Overlooked Skyhooks

Daniel C. Dennett, *Darwin's Dangerous Idea: Evolution and the Meanings of Life*. New York: Touchstone, 1996. Pp. 586. US$16 PB.

By Robert L. Campbell

DANIEL Dennett's book on evolution has been much chewed over and much praised, yet little has been said about it from an epistemic standpoint. That is a strange omission, for Dennett is not a biologist by profession but a philosopher of mind. Perhaps the sheer profusion of the book, the endless parade of adaptation and units of selection, cranes and skyhooks, spandrels and pendentives and punctuated equilibrium, has discouraged readers from paying heed to the claims about knowledge ventured in its pages. Or perhaps readers are simply inclined to nod agreement with the claims.

Dennett's book is so full of crannies and by-ways that it resists abstraction. But while the applications may follow one another in ways that are hard to anticipate, the theme is clear. The Darwinian idea is the idea of evolution by variation and selection, and it applies to everything in the living world. Whatever exists in the biosphere must have come into being. All 'lifting' in the space of biological possibilities must be done from below, by cranes that are themselves products of variation and selection; no lifting can be done from above, by skyhooks. Both biological and cultural evolution must be accounted for in a Darwinian manner. Dennett regards the Darwinian idea as having near-universal application, and his insatiable desire to apply it to yet one more topic (or to dissect resistance to it in one more domain) is what generates the sprawl.

The Trouble with Libraries

My project is basically the same as Dennett's. I, too, subscribe to the program of evolutionary epistemology. Both the evolution of knowledge in phylogeny, and its development in individual ontogeny, are to be accounted for by mechanisms of variation and selection. But taking evolutionary epistemology seriously means accepting the obligation of accounting for the way that knowledge comes into being—for the way that mental representation *emerges*. And conventional understandings of knowledge, ones that remain deeply entrenched in Western philosophy and in contemporary cognitive science, block the way to such an account.

For Dennett, the blockages begin on page 107, when he borrows the metaphor of a Library of Babel to explicate the space of possible books. By seemingly innocuous analogy, he posits a Library of Mendel to explicate the space of possible genomes. Volumes in the Library of Babel consist of sequences of characters (letters or punctuation marks). Volumes in the Library of Mendel consist of sequences of DNA bases (p. 111). The Library of Mendel is a reasonable tool for characterising the space of biological possibilities, whose 'Vastness' cannot be communicated to the average reader without special effort.

But Dennett wants a good deal more out of this analogy. Comparing differences in the DNA sequences of individual viruses that belong to a 'quasi-species' with typographical variants in different editions of *Moby Dick* (p. 191) ought to make a few readers uneasy. Dennett's discussion of 'DNA branding' (the insertion of junk DNA sequences that can be decoded as trademarks, p. 316) stumbles close to the edge. His speculation about "two equally viable and constructible DNA languages, Mendelese (ours) and Zendelese" (p. 319), strides confidently over it.

There is, after all, a crucial disanalogy between sequences of DNA bases and sequences of alphabetic characters. DNA does not have to be interpreted by a mind (unless, of course, we are talking about researchers who read junk-DNA trademarks). Books do. Nothing has to *know* what the sequences mean, for stretches of DNA to bring about the construction of proteins. Something does have to know what the sequences mean, for books to be of any use at all.

A viable evolutionary account must refute the Argument from Design by explaining how DNA came into being, long before any minds were around. Dennett accepts the burden, when it comes to the emergence of DNA out of a milieu that lacked such macromolecules with such functions; he provides a detailed treatment, for instance, of the possible

mediating role of self-replicating clay crystals (pp. 149–63). But precisely because it cannot presume that minds were given from the start, a viable evolutionary account also has to explain how the ability to read, understand, and interpret all of those possible books in the Library of Babel came into being. Dennett has remarkably little to say about the emergence of knowledge in a world where previously there was none, or about qualitative changes in the powers of knowing systems once knowledge emerged. These matters are addressed in a meagre seven pages (pp. 374–81), which sketch a sequence of four types of 'creatures'.

