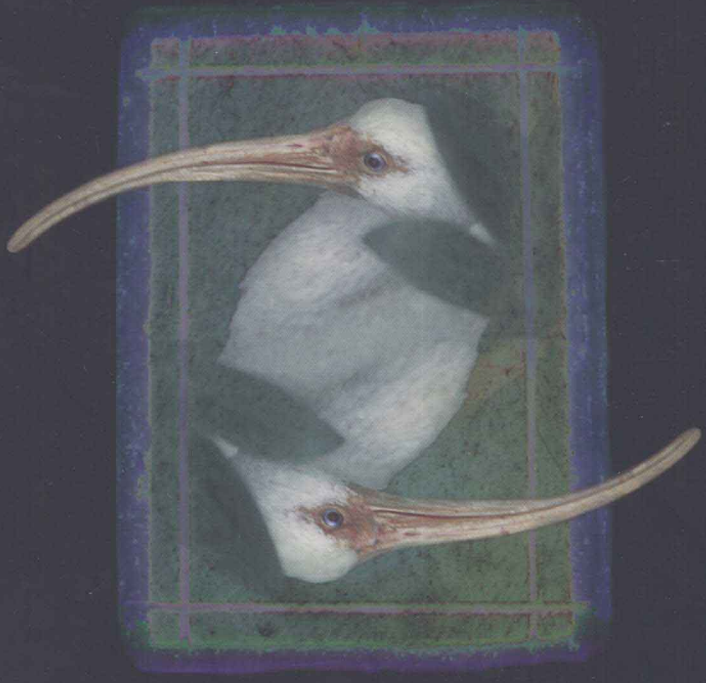
MYSTERY of MYSTERIES

IS EVOLUTION A SOCIAL CONSTRUCTION?



MICHAEL RUSE

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Is Evolution a Social Construction?

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For

John Beatty

Peter Sloep

Paul Thompson

Preface

This is a book about the nature of science using evolutionary theory as a case study. It follows on the heels of another book written by me, *Monad to Man: The Concept of Progress in Evolutionary Biology,* also published by Harvard University Press—a book which contains similar themes. The difference is that whereas in that book I was using philosophy to try to understand biology, in this book I am using biology to try to understand philosophy. I should say also that *Monad to Man* was directed at a specialized audience: it was long, with detailed references. This book is intended more for a general audience. I have tried not to overburden the reader with background research, a temptation for a scholar somewhat akin to the addict's craving for a cigarette. Although *Mystery of Mysteries* and *Monad to Man* are two independent books and meant to be read that way, if you really want more information or documentation on claims made in the former, I suggest that the best place to start is with the index to the latter.

Monad to Man relied heavily on archival findings as well as on detailed personal interviews. Here, although my understanding of evolutionary theory's history is obviously influenced by this research, I have confined myself to the public printed record. The exception is extensive interviews I conducted with two of today's leading active evolutionists: the English sociobiologist Geoffrey Parker of Liverpool University and the American paleontologist Jack Sepkoski of the University of Chicago. One of the marks of modern professional science is a reluctance of its practitioners to reveal their cultural commitments too publicly, especially in their technical writings. Since these two men are professionals *par excellence*—that is a major reason why I chose them—and since I wanted to know something of their extrascientific lives and

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beliefs and of the possible connections with their science, lengthy face-to-face discussions were needed. It is the nature of such encounters that Parker and Sepkoski were somewhat at my mercy. Obviously, I could not tell them what I was hoping or dreading to hear before I started the interviews. Hence, here, I want to express not merely thanks for their time and hospitality but the sincere hope that I have not betrayed their trust or our friendship. If they disagree with what I have made of the material, I am sure they will agree that such disagreements are the nature of scholarly discourse.

