ARTICLES

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Anti-Antiscience: The Fight for Science and Reason

The Varieties of 'Antiscience'

On various occasions over the past three decades or so, cultural, political, epistemological and ethical criticisms of science have been labelled 'antiscience.' This label has been used for a wide variety of phenomena, such as the counter-culture movement, feminist critique, left-wing criticism, relativist and constructivist sociology of science, and various postmodern criticisms. At times, there is also a vague hint of something called "the antiscience movement." The most recent examples of this genre are Paul Gross and Norman Levitt's *Higher Superstition: The Academic Left and Its Quarrels with Science* (Gross and Levitt, 1994) and Gerald Holton's *Science and Anti-Science* (1993). Also, recently there have been two conferences organized by an organization called the National Association of Scholars, one in Cambridge, Massachusetts in November 1994 called "Objectivity and Truth in the Natural Sciences, the Social Sciences, and the Humanities," and another in New York in June 1995 with the title "The Flight From Science and Reason." A somewhat less visible, but equally passionate forum for warnings about the threat of antiscience is the popular journal *The Skeptical Inquirer.*

Higher Superstition has attracted considerable interest in American academia. Written by two scientists, Paul Gross, a biologist and now the director of the Center for Advanced Studies at the University of Virginia, and Norman Levitt, a professor of mathematics at Rutgers University, the book might be seen as the scientists finally striking back at those who have already for some time been enthusiastically disparaging science. Gross and Levitt are particularly infuriated with the "postmodern" attempts by humanists and social scientists to question science as a valuable way to finding out the truth about the world. However, according to the authors, the immediate danger of all this is not to science itself, but rather to the larger culture.

Their book has created quite a stir and been widely reported on in academic journals and magazines. For instance, in the fall of

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1994, the American academic weekly *The Chronicle of Higher Education* dramatically quoted the authors as dismissing "the relativism of the social constructivists, the sophomoric skepticism of the postmodernists, the incipient Lysenkoism of feminist critics, the millenialism [sic] of the radical environmentalists, the radical chauvinism of the Afrocentrists" as "unscientific and antiscientific nonsense" and as a "bizarre war against scientific thought and practice being waged by the various ideological strands of the academic left" (Cordes, 1994; Gross and Levitt, 1994: 252–53). Indeed, the authors do not mince their words when they attack their targets. In their book, they single out a number of positions, which they see as inspired by postmodern thought and values: the Marxist view of science as a tool of capitalism, either as such or revamped into the newer doctrine of "cultural constructivism," the radical feminist view of science as affected by gender bias, the multiculturalist condemnation of Western science as inherently inaccurate, and various radical environmentalist views which hold science responsible for ecological disaster (Gross and Levitt, 1994: 4–5).

In a later article entitled "Antiscience in Academia – Knocking Science for Fun and Profit," Gross and Levitt discuss what they believe to be the guiding motives of this "academic" or "cultural" left and how the latter's criticism differs from "serious" criticisms of science. They also speculate about the reasons why this criticism is becoming so popular:

> A new and fashionable cottage industry has appeared among the intelligentsia, especially among academics. Its principal activity is to issue quantities of arrogant and hostile criticism of science. The specific content of the examined science rarely comes into it, for the simple reason that *the trendier critics don't bother to study the science seriously* ...
> This style of criticism must be distinguished from the informed judgments that have by tradition been a part, explicitly or otherwise, of serious philosophy and history of science, and that have, at their best, encompassed the logic, the evidence, and the methodological constraints of the science under study...
> What concerns us, however, is the new brand of criticism, a hybrid discipline ... whose external semblances are variously sociological, historical, even philosophical, but whose underlying motive is none of these. Rather, *it is ideology that is in the driver's seat* – specifically the ideology of what has been called the "academic" or "cultural" left...
> Its view of science is today highly influential among the academy ... and increasingly so outside the campus gates. In part, this is due to a tactical exploit of the new science critics: they have avoided the professional scrutiny of scientists and others devoted to reason as a means of understanding the world ... Most important is the debasement of the public discourse of science and technology, a discourse already inadequate to the complexity of *global issues at whose heart lie scientific questions* (Gross and Levitt, 1995, italics added)

