

McGinn's book is very worth reading by anyone interested in these issues. He often argues cogently, and his arguments are sometimes persuasive. Almost every page has something stimulating on it; even his implausible views and arguments are sophisticated and stimulating. Why then do I think that his book is, on the whole, unsatisfactory? Well, for one thing, McGinn's assumed preliminary theses really do need some defending, and they receive none. Amplified exegesis is just not defence. The looks-x/is-x distinction particularly calls for a careful and extensive analysis in relation to the primary/secondary quality distinction; McGinn's negligence here is just outrageous. When McGinn does defend some proprietary view, he all too often does it by trying to eliminate rival views, without offering an independent argument in favour of his own view—a very dangerous practice. Or he will sometimes recommend some proposition because it has interesting consequences, as though that were sufficient. But most of all, there is just too much aprioristic dogmatism throughout the book. For example, McGinn claims that it is simply self-evident that all sense-perception must be perception of the world as having secondary qualities. He also claims that it is an *a priori* matter whether some quality is primary or secondary, and that it is another *a priori* truth that only primary qualities pertain to how objects are in themselves, so that all secondary qualities are *a priori* unfit to figure in a scientific conception of the world. None of these things seem self-evident or *a priori* to me. Why could not there be a world in which colours and flavours and odours are primary qualities, i.e., a world in which objects have such and such causal powers in virtue of their colours, odours, or flavours and without which colours (etc.) they would lack those causal powers? Personally, I would much like some, at least, of McGinn's *a priori* dogmas to be metaphysical truths, and perhaps they are; but nothing he says shows that they are. I suppose I can sum up my discontent by saying that McGinn's philosophical methodology contains more sheer cocksure slapdashery than the philosophical community ought to tolerate.

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Abusing Science: The Case Against Creationism

PHILIP KITCHER

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During the last twenty-five years, a number of organizations have been created to promote the thesis that the Book of Genesis provides a legitimate basis for a scientific account of man's origins. This programme of research has become known as Creation Science (CS), and the expressed purpose of these organizations has been to secure CS equal time with Evolutionary Theory (ET) in the classrooms of America. Creationists have consistently presented themselves as the standard bearers of academic freedom and tolerance. And their efforts have touched a responsive chord: recent surveys indicate that 76 per cent of Americans believe that both theories should be taught to students.¹

¹ This figure was the result of an opinion survey conducted by NBC News, reported in *The New York Times* (November 18, 1981). In concert with other polls that show a

Abusing Science is an exciting assault upon the Creationist drive to reform science education, distinguished by its non-compromising approach to the issue of equal time. The Arkansas Case (1982) is now the legal touchstone for resolving this issue. Although Creationists have taken pains to avoid depicting God in religious terms as a personal, loving Creator, the presiding judge ruled that the Creationist-sponsored Arkansas Statute was passed with the specific purpose of advancing religion. Judge Overton declared that there can be no doubt that CS attempts to short-circuit the Establishment Clause of the First Amendment, and that this covert attempt to entrench what is inherently a religious theory in effect abuses religious freedom and tolerance.²

Philip Kitcher is not content with the legal resolution of the balanced treatment question. He presents the thesis that CS abuses science, independently of what we may think of its attempt to by-pass the American Constitution. CS is not simply falsified or bad science; Kitcher contends that CS is pseudo-science; a dissemblance of the genuine article designed to subvert the aims and methods of the natural sciences. If we grant CS equal time (or any time at all), this movement may "succeed in wreaking havoc upon science education (and, ultimately, upon American science)" (3). Tolerance and fairness are certainly laudable values, however "real open-mindedness requires not that we abandon our intellectual standards, but that we use them to examine the credentials of the ideas that others espouse ..." (167). Since CS is "scientifically worthless" (174), Kitcher rejects the Creationist plea for balanced treatment, remarking that "there is utterly no reason ... to exhort promising students to waste their careers in the pursuit of such obvious folly" (132-133).