The most primitive of these are 'Darwinian creatures', whose behaviour is entirely hard-wired and whose variation and selection take place entirely at the genetic level. Dennett attributes no knowledge to such creatures. Next come 'Skinnerian creatures', which exhibit conditional phenotypic plasticity. They are capable of reinforcement learning in the behaviourist sense—a most peculiar kind of learning, because according to Dennett they learn without knowing anything.

Dennett attributes knowledge at the next level in the hierarchy to 'Popperian creatures' that can try out hypotheses without enacting them. But all he says is that the Popperian creature's "inner environment ... must contain lots of *information* about the outer environment and its regularities" (p. 375). What are the functions of knowledge for a Popperian creature? How could such a creature make a mistake, from its own point of view? Nothing else is specified, save for the admonition that the creature's "inner environment [is not] simply a replica of the outer world" (p. 376). How could such a beast have evolved from the epistemically underendowed Skinnerian and Darwinian kinds that preceded it? Dennett confines himself to the obvious proviso that "the information about the world has to be there, but it also has to be structured in such a way that there is a nonmiraculous explanation of how it got there" (p. 376). The explanatory burden must have seemed much lighter because of all the 'information' contained in DNA, whose emergence had already been accounted for.

Dennett's final stage is that of 'Gregorian creatures', those who design portions of their external environments in ways that inform their inner environments, particularly through the use of words and tools. Gregorian creatures are said to be capable of "learning how to think better about what they should think about next" (p. 378). Words, we are told, not only transmit information, but literally "take up residence in a brain" (p. 379). The arrival of language is what makes Gregorian creatures (p. 376)—but what made the arrival of language possible is not discussed at all.

Knowledge-as-Correspondence

I believe that Dennett's account of the different types of creatures is perfunctory and unsatisfying because his account of knowledge is radically inadequate. Now it might seem pointless to attribute any account of knowledge to Dennett, given his advocacy of the 'intentional stance'. Dennett has long claimed that there is no ontological fact of the matter that constitutes intentionality, or having knowledge, or having mental representation; there is just that language-game, the intentional stance, that we as observers choose to adopt. In the works of a philosopher who insists that attributions of knowledge are merely 'as-if', we are not likely to find the clear and bold characterisations of knowledge put forward by such philosophers as Jerry Fodor (1975) or such cognitive scientists as Alonzo Vera and Herbert Simon (1993). Instead, we are limited to recognising what is being presupposed about knowledge. Fortunately, Dennett's presuppositions are neither unusual, nor difficult to identify.

Like most other philosophers and cognitive scientists, Dennett assumes that we have knowledge because things in our minds (structural mental representations) correspond to things in the world. I believe that this is a deep error that has many surface manifestations. I find five of them in the book:

1) Confusing external and internal representation. External representations reside in the environment; internal representations reside in our minds. They are not the same—indeed, cannot be the same—but those who hold conventional views are strongly tempted to conflate them. An example is confusing what is written in a book about whales with what it is about our minds that enables us to know about whales (or to interpret what is written in books about them). It is one thing to treat the letter string WHALE as encoding the word 'whale'—we can make use of this encoding relation because we already know the letter string, and we already know the word. It is another to treat our whale-representation as encoding whales in the world. For our whale-representation to encode whales in the world, we must *already know* whales in the world, and we must already know our whale-representation, so we can recognise the correspondence between them and use the whale-representation to stand in for whales. But if we cannot know about whales without using our whale-representation, then our whale-representation cannot require us to have prior knowledge of whales.

2) Insisting on characterising representation from an *observer's* standpoint rather than from the *organism's* standpoint. An example would be characterising the frog's knowledge of flies from *our* point of view,

rather than from the frog's point of view. Unlike the frog, the observer already knows the environment, already knows something about the frog's mental representation, and already knows about the correspondence between them. Committed as he is to an 'as-if' treatment of intentionality, Dennett can approach intentionality only from the observer's standpoint.

