BOOKS: PHILOSOPHY OF SCIENCE

# What It's All About

Barry Allen

Rage against science! Science wars! The postmodern know-nothings Alan Sokal satirized are being taken seriously when they say that science is "a social construction."

Prominent scientists, notably the physicist Steven Weinberg, have spoken out against the social construction fad. We are told we can't treat inexorable laws of nature like that. Scientific results are the deepest truths we know, and they hold regardless of society and its constructions. "Any intelligent alien anywhere," Weinberg says, "would have come upon the same logical system as we have to explain the structure of protons and the nature of supernovae."

**The Social Construction of What?**
*by Ian Hacking*
Harvard University Press, Cambridge, MA, 1999. 271 pp. $29.95, £18.50. ISBN 0-674-81200-X.

But how could he know that? If intelligent aliens were as common as blackberries, someone like Weinberg might know what he claims to. But they aren't, and he doesn't. Weinberg oversteps the limits of serious expertise, and expects the same authority he commands on his specialist turf. For all his accomplishments, however, Weinberg knows no more about how aliens think than you or I do. His stance differs from the social constructionism he criticizes only in its unexamined metaphysical assumptions.

Coleridge said that everyone is born either a Platonist or an Aristotelian. In *The Social Construction of What?* Ian Hacking contends that today's "science wars" also rehearse this "profound and ancient philosophical dispute." Steven Weinberg and Bruno Latour represent philosophical attitudes "that have opposed each other for at least 2300 years." Weinberg is in the tradition of high rationalism, which runs from Plato to Steven Hawking. Latour, Andrew Pickering, and their fellow social constructionists are modern-day Sophists. They see convention everywhere that the Platonists see nature, and they are more interested in the rhetoric of persuasion than the proof of truth. "Although social constructionists bask in the sun they call postmodernism, they are really very old fashioned."

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The issues between the rationalists and the constructivists, however, are real. Hacking does not try to debunk either side. Instead, he patiently sifts their disagreements to identify three philosophical sticking points, where the two sides clash on issues of long standing.

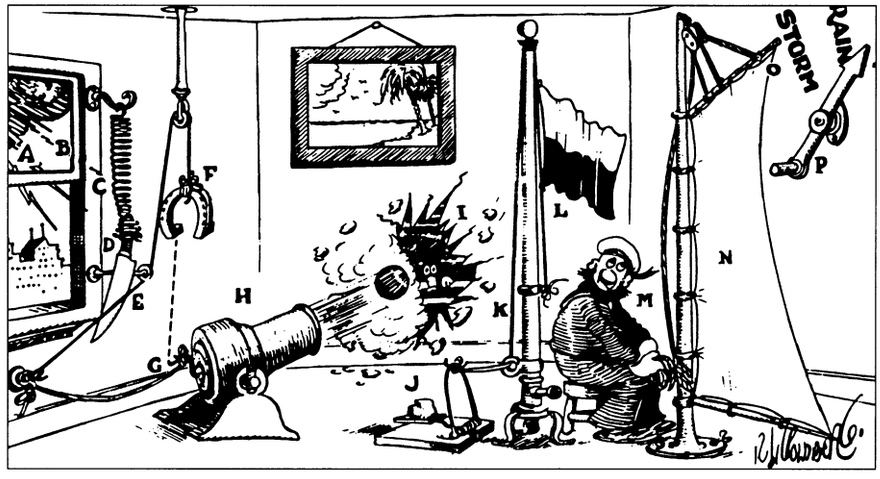
*Contingency.* Is much of present science inevitable? Is it ordained, as Weinberg implies, that any intelligent being starting anywhere will come to the same discoveries—the velocity of light, thermodynamics, quarks? One theme in the social construction literature is the contingency of important scientific discoveries, such as quarks or microbes. The claim is not that the results are untrue or ill-founded, but only that a perfectly good science might have done without them.