As always when writing a book, I have incurred debts to many people. The immediate support while I was writing this book came from the Social Sciences and Humanities Research Council (of Canada). It is the final part of a project which began a decade ago when I received a fellowship from the Isaak Walton Killam Memorial Fund. As always, I owe much to my home institution, the University of Guelph, especially my dean, Carole Stewart, and my chair, Brian Calvert. I am much indebted to the following people who read earlier drafts of the manuscript: Barry Allen, Michael Bradie, Jim Brown, David Depew, and Bruce Weber. Denis Lynn read and offered suggestions on the glossary. My secretary, Linda Jenkins, and my research assistant, Alan Belk, did all of those things which I should have done myself but did not. Michael Fisher and Susan Wallace Boehmer of Harvard University Press have been everything that one could hope for in editors: friends, guides, supporters, and critics. Most importantly, Lizzie and the kids were there whenever I looked up from the keyboard.

Mystery of Mysteries

Is Evolution a Social Construction?

"The Einsteinian constant is not a constant, is not a center. It is the very concept of variability—it is, finally, the concept of the game. In other words, it is not the concept of some*thing*—of a center starting from which an observer could master the field—but the very concept of the game."

In mathematical terms, Derrida's observation relates to the invariance of the Einstein field equation $G_{\mu\nu} = 8\pi MT_{\mu\nu}$ under nonlinear space-time diffeomorphisms (self-mappings of the space-time manifold which are infinitely differentiable but not necessarily analytic). The key point is that this invariance group "acts transitively": this means that any space-time point, if it exists at all, can be transformed into any other. In this way the infinite-dimensional invariance group erodes the distinction between observer and observed; the π of Euclid and the G of Newton, formerly thought to be constant and universal, are now perceived in their ineluctable historicity; and the putative observer becomes fatally de-centered, disconnected from any epistemic link to a space-time point that can no longer be defined by geometry alone.

(Sokal 1996a, 221–222; quoting Derrida, above, 1970, 266)

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PROLOGUE

Science Wars

Very impressive stuff, especially if it comes dripping with footnotes as learned and as obscure as the text. But in the privacy of your own mind—with your guard down intellectually—have you really any idea what the quotations on the opposite page actually mean? "The infinite-dimensional invariance group erodes the distinction between observer and observed"? Although I am not sure that I would have been brave enough to be the first to say so publicly, to me it all reads like pure, unadulterated gobbledy-gook. And I very much hope that it does to you, too, because that is precisely what it is! Nonsense in polysyllables, pretending to be a serious contribution to knowledge.

However, the editors of a major journal, *Social Text,* in the trendy new academic discipline of "cultural studies," did not read it that way. They took the paper seriously and published it. At once, the author, a reputable physicist from New York University, revealed it for the hoax—the pseudo-article—that it is (Sokal 1996b). Whereupon, failing to realize that there are times when the only sensible course of action is to maintain silence, as dignified as you can make it, one of the gurus of cultural studies penned a long and windy and essentially irrelevant opinion piece in *The New York Times,* defending the editors in their silly and (to be frank) slipshod actions (Fish 1996).

Academics love this sort of thing. Even normal people can crack a smile, when seemingly arrogant, pompous, but essentially shallow and

lazy people, who talk in loud, bullying tones on subjects about which they know absolutely nothing and cloak their nonthoughts in ponderous imported jargon ("hegemony"—does anybody really know what that word means?), are shown to be the charlatans that they truly are. And if they are sufficiently conceited or naive to fight back, then so much the more fun. For academics, it is time to turn to the keyboard and add to the controversy. Historians can compare this with great hoaxes of the past. Philosophers can discuss the ethical implications and whether the perpetrator, who at once revealed his role, can strictly be considered to have committed a fraud. And scientists can tell all who will listen that the affair only shows that English departments, where cultural studies is usually located, deserve even less funding than they currently get. Why do they not stick to teaching people how to use the semicolon properly?

But pull back for a moment. Stop the argument about whether the physicist-author, Alan Sokal, deserves a medal or censure, or whether the cultural studies defendant, Stanley Fish, is a man of courageous integrity or foolhardy insensitivity. Let us put things in context and ask ourselves why this happened. Why would a serious scientist take time out to pen a hodgepodge of quasi-fragments about the nature of science, glued together by the worst excrescences of French philosophy, dolled up with all of the apparatus of the scholarly article—quotations, footnotes, references—and send it off to a journal not in his field? And why, why would serious scholars in the humanities—and these people are very serious—be so eager to receive and accept such a piece that they would embrace it and legitimize it by putting it in their journal? Why, above all, would they be so self-confident that they would publish such a piece without first running it past at least one person who knew something about physics?