Consequently, the lengthy discussion of meaning in frogs, in 'two-bitsers', and in human beings (pp. 400–12) spins its wheels. Dennett says of a vending machine (a 'two-bitser') originally designed to discriminate between US quarters and other coins, but now transported to Panama (where the machine will treat a quarter-balboa the same way that it treats US quarters: "The two-bitser was forever oblivious of the change in meaning of its internal state" (p. 409). From whose perspective is this statement being made? The system's point of view? Or the point of view that belongs to an observer or user of the system? If Dennett cannot characterise knowledge without invoking an observer, how will he ever be able to explicate *the observer's* knowledge? If he must posit an observer before he can give an evolutionary account of knowledge, he has no way to produce an evolutionary account of the observer.

3) Affirming a conception of knowledge by *correspondence*. Knowledge, on this view, consists of structures in a mind that correspond to structures in the world, and such correspondences are what make it knowledge. The posited mental structures can be regarded as digital and symbolic, or analog and connectionist; the correspondences are what is important. Dennett's endorsements of knowledge by correspondence are glancing and indirect, for example, his presentation of "functional role semantics" (p. 411), or his implication that the Popperian creature's inner environment harbours structures that correspond to those in the outer environment. A statement by Alonzo Vera and Herbert Simon spells out what he merely implies: "The information in DNA and RNA is certainly represented symbolically, the symbols having clear denotations, but this information is not in the organism's conscious awareness" (Vera and Simon 1993, p. 44). The following reply to Vera and Simon carries just as much force when applied to Dennett: "If DNA contains denoting symbols, then why doesn't rain denote clouds? Why doesn't smoke denote fire? Why doesn't water trickling out of a snow bank denote the sun shining on the snow bank? Why don't activities inside a cell denote the transmitter molecule that docked on the cell surface and thereby triggered those internal processes? In every one of these cases we find covariation, and in some cases control, but in no case do we find representation" (Bickhard and Campbell 1996, p. 117).

4) Presuming that knowledge is a primitive kind, and that particular mental representations are combinations of *knowledge-atoms*. In contem-

porary cognitive studies, these irreducible epistemic atoms are variously known as features or semantic primitives. For Jerry Fodor (1981), every lexical concept expressible in English is a knowledge-atom. It is doubtful that secondary sources would identify Dennett as a believer in knowledge-atoms. But a commitment to them follows directly from his analogy between the Library of Babel and the Library of Mendel (each of which has an 'alphabet'), and his endorsement of the theories of linguist Ray Jackendoff (Jackendoff 1993, p. 380), which are saturated with 'lexical decomposition' and semantic primitives.

5) Collapsing distinctions between knowledge and language. If knowledge is a structural encoding of the world, then it makes sense to view linguistic structures as encodings of encoded knowledge. Linguistic communication becomes the recoding of mental structures into linguistic structures by the speaker, and their decoding into encoded mental structures by the listener. So for Dennett, the "information-encoding properties of real language" (p. 371) are utterly transparent: language just recodes encodings.

How to move beyond the underlying error of knowledge-by-correspondence is not a topic for an essay review. The alternative includes treating knowledge as an aspect of an interactively competent system that functions in an environment; distinguishing between the ability to differentiate one type of environment from another and knowing what those environments are; characterising similarity in terms of topologies of overlapping processes; distinguishing between interactive knowledge and language as an action system for operating on understandings that are shared among interactive knowers of certain kinds—and a host of other things. Proper treatment of knowledge as interactive and of communication as a means of transforming shared understandings has been laid out elsewhere (e.g. Bickhard 1993; Bickhard and Campbell 1996; Bickhard and Terveen 1995). Still, if we accept the foregoing diagnosis of knowledge-by-correspondence even provisionally, it does have one virtue that can be illustrated here: it integrates Dennett's constant recourse to library analogies with his endorsement of memetics (Chapter 12).