In their mission against antiscience, Gross and Levitt have found allies in the people behind *The Skeptical Inquirer*, the journal of the Committee of the Scientific Investigation of Claims of the Paranormal (CSICOP), an organization devoted to critical inquiry into pseudoscience and paranormal claims. This journal and its background organization has existed for two decades, with local and regional organizations in the United States and with contact to other national organizations of "skeptics." Gross and Levitt's above mentioned "Antiscience in Academia" article appear in the March/April 1995 issue of this journal, but already one year earlier (Spring 1994), a whole issue was devoted to "The Antiscience Threat." In that issue, Paul Kurtz, the founding chairman of CSICOP, identified the following ten reasons for what he believed were examples of

antiscience sentiments in contemporary society:

1) The anxiety about a possible nuclear holocaust after World War II.
2) Fears generated by the environmental movement.
3) Widespread phobia about chemical additives.
4) Suspicion of biogenetic engineering.
5) Widespread attack on orthodox medicine.
6) The growing opposition to psychiatry.
7) The phenomenal growth in "alternative health cures."
8) The impact of Asian mysticism in the form of Yoga and various spiritual cures.
9) The revival of fundamentalist religion even in advanced scientific and educational societies; creationism in the United States.
10) The growth of multicultural and feminist critiques of science education.

The same 1994 issue of *The Skeptical Inquirer* also contained excerpts from Harvard physicist and historian of science Gerald Holton's then brand-new book *Science and Anti-Science* (Holton, 1993). Holton appears to have the most ominous and far-reaching vision of the critics of antiscience. He makes a direct connection between antiscience sentiments in society and disastrous consequences for the political system as a whole. For Holton, such sentiments are dangerous, because they can easily serve reactionary political forces. This is evident from the following:

> [H]istory has shown repeatedly that a disaffection with science and its view of the world can turn into a rage that links up with far more sinister movements.

and

> History records that the serious and dedicated portion of the anti-science phenomenon, when married to political power, does signal a major cultural challenge. At its current level, this challenge may not be an irreplaceable threat to the modern worldview as such. But it cannot be dismissed as just a distasteful annoyance either, nor only as a reminder of the failure of educators. On the contrary, the record from Ancient Greece to Fascist Germany and Stalin's U.S.S.R. to our day shows that *movements to delegitimate conventional science are ever present and ready to put themselves at the service of other forces that wish to bend the course of civilization their way* – for example, by the glorification of populism, folk belief, and violence, by mystification, and by an ideology that arouses rabid ethnic and nationalistic passions... (Holton, 1994, italics added; excerpted from Holton, 1993, chapter 6).

Going back to Holton's book, we find that, for him, there are four prominent sections among the current "cohort of delegitimators" which "advocate the end of science as we know it:"

1) A type of modern philosopher who asserts that science is nothing more than a social myth, or sociologists of science (such as Bruno Latour) who wish to abolish the distinction between science and fiction.
2) A small group of alienated intellectuals, who have chosen to attack science (such as Arthur Koestler).
3) The resurgence of "Dionysians" – people with New Age type preferences and a profound opposition to the idea of objective data; such preferences are traceable to the 1960's counterculture and 19th century Romanticism.
4) Radical feminists such as Sandra Harding, who calls for a total "intellectual, moral, social, and political revolution" against androcentrism and faith in the progressiveness of scientific rationality (Holton, 1993: 153–154).

Thus, as we see, a number of different things are called "antiscience." The common concern of those who worry about antiscience appears to be that they see this

type of criticism as fundamentally irrational. Furthermore, the authors warn that abandoning science and reason is socially dangerous, because they are central for public discourse and for solving global problems. What is also common for the writers against antiscience is that against the various types of alleged "superstition" or "ideology" is upheld a picture of science which appears largely unproblematic. In this respect, the writers on antiscience appear to have a similar conception of science as the journal *The Skeptical Inquirer*, in which the picture of science has always been relatively idealized, and probably much harder than many practising scientists would care to recognize. (To its credit, *The Skeptical Inquirer* does try to keep an open mind about paranormal phenomena, but sometimes the writing is militantly black and white, and the CSICOP conferences are veritable celebrations of science).

But there is also genuine puzzlement. Gross and Levitt note that they and other scientists find enigmatic the academic left's "open hostility to the *actual content* of scientific knowledge and toward the assumption, which one might have supposed universal among educated people, that scientific knowledge is reasonably reliable and rests on a sound methodology" (Gross and Levitt, 1994: 2). As to this hostility to science they say

> There is something medieval about it, in spite of the hypermodern language in which it is nowadays couched. It seems to represent a rejection of the strongest heritage of the Enlightenment. It seems to mock the idea that, on the whole, a civilization is capable of progressing from ignorance to insight ... All the more shocking is the fact that the challenge comes from a quarter that views itself as fearlessly progressive – the veritable cutting edge of the cultural future. ... These critics of science do not repine for the traditional mores and devout certainties of a prescientific age. *They accuse science itself of a reactionary obscurantism*, and they revile it as an ideological prop of the present order, which many of them despise and hope to abolish (Gross and Levitt, 1994: 3, italics added)

Can Scientists Be Antiscience?