Start with the scientists. In this century, they have had what one can with modesty describe as a good run for their money, although more precisely one might describe it as a good run for our money. For various reasons, this has been the century of science, of great science: relativity theory, quantum mechanics, the double helix, plate tectonics, and much more. It has, moreover, been the century of the scientist, as governments, foundations, industry have poured vast sums of money into the

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enterprise, producing virtual factories of researchers, technicians, students, administrators, and coordinators, all dedicated to turning out more and more empirical results, more and more theories and hypotheses, in more and more outlets: journals, books, bulletins, conference papers, and various electronic forms.

But now, again for various reasons, the funds are drying up and the prestige is wilting. Part of this is from a general revamping of the global economy, with Western governments and industries having to retrench, to spend more frugally, especially on things without prospects of immediate return—pure scientific research, for instance. Part of this is from the changes in the global power structure, with the collapse of the Soviet communist system and the end of the Cold War. No longer is there the perceived need to spend large sums on defense-related science. Does anyone really think that trips to Mars are needed to save us from the Russians? And part of this decline in the status of science is due to a general change in our culture—an increasing willingness to ask difficult and hostile questions about the sacred icons of society and less willingness to rest content with obfuscating banalities in reply.

This last factor is particularly grating to scientists, for culture does not change in isolation and without reason. In some cases, the enemies of science are obvious and, while dangerous, at least understood and respected for what they are. When biblical literalists try to destroy the teaching of evolution, one may be aroused but one is certainly not surprised. Nor does one feel particularly resentful, or betrayed. After all, what would one expect of an evangelical Christian who accepts the absolute truth of every word of Genesis? But the enemies apparently also reside within, and over this less obvious fact there is resentment, deep resentment. Science is under attack from people of equal standing, often from people inhabiting the same institutions: that is, from scholars in the humanities, from many in the social sciences, and even, in some few cases, from inside the scientific enterprise itself. Always jealous of science and its success, these critics take now the opportunity to attack the empirical investigation of nature and to drag it through a mud of their own making.

How can this be and how can it have come about? The manifesto of the doughty defenders—that which stimulated Sokal to action, not

to mention the editors of *Social Text* in their search for science-debunking contributions—appeared a year or two back. Written jointly by a life-sciences administrator and a professional mathematician, Paul R. Gross and Norman Levitt, *Higher Superstition: The Academic Left and Its Quarrels with Science* has an explanation as simple as it is stark. The 1960s was the age of the flower children: sex, drugs, Eastern mysticism, and above all a deep hatred of science, seen to be the essential engine of the military-industrial complex, then engaged in a corrupting and evil, although highly profitable, conflict in Vietnam. Times have moved on, but not the thinking of these children—children no more, but powerful professors and administrators in the humanities and social science faculties of the universities of the West. Now they and their students can give full vent to their opposition to science, an opposition based on prejudice, fear, and, above all, rank ignorance. Searching out allies and molding opinion to their ends, these critics have no limits to their intentions and their arrogance. Little wonder, then, that the editors of *Social Text* seized happily on Sokal's submission—a piece rubbishing the pretensions of modern science and from a scientist himself! Exposing the piece to referees could only lead to criticism, and that is precisely what the editors did not want.

To the outsider, this scenario sketched in *Higher Superstition* sounds like paranoia. Or self-interest. One's suspicions are hardly abated when one learns from Gross and Levitt that a good way to stop the rot would be to put the hiring of new faculty in the humanities in the hands of the nation's scientists. Not only would they be asked to judge the merits of applicants in high-energy physics but also in Restoration comedy. One shudders at the thought. Goodbye *Social Text!* Welcome *Reader's Digest!* Yet, as the saying goes, even paranoids have real enemies. Could it be that these people have a point, that there is indeed a conspiracy or (perhaps with less conscious design) a movement to tear down the status and achievements of science—a conspiracy or movement fueled by ideology, in respects akin to that fingered by Gross and Levitt?