Memetics

Richard Dawkins' doctrine of the meme claims that there are gene-like packets of information that constitute knowledge, that are transmitted from their nesting sites in one human brain to other human brains via language, and that function as replicators. What genes are to biological evolution, memes are to cultural evolution.

Memetics makes an obvious commitment to 4) above, that knowledge consists of knowledge-atoms. Memes are the atoms (unless complex and compound memes are introduced, in which case a subset of memes would take on atomic status). The adepts of memetics are overtly committed to 5), that knowledge is structural encoding and language re-encodes knowledge for transmission. Accounts of memes, like accounts of the Library of Babel and the Library of Mendel, erase the distinction between external and internal representation: "today we live awash in a sea of paper-borne memes, breathing in an atmosphere of electronically-borne memes" (p. 347). Memes are exactly the same whether they dwell inside or outside (though they must dwell inside us to get themselves replicated). There is no sense in differentiating an organism's standpoint from an observer's standpoint for genes; the proteins specified by a gene, and the phenotypic characteristics associated with it, will be exactly the same whether these relationships are known (as they may be for the observer) or not (as is nearly always the case for the organism). So there is no felt need to make the distinction for memes, either (compare 2 above).

As for 3), there is no explicit statement that knowledge is constituted by correspondences in Dawkins (1989). But of course Dawkins is not a cognitive scientist or a philosopher of mind. Dennett *is* a philosopher of mind, and he clearly is committed to knowledge-by-correspondence. If my five criticisms are correct, memetics cannot be a viable evolutionary theory of human knowledge. It is not a viable theory of knowledge, period.

Derivative from this impasse are a host of other embarrassing problems. Dennett glimpses some of them himself. For instance, if memes are genuine replicators, they must be able to make exact copies or replicas of themselves—nearly all the time (p. 343). But the 'mutation rate' for memes seems unacceptably high. In fact, "We seldom pass on a meme unaltered ... unless we are particularly literal-minded rote learners" (p. 355). For Dennett, this is an inconvenience that makes it terribly difficult to trace lines of cultural–evolutionary descent for particular memes. The problem is fundamental. Jean Piaget (1962) pointed out that cognitive development in human beings does not proceed by copying what is out in the world, or by copying the contents of other human minds; development proceeds through the assimilation of what we encounter in the environment to our existing knowledge. So much for Dawkinsian fantasies about items in the meme pool "leaping from brain to brain" by imitation (quoted on p. 345).

Dennett, like Dawkins, keeps emphasising non-rational or anti-rational memes that replicate *because* of their built-in defences against rational scrutiny by the minds in which they are currently nesting. But then

memetics falls prey to a self-referential argument. Memes propagate because they're catchy, or because they come equipped with defences against inquiries that might undermine them. But the doctrine of memetics is itself a collection of memes—so acceptance by scientists need have nothing to do with its truth or falsehood. Indeed, if we push the argument a step farther, it follows that if memetics is correct, our very notions of truth and falsehood, evidence and reasons, good and bad arguments, and so on, are themselves memes, whose acceptance need have nothing to do with their epistemic virtue or lack thereof. If the meme doctrine were true, it would be impossible to have scientific knowledge about memes (or about anything else); memetics, like epistemic relativism or hard psychological determinism, embroils its proponents in self-referential inconsistency. Dennett admits the self-referential inconsistency, without seeming to be fazed by it: "in its own terms, whether or not the meme replicates successfully is strictly independent of its epistemological virtue; it might spread in spite of its perniciousness, or go extinct in spite of its virtue" (p. 364).

But the ultimate question for an advocate of evolution by variation and selection is: Where do memes come from? Presumably there were no knowing systems, or learning systems, or systems with emotions, or systems with reflective consciousness back at the time of the Big Bang. Now there are systems of all these types. So the evolutionist must account for their emergence during the intervening epochs.

How, then, did memes emerge? How could they have emerged? Why is a copy of *The New York Times* a potent meme vehicle for some human beings, whereas for a pigeon it is no more than a niche liner, or a thing that conceals a bit of food (p. 352)? An evolutionary answer to this question would require an account of what knowledge is for pigeons and how that came into being, as well as an account of what knowledge is for humans and how that came into being. No such thing is even hinted at in Dennett's book.

