenstein’s close friends John Maynard Keynes and Frank Ramsey first clearly equated logic with rationality, and Popper and others noted the equivalence of logic and probability and their common roots in rationality. There is a vast literature on interrelationships of these disciplines and the gradual growth of understanding that they are all facets of our innate psychology. Those interested might start with Ton Sales article in the Handbook of Philosophical Logic 2nd Ed. Vol 9 (2002) since it will also introduce them to this excellent source, now extending to about 20 Volumes (all on p2p libgen.io and b-ok.org).

Ramsey was one of the few of his time who was capable of understanding W’s ideas

and in his seminal papers of 1925-26 not only developed Keynes' pioneering ideas on subjective probability, but also extended W's ideas from the *Tractatus* and conversations and letters into the first formal statement of what later became known as substitutional semantics or the substitutional interpretation of logical quantifiers. (See Leblanc's article in *Handbook of Philosophical Logic* 2nd Ed. V2, p53-131(2002)). Ramsey's premature death, like those of W, Von Neumann and Turing, were great tragedies, as each of them alone and certainly together would have altered the intellectual climate of the 20th century to an even greater degree. Had they lived, they might well have collaborated but as it was, only W realized he was discovering facets of our innate psychology. W and Turing were both Cambridge professors teaching classes on the Foundations of Mathematics—though W from the position that it rested on unstated axioms of our innate psychology and Turing from the conventional view that it was a matter of logic that stood by itself. Had these two homosexual geniuses become intimately involved, amazing things might have ensued.

I think everyone has these “deflationary” reductionist tendencies, so I suggest this is due to the defaults of intuitive psychology modules which are biased to assigning causes in terms of properties of objects, and cultural phenomena we can see and to our need for generality. Our inference engines compulsively classify and seek the source of all phenomena. When we look for causes or explanations, we are inclined to look outward and take the third person point of view, for which we have empirical tests or criteria, ignoring the automatic invisible workings of our own mind, for which we do not have such tests (another arena pioneered by W some 75 years ago). As noted here, one of W's takes on this universal “philosophical” problem was that we lack the ability to recognize our normal intuitive explanations as the limits of our understanding, confusing the untestable and unchallengeable axioms of our System 1 psychology with facts of the world which we can investigate, dissect and explain via System 2. This does not deny science, only the notion that it will provide the “true” and “real” meaning of “reality”.

There is a vast literature on causes and explanations so I will only refer to Jeffrey Hershfield's excellent article “Cognitivism and Explanatory Relativity” in *Canadian J. of Philosophy* V28 p505-26(1998) and to Garfinkel's book “Forms of Explanation” (1981). This literature is rapidly fusing with those on epistemology, probability, logic, game theory, behavioral economics, and the philosophy of science, which seem almost completely unknown to H. Out of the hundreds of recent books and thousands of articles, one can start on this with Nancy Cartwright's books, which provide a partial antidote to the “Physics and Math Rule the Universe” delusion. Or, one can just follow the links between rationality, causality, probability,

information, laws of nature, quantum mechanics, determinism, etc. in Wikipedia and the online Stanford Encyclopedia of Philosophy, for decades (or, with W's comments in mind, maybe only days) before one realizes he got it right and that we do not get clearer about our psychological "reality" by studying nature. One way to look at ISL is that its faults remind us that scientific laws and explanations are frail and ambiguous extensions of our innate psychology and not, as H would have it, the reverse.