One has to say that precisely this is suggested by the editors of *Social Text*, in their arrogant response to Sokal's hoax. They speak insouciantly of "questioning, as we do, the scientific community's abuses

of authority, its priestly organization and lack of accountability to the public" (Robbins and Ross 1996, A28). The chutzpa level is off the scale. Uncontrite, they trust that the kind of critique they level "will help us avoid disastrous scientific irresponsibility in the future."

Stuff like this does not come from nowhere, even from members of English departments. The fact is that people like this are fortified by three or four decades of systematic deconstruction of science, its practitioners, its products, its promoters. Indeed, in respects the literary criticism types are Johnny-come-latelies, noteworthy more for the venom of their attacks than for the originality of their arguments. The materials for critique lie readily at hand. Take some of the real heroes of science. One by one, they have been paraded forth, clad only in their tattered underwear, with signs around their necks, rather like the victims of one of Mao Zedong's purges. In the eyes of their critics, a less creditable, more sleazy bunch would be hard to imagine.

Isaac Newton, for example, the greatest of the great, discoverer of the law of gravitational attraction, author of the *Principia,* mathematical genius. Or so you might think. However, for a start it appears that he was one of the shiftiest data manipulators in the history of physics, the kind of man who sends shudders down the spines of honest researchers and who has congressional critics in spasms of investigative frenzy. He trimmed, cooked, and forged the data until his science was as stylized as a painting by Picasso. And he was so brazen and arrogant about it all: "Not the least part of the *Principia's* persuasiveness was its deliberate pretense to a degree of precision quite beyond its legitimate claim. If the *Principia* established the quantitative pattern of modern science, it equally suggested a less sublime truth—that no one can manipulate the fudge factor quite so effectively as the master mathematician himself" (Westfall 1973, 751–752).

But more than that, we now know that Newton showed far less enthusiasm for sober science and much more for crazy speculation about biblical prophecy and alchemic experimentation. Indeed, not only did he poison himself with foul chemicals, but there is reason to believe that his thinking about gravitational attraction was a mere outgrowth of murky mystical speculations that came from his own strange chemistry: "the alchemical hermaphrodite, sulphur surrounded by its mercury,

offered a model to explain the universal property that all bodies possess to act upon each other at a distance" (Westfall 1980, 375). A sadist of the worst kind—his persecution of forgers when he was Master of the Mint turns even hardened stomachs—Newton's only redeeming feature seems to have been that he was homosexual, although even here we find some pretty dicey relationships.

Next comes Charles Darwin, father of evolutionary theory and a real neurotic if ever there was one. Not that we should be surprised since, coming as he did from the comfortable rich upper-middle classes, in proposing a theory of common origins Darwin was threatening the very foundations and stability of the social hierarchy which supported and nourished him. Little wonder that reaction to *On the Origin of Species* was purely political and that those who really reveled in its message were the rank atheists. Fortunately, whatever his failings as a man of science—and they were legion—in other respects Darwin was a man of resource, and so by the time that he published his work on our own species (*The Descent of Man*) the beast had been tamed. Indeed, his vision was essentially the Victorian equivalent of home video (Desmond and Moore 1992, 580):

> The Darwins fitted the picture perfectly. The *Descent* was essentially their story. Natural and sexual selection had made and maimed them. Charles had strutted like "a peacock admiring his tail" courting Emma. Coy and impressionable, she had selected him, admiring his "courage, perseverance, and determined energy" after a voyage around the world. Her "maternal instincts" and feminine intuitions had been the mainstay of their marriage (even if partly a hold-over from "a past and lower state of civilization"). Endowed with wealth, they had a head-start in the struggle—and an "accumulation of capital" was essential if civilized Westerners were to spread and subdue the lower races.