Anti-Evolutionary Conceptions of Knowledge

The meme doctrine is *anti-evolutionary*. Memes weren't lifted into place by cranes: they need skyhooks! Knowledge that is built out of knowledge-atoms, that cannot be characterised from the organism's standpoint, that exists on the pages of a book in precisely the same manner that it exists in the reader's mind, has to be radically different from anything that goes on in the non-knowing parts of the environment. Knowledge construed as structures-that-correspond, knowledge construed as gene- or virus-like

epistemic packets, knowledge that is not an aspect of the system's functioning, could not have emerged out of anything else.

Nothing is more instructive in this regard than Dennett's struggles with Noam Chomsky. He is rightly concerned (pp. 384–400) about Chomsky's assertion that a key aspect of human language ability—our ability to speak grammatically—could not have arisen through evolutionary processes. But the main damage is done by Chomskian doctrines that Dennett, like so many other philosophers and cognitive scientists, takes for granted or passes over as innocuous. Chomsky's belief in the autonomy of syntax leads straight to his conclusion that human language could not be the product of biological evolution. Chomsky's doctrine of linguistic competence (if we are able to speak English grammatically, that is because we know and use the same set of formal rules that the Chomskian linguist would use to sort out the good sentences of English from the bad ones) leads straight to his contention that we are able to learn human languages only because we are born with an encoded Universal Grammar in our heads (Campbell and Bickhard 1986). How could such a Universal Grammar have come into being through variation and selection processes of evolution, if it is so resistant to variation and selection processes of learning? Dennett inveighs against innate encoded ethics modules (pp. 467–8) but what arguments does he have against them, that he could not also bring to bear against the innate encoded syntax modules that he is willing to accept?

Chomsky's anti-evolutionary stand follows from his assumptions about linguistic knowledge. Dennett offers no alternative to this conception of language. What he needs is a principled critique of what Dartnall (1997) calls "reverse psychologism"—the practice of reading logical and linguistic analyses of human accomplishments back into human minds as accounts of how the accomplishments are done. Without such an account, Dennett can only complain in vain about Chomsky's resistance to Darwin's dangerous idea. Nor does Dennett have a viable defence against Fodor's more general anti-evolutionary doctrines, which follow ineluctably from Fodor's view of knowledge as correspondence-based, language-like, and built out of knowledge-atoms (Campbell and Bickhard 1987). Without intending to, Dennett ends up with a conception of knowledge as resolutely evolution-proof as anything dreamed of by Chomsky or Fodor.

Including Knowledge within the Darwinian Account

Fully naturalising knowledge means situating it within a thoroughgoing Darwinian account. This is a hard task. To be up to it, Dennett needs to

orient himself differently. First, he needs to abandon the intentional stance and make a firm commitment to realism. Whatever advantages Dennett believes it might have, agnosticism about cognitive ontology has not enabled him to avoid any of the pitfalls of conventional thinking in philosophy of mind or cognitive science. If intentionality is not an aspect of a real system, but merely a language-game that we choose to play with regard to that system, then the system's standpoint means nothing to us, and we cannot even ask what knowledge is *for the system,* or take on the ontological questions posed by its emergence.

Second, he should recognise and reject reverse psychologism (the practice of reading formal logic and linguistics back into the operations of minds). This, in turn, requires a commitment to a process account of knowledge, and to an account of language as a communicative action system. Extensive labour is required to reconceive language as a system of operators on shared understandings, whose functioning is sensitive to our knowledge and its organisation without isomorphically recoding our mental representations (Bickhard 1980). Without a commitment to ontological realism in the psychological realm, such labour is unlikely to seem worthwhile.

