



Reflections on Trees of Knowledge

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Source: *Spontaneous Generations: A Journal for the History and Philosophy of Science*, Vol. 3, No. 1 (2009) 223-225.

Published by: The University of Toronto

DOI: [10.4245/sponge.v3i1.8474](https://doi.org/10.4245/sponge.v3i1.8474)

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Published online at jps.library.utoronto.ca/index.php/SpontaneousGenerations
ISSN 1913 0465

Founded in 2006, *Spontaneous Generations* is an online academic journal published by graduate students at the Institute for the History and Philosophy of Science and Technology, University of Toronto. There is no subscription or membership fee. *Spontaneous Generations* provides immediate open access to its content on the principle that making research freely available to the public supports a greater global exchange of knowledge.

Reflections on Trees of Knowledge*

Marion Blute[†]

On September 30th I attended a talk¹ by Ian Hacking, the renowned philosopher of science. The topic, “The Tree of Knowledge,” was irresistible for someone like myself whose main interest is in sociocultural evolution. I was rewarded with a dazzling display of erudition about (and beautiful pictures of) stylized trees drawn through history and across civilizations. Hacking generously credited the many experts he had consulted to amass this treasure. This was consistent with his preference for “collaborating disciplines” over interdisciplinarity—see “The Complacent Disciplinarian” at www.interdisciplines.org/interdisciplinarity/papers/7.

I did wonder if we took any one of a number of striking natural objects—perhaps stars, flowers, or rivers for example, if we could not amass a similar collection. Probably so—used perhaps as symbols of enlightenment, beauty and time respectively. The interesting thing about tree-diagrams to Hacking however is that they have apparently so often been employed to represent knowledge—in some cases its organization, and in others its history. (Western philosophers commonly root their tree of knowledge in Aristotle.) I could not help but wonder if the explanation for all that tree-drawing might be because the artists were actually onto something, descent with modification in the realm of culture. That struck me as more plausible than Hacking’s speculation in “The Complacent Disciplinarian” that trees might be a “universal mental module” but one that “human beings learned to use and represent only in historical time.” Near the end of his talk he mentioned neurophysiology but inconclusively—presumably he had sought, but not yet found, evidence that human decision-making is innately sequential, discrete and even binary.

Although it was not raised (at least before I had to leave the discussion,) I doubt that Hacking would favour a cultural evolutionary “the

*Received November 2009.

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¹Held at the Institute for the History and Philosophy of Science and Technology, University of Toronto.

tree-drawers were on to something” view. The reason for suspecting so was that in response to a question about lateral gene transfer (LGT) in prokaryotes (cells like bacteria without membranes surrounding their nucleus), he sounded gleeful in mentioning participation in a conference on the topic. The commonness of LGT among prokaryotes, typically mediated by parasitic-like DNA elements, makes the evolution of such genes, relative to those transmitted by normal cellular reproduction processes, net-like rather than tree-like. This is not to say that their own evolution is any less tree-like than that of others but certainly complicates, and in the eyes of some makes impossible, taxonomy and phylogenetic reconstruction of prokaryotic *organisms*. In any event, such is not the case for multicellular eukaryotes including the familiar plants, animals and fungi where, except for transfers from their chloroplasts and mitochondria to the cellular nucleus, LGT is far less frequent. There abundant DNA, RNA and protein sequence data is currently creating a golden age of taxonomy and phylogenetic reconstruction leading to solutions of many long-standing problems in understanding relatedness and descent among many groups of organisms large and small. Recalling that there had recently been a conference on the topic of “Perspectives on the Tree of Life” as part of a project on “Questioning the Tree of Life” and that Larry Moran had blogged it on Sandwalk at www.sandwalk.blogspot.com/2009/07/perspectives-on-tree-of-life-day-one.html. I checked, and Hacking had participated in that particular conference. Moran summarized his contribution as follows:

He talked about *The Fatal Attraction of Trees*. The idea is that we all have a preference for organizing information in a tree-like manner and this bias gets in the way of accepting a different view of evolution.

I hazard a guess then that if Hacking writes a book on “The Tree of Knowledge” his ultimate point will not be that knowledge is a cultural tree, but will instead be a reflexively ironic one. Trees of knowledge themselves illustrate that knowledge is *not* a tree because trees as symbols of knowledge have arisen independently in so many different time periods and across so many different civilizations. Although sometimes underappreciated however, analogy or homoplasy (similarity due to similar selection pressures) is as much a part of evolutionary processes, including the cultural, as is homology (similarity due to common descent.) It is often said for example that even Darwin’s greatest contribution lay not in the first “great principle” of his theory—that of interpreting the “unity of types” genealogically, but in his second one—that of interpreting the “conditions of existence” as exerting natural selection. There is even

nothing unevolutionary about independent origins. Given that life was created by nomothetic physio-chemical forces, it is unlikely to have arisen only once; it is just that the near universality of the genetic code implies that all so-far-known living things on earth today have descended from only one of those. This is a common assumption about evolutionary processes. For example, mitochondrial Eve and Y-chromosomal Adam do not mean that only one female or one male lived at the appropriate times (plural) in Africa. It is just that all mitochondria through females and Y chromosomes through males (although not necessarily all autosomes) present today descend only from one of those that did.

Hence knowledge can take the form of a genealogical tree for a particular time period in a particular place while still doing so for similar reasons but independently at other times and in other places. Even if all human languages on earth did not have a common ancestor, the “mother tongue,” particular languages within each of many language families (and indeed some of the families themselves) still could. On “death of trees” talk about evolution I liked NickM’s comment on the topic on Moran’s blog:

Why can’t we be a little sophisticated about this, admit that ‘right’ and ‘wrong’ come in degrees in science, and that this applies to the Tree of Life metaphor like everything else. In other words, why not apply some balance along the lines of Asimov’s famous line? ‘When people thought the earth was flat, they were wrong. When people thought the earth was spherical, they were wrong. But if you think that thinking the earth is spherical is just as wrong as thinking the earth is flat, then your view is wronger than both of them put together.’

I doubt then that all the drawers of trees of knowledge have been deluded by their genes. Instead, at least some of them were indeed onto something—the historical side of evolution in the realm of culture.

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