And so on and so forth, right through to the point where evolution's champion had so domesticated the subject that, as a mark of thanks from a grateful nation, he ended up buried in that peculiarly English Valhalla, Westminster Abbey. Appropriately, he and Newton lie there together, for eternity.

Freud hardly deserves a mention. Everyone criticizes him. Even those who come to praise him get in their licks. Having destroyed his personal papers, "Freud actively sought to cultivate the unknown about himself to ensure that he, as intellectual hero, would not be devalued by an overly detailed understanding of his genius" (Sulloway 1979, 7). This is perhaps as well, for it would be a mistake to think that Freud should "be judged against the higher standards of certainty that generally prevail for research and discovery in the physical sciences" (499–500). Little wonder that in right-thinking philosophical circles Freud has become a by-word for how not to do science. The unhealthy relations of a late-nineteenth-century Viennese family have been blown up into a phantasmagoric edifice, totally lacking foundations in the real world.

Albert Einstein might seem more hopeful, but here too one should step with care. In this modern age, all of that stuff about relativity is too obviously cultural to need detailed proof that his work was more an epiphenomenon of his society than a disinterested reflection of objective reality (Gross and Levitt 1994, 46, quoting Ferguson 1990, 238):

> The inner collapse of the bourgeois ego signaled an end to the fixity and systematic structure of the bourgeois cosmos. One privileged point of observation was replaced by a complex interaction of viewpoints. The new relativistic viewpoint was not itself a product of scientific "advances" but was part, rather, of a general social and cultural transformation which expressed itself in a variety of "modern" movements. It was no longer conceivable that nature could be reconstructed as a logical whole. The incompleteness, indeterminacy, and arbitrariness of the subject now reappeared in the natural world. Nature, that is, like personal existence, makes itself known only in fragmented images.

In any case there are serious questions about whether Einstein really did the work himself, or whether the true author was that first wife whom he conveniently dumped, when once he was on the road to fame (Stachel 1995).

So the story goes on. The latest giant of science to receive the debunking treatment is Louis Pasteur, famous for his work on milk and wine and against disease, most notably rabies. I suppose that when you

pick up a book with the title *The Private Science of Louis Pasteur* (by Gerald Geison) you already have an idea what it is all about, and you are certainly not disappointed in this case. In the words of one sympathetic reviewer, Pasteur appears "authoritarian, politically reactionary, self-deceiving, overly concerned with priority and credit, ungenerous to his devoted assistants and ruthless with his less privileged and capable adversaries, and overconfident and reckless in putting human patients at risk" (Kohler 1996, 332). And this is just a start. I have but one piece of advice if Pasteur comes around offering relief through some new pharmaceutical product. In the immortal words of Nancy Reagan: "Just say no!" The famous anthrax vaccinations were done with a substance prepared according to a recipe filched from a rival, they had been preceded by very private failures, and they were inflicted on humans before anyone had got round to testing them on animal models.

Enough. No wonder that the science critics are intoxicated with the success of their crusade. Nary an idol of modern science stands erect, untouched. And if you think these men themselves were moral and intellectual cripples, imagine the status of the work they produced. Why should the editors of *Social Text* have bothered to seek out the refereeing expertise of the very group they are determined to destroy? If, as they now say, Sokal's article struck them then as rather ponderous and naive, this is only to be expected and a small price to pay in the campaign to take the battle right to the enemy. Nor, looking at things from the other side, is it any wonder that the scientists are hugging themselves with delight at the abyss into which the critics have tumbled—or chuckle that these critics now sit at the bottom, mud-bedaubed, blaming others. After years of abuse, the tormented giant is striking back.

But there are serious issues here worth discussing. Science is important, important to us all. Whether you think it is more or less than the sum of its parts, including its practitioners, it is today a major part of our culture, in the broadest sense. For all of the attacks, it is a dominant factor in our lives. Moreover, who in this century of war and destruction—evils brought on in large measure by science-fueled technology—could deny that science has its dark side, and that possibly not everything claimed in the name of science is a simple reflection of objective reality? When recently the possibility of life on Mars was

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