Third, Dennett needs to take other conceptions of mind and cognition a lot more seriously. In its search for psychological understanding, *Darwin's Dangerous Idea* keeps rounding up the usual suspects. The brilliance of such figures as Quine and Chomsky is not in doubt. But should they be allowed to set the limits of debate on cognitive issues? Such exclusiveness seems no more advisable than letting John Rawls set the limits of debate on moral issues. A look at Dynamic Systems Theories, regulatory-systems theories, or functional linguistics, among others, might pay dividends. And Piaget may not be on the list of required reading for American cognitive scientists, but some consideration of his 60 years of effort toward an evolutionary epistemology might pay off.

Finally, Dennett needs to temper the zeal that becomes an occupational hazard when defending evolutionary theory against the forces of darkness. I agree that doctrines central to many of the world's religions are false and profoundly harmful to human beings, but I do not conclude that peaceful religious practices should be forcibly suppressed. Dennett wants to suppress religious schools: "Save the Baptists! Yes, of course, but not *by all means.* Not if it means tolerating the deliberate misinforming of children about the natural world ... Misinforming a child is a terrible offence" (p. 516).

Dennett may have been battling religion a little too long. Any objection to his formulations, he says, bespeaks a wholehearted faith in the Argument from Design. He insinuates that criticisms of memetics

emanate from the hopeless humanities, in a vain and unscientific reaction against the Darwinism that will make them obsolete (pp. 361–2). But the fate of Darwinism does not depend on memetics. Darwin himself did not understand the mechanism of heredity, and others had to remedy this deficiency and create the neo-Darwinian synthesis that we know today. Darwin subscribed to a theory of pangenesis via gemmules. We do not conclude that Bishop Wilberforce won the debate because Darwin believed in gemmules. We should not conclude that evolutionary epistemology will founder because Daniel Dennett believes in memes.

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References

Bickhard, M.H. (1980) *Cognition, Convention, and Communication.* New York: Praeger.

Bickhard, M.H. (1993) "Representational content in humans and machines", *Journal of Experimental and Theoretical Artificial Intelligence, 5.*

Bickhard, M.H. and R.L. Campbell (1996) "Topologies of learning and development", *New Ideas in Psychology, 14.*

Bickhard, M.H. and L. Terveen (1995) *Foundational problems in Artificial Intelligence and Cognitive Science: Impasse and Solution.* Amsterdam: North-Holland.

Campbell, R.L. and M.H. Bickhard (1986) *Knowing Levels and Developmental Stages.* Basel: S. Karger.

Campbell, R.L. and M.H. Bickhard (1987) "A deconstruction of Fodor's anticonstructivism", *Human Development, 30.*

Dartnall, T. (1997) "What's Psychological and What's Not: The Act/Content Confusion in Cognitive Science, Artificial Intelligence, and Linguistic Theory", in S. O'Nuallain *et al.* (eds), *Two Sciences of Mind: Readings in Cognitive Science and Consciousness.* Philadelphia: John Benjamins.

Dawkins, R. (1989) *The Selfish Gene.* Oxford: Oxford University Press

Fodor, J.A. (1975) *The Language of Thought.* New York: Crowell.

Fodor, J.A. (1981) "The Present Status of the Innateness Controversy", in J.A. Fodor (ed.), *RePresentations.* Cambridge, Mass.: MIT Press.

Jackendoff, R. (1993) *Patterns in the Mind: Language and Human Nature.* London: Harvester Wheatsheaf.

Piaget, J. (1962) *Play, Dreams and Imitation in Childhood.* New York: Norton.

Vera, A.H. and H. Simon (1993) "Situated action: A symbolic interpretation", *Cognitive Science, 17.*

Author's Response

By Daniel C. Dennett

ROBERT Campbell has a daunting task: to convince just about everyone in cognitive science and analytic philosophy that he or she has been barking up the wrong trees for years. Perhaps he is right, but he is unlikely to convince the rest of us by taking one book from the purportedly mistaken tradition and attempting to convict it of the cardinal sins by what might be called guilt by free association. As he admits, my book is not mainly about the epistemological issues that are central to him, so he must read a lot into my decisions about what not to discuss at length, and into various phrases he plucks out of discussions of other topics. Still, the tactic might have worked, if it weren't for some misconstruals.