Kitcher discusses a number of vexing problems, both scientific and political, but he fails to present them in a rigorous and compelling manner. The central problem generated by the rise of CS concerns control of the science curriculum. Although this problem is the focal point of *Abusing Science*, the book is described (rather misdescribed) by Kitcher as "a manual for intellectual self-defense, something that can be consulted when the smiling advocates of Creationism launch their attack" (4), as though the problem of curriculum control has already been satisfactorily resolved by the reader. Kitcher's real target, however, is not the group committed to ET but the ambivalent 76 per cent who, perhaps out of ignorance of the stakes, express a genuine concern for fair play and desire a voice in the education of their children. Kitcher is out to undermine their democratic instincts, to convince these people that the issue should not be settled by a vote or a committee of teachers, parents, and politicians, but by a consensus of the experts. In so doing, he endorses standard policy in the community of science, expressed by Kuhn in this way: "One of the strongest, if still unwritten, rules of scientific life is the prohibition of appeals to heads of state or to the populace at large in matters scientific".³ The scientific community has grown accustomed to complete autonomy—to unchallenged

noteworthy decline of confidence in public schools, this figure is best read as a protest to the amount of control held by the experts. See "Opinion Roundup", *Public Opinion* (October/November 1981), 23-26.

2 See Marcel Chotkowski La Follette, ed., *Creationism, Science, and the Law: The Arkansas Case* (Cambridge: MIT Press, 1983), 45-73.

3 Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1971), 168.

control over the content of its programmes of research and the training of its members. And Kitcher wants us to leave things just as they are: "If 'Scientific' Creationism merits no discussion in the community of professionals, then it does not deserve a place in the classrooms where those professionals are being educated" (173).

Even if we choose to overlook Kitcher's appeal to authority, we should take issue with his obfuscation of what are surely two separate matters: one concerning the admissibility of CS as legitimate science, and a second concerning public input into science education. Although it may very well be true that CS is not recognized by the experts, it does not follow that the concerned public should leave the education of their children to these experts. The status of Creationism, in other words, need not be used as a paradigm for resolving the problem of curriculum control. After all, we may entertain numerous reasons for including "glorious fakes" like CS in the science curriculum: they can be used to highlight the strengths of the received theory, particularly when genuine alternatives are unavailable; they can serve as effective tools to illustrate the sorts of *mistakes* that are to be avoided; and they can be practical wedges against over-zealous educators who would strip our youth of intellectual autonomy in the name of truth.

These objections aside, Kitcher sets out to convince his reader that CS is worthless as science. Following a brief introduction to ET, he turns to the global criticisms of ET raised by Creationists which, for the most part, stem from confusions about the methods of science. Kitcher discusses the Creationist appeal to a misleading version of Popper's theory of science—the idea that ET is "just a theory", and that it should not be awarded a higher status than other theories. In typical Popperian form, he proclaims that "fallibility is the hallmark of science" (33), and while "conclusive evidence always eludes us" (32), we are assured by Kitcher that ET is the best theory in the face of the relevant evidence. Other Creationist allegations are handled with equal (but no less predictable) deftness; namely, the charge that ET fails to make empirical predictions, and the related but incompatible claim that ET makes false predictions.

In place of the outdated methodology invoked by the proponents of CS, Kitcher advances a set of criteria which is inspired by the more fashionable problem-oriented account of science. A successful scientific theory, argues Kitcher, is a problem-solving strategy which has three characteristics: it is independently testable; it unifies diverse areas of investigation; and it opens up new vistas of research. Regrettably, he spends little time fleshing out his preferred methodology. It is just as well, however, because similar criteria have been developed in greater detail by Lakatos and Laudan, and they have been found wanting. Moreover, the *experts* are far from a consensus on what makes an activity scientific. The suppression of this point by Kitcher certainly does not help his cause.

In the event that the appeal to an unchanging and universal method does not convince the reader of the poverty of CS and the excellence of ET, Kitcher turns to the specific points of controversy. Chapter 3 considers the detailed points of method brought forth by Creationists—complaints about the way in which ET dates the occurrence of ancestral organisms; the charge that ET appeals to implausible special assumptions when its *natural predictions* fail; and related

criticisms. Chapter 4 deals with more substantive points: the claim that random mutations could not produce the order of the world of living beings; the appeal to the second law of thermodynamics; the notion that mutations are rare and harmful (whereas ET supposedly assumes mutations to be common and beneficial); and, of course, the standard appeal to the fossil record. These issues are handled skillfully by Kitcher, making this the most rewarding chapter of *Abusing Science*. His conclusion: "All the Creationists' major objections ... turn out, on closer inspection, to be conjuring tricks, employing inaccuracy, misrepresentation, dazzling numbers, and layers of confusion" (120).