It is a curious and rarely noticed fact that the severe reductionists first deny psychology, but, in order to account for it (since there is clearly something that generates our mental and social life), they are forced into camp with the blank slaters (all of us before we get educated), who ascribe psychology to culture or to very general aspects of our intelligence (i.e., our intentionality is learned) as opposed to an innate set of functions. H and D say that self, consciousness, will, etc. are illusions—merely "abstract patterns" (the "spirit" or "soul" of the Church of Fundamentalist Naturalism). They believe that our "program" can be digitized and put into computers, which thereby acquire psychology, and that "believing" in "mental phenomena" is just like believing in magic (but our psychology is not composed of beliefs—which are only its extensions-- and nature is magical). I suggest it is critical to see why they never consider that "patterns" (another lovely language game!) in computers are magical or illusory. And, even if we allow that the reductionist program is really coherent and not circular (e.g., we are too polite to point out—as do W and Searle and many others—that it has NO TEST for it's most critical assertions and requires the NORMAL functioning of will, self, reality, consciousness etc., to be understood), can we not reasonably say "well Doug and Dan, a rose by any other name smells as sweet!" I don't think reductionists see that even were it true that we could put our mental life in algorithms running in silicon (or—in Searle's famous example—in a stack of beer cans), we still have the same "hard problem of consciousness": how do mental phenomena emerge from brute matter? Nearly always overlooked is that one could regard the existence of everything as a 'hard problem'. This would add yet another mystery with no obvious way to recognize an answer— what does it mean (why is it possible) to encode "emergent properties" as "algorithms"? If we can make sense out of the idea that the mind or the universe is a computer (i.e., can say clearly what counts for and against the idea), what will follow if it is or it isn't?

"Computational" is one of the major buzzwords of modern science, but few stop to think what it really means. It's a classic Wittgensteinian language game or family of concepts (uses) that have little or nothing in common. There are analog and digital computers, some made of blocks or mechanical gears only (Babbage etc.), we

compute by hand (as is well known, Turing's first comments on this referred to humans who computed and only later did he think of machines simulating this), and physicists speak of leaves computing "their" trajectory as they fall from the tree, etc. etc. Each game has its own use (meaning) but we are hypnotized by the word into ignoring these. W has analyzed word games (psychological modules) with unsurpassed depth and clarity (see esp. the long discussion of knowing how to continue a calculation in the Brown Book), understanding of which should put an end to the superstitious awe which generally surrounds this word and all words, thoughts, feelings, intuitions etc.

It's dripping with irony that D wrote a book on the EP of religion, but he cannot see his own materialism as a religion (i.e., it's likewise due to innate conceptual biases). Timothy O'Connor has written (*Metaphilosophy* V36, p436- 448 (2005)) a superb article on D's Fundamentalist Naturalism (though he does not really get all the way to the EP point of view I take here), noting that simply accepting the emergence of intentionality is the most reasonable view to take. But pastors D and H read from the Churchland's books and the other bibles of CTM (Computational Theory of Mind) and exhort one and all to recognize their pc's and toaster ovens as sentient beings (or at least they soon will be). Pastor Kurzweil does likewise, but few attend his sermons as he has filled the pews with pc's having voice recognition and speech systems and their chorus of identical synthetic voices shout "Blessed be Turing" after every sentence. See my review of his book "Will Hominoids or Androids Destroy the Earth? — A Review of How to Create a Mind" by Ray Kurzweil (2012) in the next section.

Emergence of "higher order properties" from "inert matter" (more language games!) is indeed baffling, but it applies to everything in the universe, and not just to psychology. Our brains had no reason (i.e., there are no selective forces operative) to evolve an advanced level of understanding of themselves or the universe, and it would be too genetically costly to do so. What selective advantage could there have been in seeing our own thought processes? The brain, like the heart, was selected to function rapidly and automatically and only a minute part of its operations are available to awareness and subject to conscious control. Many think there is no possibility of an "ultimate understanding" and W tells us this idea is nonsense (and if not, then what test will tell us that we have reached it)?

Perhaps the last word belongs to Wittgenstein. Though his ideas changed greatly, there are many indications that he grasped the essentials of his mature philosophy in his earliest musings and the *Tractatus* can be regarded as the most powerful statement of reductionist metaphysics ever penned (though few realize it is the

ultimate statement of computationalism). It is also a defensible thesis that the structure and limits of our intentional psychology were behind his early positivism and atomism. So, let us end with the famous first and last sentences of his *Tractatus*, seen as summarizing his view that the limits of our innate psychology are the limits of our understanding. "The world is everything that is the case." "Concerning that of which we cannot speak, we must remain silent."