*Nominalism.* This means a pragmatic, conventionalist, even relativist attitude toward "kinds." For a nominalist, the kinds and classifications science uses are among the equipment, not the deductions, of science. They do not reflect an independent structure of reality, but only the direction of our interests. That is very much the view of social constructionists, as well as other philosophers, including Hacking. Yet even though important scientists like Darwin and Mach were also nominalists, Hacking thinks "most scientists believe that the world comes with an inherent structure which it is their task to discover."

*Stability.* Why do scientific results hold up? Modern-day Platonists say it is because fact and reality are behind them. Modern-day Kantian constructionists say it is because a resilient coalition has been assembled in support of the results, making it too expensive and laborious to take them apart. That may be the idea zoologist Richard Dawkins had in mind when he quipped that nobody is a social constructionist at 30,000 feet.

The comment is clever, but inept. The social constructionists' claim is not that scientific propositions are false, nor that artifacts built with them are unreliable. Their target is not the logical truth of scientific propositions, but the social sources of the propositions' credibility and of scientific authority. Showing an important discovery (quarks, microbes) to be "socially constructed" is not supposed to make us skeptical about quarks or microbes. It is instead a standing invitation to rethink the idea that science is a bastion of objective knowledge, or the scientist a guardian "of the most important truths about the world," truths which the laity should receive with "pious reverence."

Although Hacking finds that "most philosophers of science resent the trendy and iconoclastic character of social studies of knowledge," he is fascinated by "the fuzzy dragon of science studies." He knows too much science to be bamboozled. But he also knows that the social




**A social construction?** "The Professor is hit with an angel cake and the angels whisper an idea for a new scientific barometer. Flash of lightning (**A**) from distant thunderstorm sends electrical vibrations (**B**) to magnetic spring (**C**) which contracts and causes knife (**D**) to cut cord (**E**) and release horseshoe (**F**), allowing it to drop on string (**G**) and pull trigger of cannon (**H**) which shoots a hole in wall. Rat (**I**), seeing a new entrance to living room, enters and is caught in trap (**J**) which springs and pulls rope (**K**), raising storm signal flag (**L**). Ex-sailor (**M**), who is a little cuckoo, thinks he is at sea and hauls down sail (**N**), causing top boom (**O**) to strike against arrow (**P**) and swing it to position, indicating storm. If you have trouble finding a nutty sailor, get a sane sailor and drive him crazy by telling him they are going to close up saloons all over the world."

study of science has never been a more interesting field. It will likely shape the future perception of science as greatly as did the positivism of the last century.

Ian Hacking is among the best philosophers now writing about science. His book is about more than an ephemeral *Kulturkampf.* He discusses psychopathology, weapons research, petrology, and South Pacific ethnography with the same skeptical intelligence he brings to quarks and electron microscopy. It is not his aim to enter a partisan controversy, still less to decide it. Instead, he clearly explains what is at stake—nothing less than the intellectual authority of modern science. "Fuzzy dragon" that it may be, social constructionism poses a serious argument. To answer it, philosophers and scientists will have to think hard about how science works and why it is important.

BOOKS: EVOLUTION

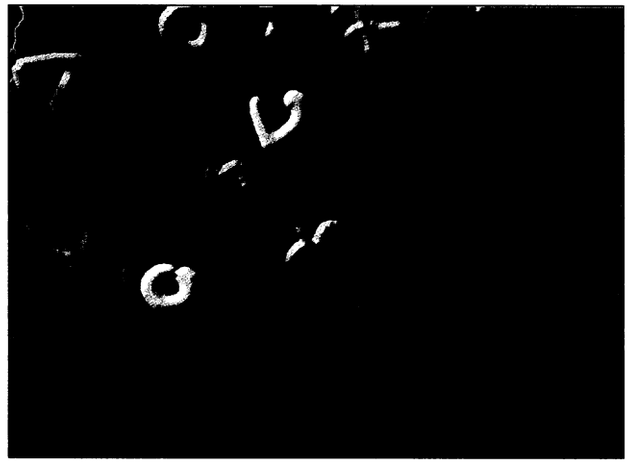
# Flying Over Uncharted Territory

**David Sloan Wilson**

Human culture is still a blank spot on the map of scientific understanding. Cultural change is often likened to an evolutionary process, but cultural anthropologists tend to be anti-biological, even anti-scientific. Theories of cultural evolution, developed primarily by biologists, present culture as everything from a servant of the genes to its own master, liberated from the laws of both biology and psychology.