The tables are turned on CS in chapter 5. Kitcher remarks that the bulk of Creationist literature is negative, drawing on a handful of anti-evolutionary themes, designed to obscure the fact that CS "has no infrastructure, no way of articulating its vague central idea, so that specific features of living forms can receive detailed explanations" (126). Although positive proposals are rare, Kitcher uncovers two Creationist problem-solving strategies: the use of Flood Geology to deal with problems about the ordering of fossils, and the appeal to a blend of design and historical narrative to explain the properties, relationships, and distributions of organisms. He also discloses an attempt to absorb much of the problem-solving apparatus of ET, which is based on the Creationist distinction between small-scale and large-scale evolution: "Creationists are perfectly willing to allow for descent with modification, even to suppose that a single species can split into two descendant species. What they deny is that one *kind* of organism can evolve from another *kind*" (143). However, the evidence suggests that the processes of microevolution differ only in degree from those of macroevolution. And the term *kind* has no fixed scientific meaning. Appearing repeatedly in Genesis, it testifies to the religious basis of Creationist writings.

The final two chapters return to the problem of curriculum control. Kitcher warns us that "it is educationally irresponsible to pretend that an idea that is scientifically worthless deserves scientific discussion" (174), thereby ruling out the possibility of CS having an instructional value other than scientific. The paradox of *Abusing Science*, however, is that if we look upon it favourably, we are forced to reject this thesis. An overwhelming case is presented for the worthlessness of CS, so compelling that one suspects, as against Kitcher, that there is no reason (legal reasons excepted) to prohibit its mere presence in the curriculum. But Kitcher is concerned that any time granted to CS would force teachers "to sit idly by while students 'decide' an issue that they are in no position to resolve rationally" (176), just as he is worried that the majority of people will refuse to accept the sound verdict of the experts. The bottom line is that Kitcher is not threatened by CS; he is afraid of the Creationists themselves and the gullibility of the American people. And so even while Kitcher maintains that Creationists are toying with our "fears about what scientific inquiry will disclose" (202), he follows in their footsteps by playing on related fears we have about charlatans and what has been perceived by many to be a downhill slide in educational standards of late.

We should not be stampeded into relinquishing whatever control we still have over the school curriculum. Although intellectual standards are a valuable safeguard against the *Soapy Sams* of the intellectual world, the Arkansas Case and recent polls are a signal that people are deeply concerned about the amount

of control already accrued by the experts. Kitcher's fears about CS may very well be warranted, and *Abusing Science* certainly provides a compelling argument to this effect, but leaving the problem of curriculum control to the experts can only aggravate the situation. Perhaps we would be wiser to seek a middle ground, one which does not require that we sacrifice the intellectual autonomy of our children in the name of science.

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Kant and the Double Government Methodology

ROBERT E. BUTTS

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In recent years Kant scholarship in Anglo-American forms has been so technical, so bound to the analysis of a particular text, or so accommodating to present styles of philosophizing, that the main thrust and the central notions of Kant's own philosophy have often become of secondary importance when they have not been lost altogether.

Butts's original and illuminating book is an effort to recover some of the losses, not by rehearsing the main tenets of Kantian doctrine in a trite way, but by examining Kant's strategy from the standpoint of a philosopher of science who is also sensitive to intellectual history. The title of the book is meant to indicate Kant's indebtedness to Leibniz from whom the phrase "double government methodology" is borrowed. But the book might just as fittingly have been called *Kant the Dietician of the Mind* to use Butts's deliberately provocative characterization of Kant's abiding interest in psychopathology and the "enthusiasm" he considered the bane of philosophy. Kant tried to steer a course between the Scylla of metaphysics and the Charybdis of fanaticism, or, in more personal terms, between Leibniz the rationalist and Swedenborg the spiritualist. Hence his lifelong preoccupation with the status of the supersensible. Kant's attempts to ground morality in practical reason, or to free religion from both the excesses of reason and the destructive sentimentalism of bogus mysticism, must be seen against the background of this larger epistemological issue.

The first two chapters set the stage with the best summary of Leibniz's metaphysics and methodology that I have come across. Butts shows how Leibniz's solution was to become Kant's problem, and why Kant accepted the research programme of the Double Government Methodology or the belief that we can talk meaningfully, albeit in different ways, of machines on earth and angels in heaven. More specifically, Kant accepted that the behaviour of material objects should be explained in mechanical terms without recourse to occult properties or theological considerations, and that study of the soul is methodologically distinct from the study of the body because souls and bodies belong to different governments.

Butts sees Kant moving away from Leibniz as early as 1777 in his whimsical and ironic essay *The Dream of a Visionary Illustrated by the Dreams of Metaphysics*. It is one of the many virtues of Butts's book that little-known works of