First, Campbell construes my intentional stance as an anti-realist doctrine: "he needs to abandon the 'intentional stance' and make a firm commitment to realism". Since many others have also construed me thus, this is my fault not Campbell's, but I have laboured mightily to correct it, in *Darwin's Dangerous Idea*, in "Real Patterns" (Dennett 1991) and more recently in "Get Real" (Dennett 1994). The intentional stance is a perspective that one adopts in order to discover real patterns that are objectively in the world. Second, he construes me as endorsing (at least indirectly) 'knowledge-atoms' and 'encoding' of a variety he and Bickhard have purportedly discredited. I cannot tell from what is said in the review whether I would agree with their criticisms of these doctrines—quite probably I would agree with a great deal—but considering that I have been an indefatigable opponent of all brands of the 'language of thought' (Dennett 1977, 1987a) and 'High Church Computationalism' (Dennett 1987b) (otherwise known as GOFAI) for almost thirty years, I am unpersuaded by this exegesis of my own work. Certainly the objections raised here do not find their targets in my own views, nor are they compelling in their own right. Consider Campbell's claim that it is a mistake to treat DNA as an informational code (like a language in that regard). He quotes a series of rhetorical questions designed to expose this confusion: "If DNA contains denoting symbols, then why doesn't rain denote clouds? Why doesn't smoke denote fire?" Well, there are a number a reasons, but the chief one is this: DNA is part of a system which does

indeed include a 'reader'—the elaborate system that constructs the proteins called-for (or denoted, if you like) by the codons, while clouds and smoke are not part of any such system.

My chief reason for replying to Campbell's review is to rebut a charge that he makes about memetics: "if memetics is correct, our very notions of truth and falsehood, evidence and reasons, good and bad arguments, and so on, are themselves memes, whose acceptance need have nothing to do with their epistemic virtue, or lack thereof ... memetics, like epistemic relativism or hard psychological determinism, embroils its proponents in self-referential inconsistency". As Campbell notes, I myself draw attention to the independence of meme-spreading and meme-virtue in general, but am not, as he says, fazed by it. Why not? Because the conclusion he draws from it is simply a *non sequitur.* There is indeed no guarantee that a meme that spreads is good (true, valid, right) or that a good meme will spread, but this permits one to discover the complex relationships between truth and memes, and show how, and why, true memes flourish (when they do). This topic was slighted by me, apparently, in my book; I have since turned to it as a major topic of my work.

For instance, in "Faith in the Truth" (forthcoming in the Oxford Amnesty Lectures volume on the values of science), I attempt to show that epistemic relativism (which Campbell and I both abhor) does not at all follow from the epistemic doctrines of Quine, Kuhn, Dawkins, or myself, in spite of declarations to that effect from Rorty and various other postmodernists. I think that Campbell and I are actually much closer to agreement than he supposes. But let me close with one final rhetorical question of my own. I would have thought that his disapproval of relativism and his love of "a commitment to realism" would put him squarely on my side against the self-styled multiculturalists who won't dare to criticise the disinformation campaigns of various religious cultures. He seems to disapprove of my disapproval of religious schools teaching falsehoods to young children. He quotes me as saying: "Misinforming a child is a terrible offense." Isn't it?

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References

Dennett, D.C. (1977) "Critical Notice of J. Fodor, *The Language of Thought", Mind, 86.*

Dennett, D.C. (1987a) *The Intentional Stance*. Cambridge, Mass.: Bradford Books/ MIT Press.
Dennett, D.C. (1987b) "The Logical Geography of Computational Approaches: a View from the East Pole", in M. Harnish and M. Brand (eds), *Problems in the Representation of Knowledge*. Tuscon : University of Arizona Press.
Dennett, D.C. (1991) "Real Patterns", *Journal of Philosophy*, *87*.
Dennett, D.C. (1994) "Get Real", *Philosophical Topics*, *22*.