Among this varied crowd is the concept of memes, a term coined by Richard Dawkins in his famous book *The Selfish Gene* (1976). Memes are units of cultural transmission (or imitation). They share with genes the status of replicator, because both are copied across generations with high fidelity. Like genes, memes that evolve are "selfish," existing only to replicate themselves. In this view, not only are we lumbering robots controlled by our genes, but we are also controlled by our memes, which do not always agree with our genes. For example, memes might compel us to produce symphonies instead of babies.

Dawkins' main point was to show that genes are not the only replicators. In *The Meme Machine*, psychologist Susan Blackmore attempts to develop the meme concept into a full-fledged theory of cultural evolution. Her book belongs to a genre that strives for both scientific importance and mass-audience appeal. It is published by a distinguished university press but has the splashy cover of a trade book, with memes that look like children's breakfast cereal floating between two human heads and lightning bolts in the background for dramatic effect. Ideally, it should be as revolutionary as Darwin's *Origin* and so readable that you want to take it to the beach. This genre works best when important scientific developments are reported to a wider audience by a gifted writer, who need not be involved in the actual research. Unfortunately, there have been no recent breakthroughs in meme research, which places Blackmore in an impossible position. She must achieve the breakthrough herself and describe it for nonspecialists—all in one book. Not surprisingly, she fails.



**A memetic adaptation.** The splashy dust jacket illustration may help transmit the concept of memes to a wider audience.

**The Meme Machine**
*by Susan Blackmore*
Oxford University Press, New York, 1999. 286 pp. $25, £18.99. ISBN 0-19-850365-2.

Part of the problem stems from the replicator concept, which has led to some interesting insights but often merely redescribes the familiar. Although those selfish genes care only about replicating themselves, that action usually requires coordination with other genes, suggesting the conventional view of well-adapted organisms. Genes have "extended phenotypes" that reach beyond the individual organism, but how does this change our understanding of familiar examples such as termite mounds and beaver dams? In much the same way, selfish memes often turn out to be a convoluted way to describe the obvious. What do we gain by thinking of the first four notes of Beethoven's fifth symphony as a powerful meme? Or by saying that "Religious memes are stored, and thus given improved longevity, in the great religious texts"?

More problems arise when we try to think of culture as broken into replicating units like genes. Unlike genes, memes do not exist in a physical form. It is hard to identify a unit (a problem also existing for genes). And memes may not even replicate with high fidelity, as the children's game of telephone attests. Blackmore and Dawkins (in his introduction) confront some of these problems, sometimes quite successfully, but one of the largest problems is not addressed. The oft-repeated accusation that natural selection is a tautology fails because fitness is not defined in terms of whatever evolves but in terms of the properties that enable organisms to survive and reproduce in their environments. Moths that are colored to match their background have a high fitness with respect to bird predation, but cryptic coloration may not evolve if the appropriate mutations either do not arise or are lost by genetic drift. The ability to define fitness independently of what evolves saves the concept of natural selection from being a tautology. For the meme concept to escape the same problem, we must define cultural fitness independently of what evolves. If the first four notes of Beethoven's fifth is a powerful meme only because it is common, we have achieved no insight.

Another problem is that Blackmore addresses such large issues—our big brains, language, sex, altruism, religion, the concept of self—that her analysis becomes hopelessly superficial. In each case, huge literatures and complex issues are skimmed and found wanting in a few pages, paving the way for the new memetic approach, which is itself presented in only a few more pages. The effect on the reader is ultimately boring, like a person at a cocktail party who approaches you with a new theory for the fall of the Roman Empire.

Understanding the terra incognita of culture will require hard empirical research informed by solid theory. It will be more like trudging through a rain forest than cruising overhead at 30,000 feet. Blackmore's enthusiasm for the meme concept is genuine and may even be justified, but to make progress she will need to exchange her pilot's cap for a pith helmet.

CREDIT: *THE MEME MACHINE*

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