What is interesting is that most of the current warriors against antiscience use this term only to denote efforts by outsiders to science, or by members of *other* academic fields than natural science. Antiscience advocates are typically described as knowing little about science. This is the case with Gross and Levitt, who primarily attack literary criticism types, SSK sociologists, philosophers, feminists and the like. In *Higher Superstition*, their targets are a motley bunch. They include Paul Feyerabend, Bruno Latour (*Science in Action*, 1987 and material related to his new book *Aramis or the Love of Technology*, 1996), some chaos theorists, some environmentalists and AIDS activists, Evelyn Fox Keller, Helen Longino and Donna Haraway as representatives for feminist critique of science, and finally Jeremy Rifkin, that popular alarmist about ever-new scientific dangers, from global warming, to runaway biotechnology, to the risk of eating meat. As their choice of Latour shows, Gross and Levitt have not always succeeded in picking the most representative people for their critique of "cultural constructivism." For instance, although they make much of constructivism in their book, they have largely missed what the science studies community *itself* would consider leading SSK constructivists. However, they do critically discuss Shapin and Schaffer's *Leviathan and the Airpump* (Shapin and Schaffer, 1985).

But others believe that also scientists can be antiscience. For instance, in his review of their book, the philosopher Michael Ruse takes issue with Gross and Levitt about exactly this matter (Ruse, 1995). Ruse specifically asks why the authors, if they are critical of the "academic left," do not criticize such highly visible left-wing scientists like

Stephen J. Gould and Richard Lewontin. According to Ruse, these two are well-known political attackers of science – more specifically, research on the biological foundations of human behavior (sociobiology, behavioral genetics, and the like). Additionally, they are much appreciated and quoted by humanists and social scientists.

This same sentiment that important left-wing scientists are missing is echoed by Edward O. Wilson, the author of *Sociobiology* (Wilson, 1975). Wilson does not criticize Gross and Levitt for excluding Gould and Lewontin, but tries instead to compensate for this lack himself in his recent autobiography *Naturalist*, published in the Fall of 1994. I was asked to read the manuscript of this book and did indeed wonder why Wilson insisted on calling the critics of sociobiology "postmodern," of all things. In my view, the use of "postmodern" for left-wing criticism in 1975 was anachronistic. But then I happened to pick up *Higher Superstition* and saw that on its back cover Wilson had endorsed this book in glowing terms. It is not hard to imagine what had happened: Gross and Levitt's terms like 'ideology' and 'the academic left' only too painfully reminded Wilson of his own experiences with left-wing academics in the 1970s and '80s attacking what he regarded as a piece of objective scholarship. Thus, we have here an indication that the expression 'the academic left' was a well-chosen one for its inclusiveness – at least Wilson was willing to recast his opponents as part of the postmodern attack on science and himself as a proscience warrior. This was also the gist of his talk about science and ideology at the National Association of Scholars conference in Cambridge in November 1994 (Wilson, 1995).

Allegations about scientists being antiscience can be found especially in conjunction with recent controversies in biology. Ten years ago, the editor of *Minerva*, sociologist Edward Shils warned about antiscience within science itself in his preface to *Storm over Biology*, a collection of essays and editorials on recent biology, from recombinant DNA to sociobiology, by the Harvard microbiologist and proscience activist, Bernard Davis. In his preface Shils even spoke about an antiscience movement:

> The antiscience movement that has grown up in recent years is ignored by most of the scientific community. But *it derives much of its force from the support of a small group of scientists* and it may accomplish real mischief....
> The disaffected scientists charge that the application of scientific knowledge is often pernicious, and some of its branches are even inherently dangerous. Sometimes coupled with this criticism is the view that modern science is driven by a desire to dominate both man and nature, and that it therefore seeks alliance with the earthly powers in the polity and the economy. Another frequent argument is that those who practice scientific research are members and supporters of "the elite," disregarding the welfare of the populace, excluding them from deliberations and decisions, and choosing problems without concern for the needs of ordinary persons. A more specific accusation is that certain branches believe in the inequality of human beings and attempt to demonstrate it.
> Some critics further assert that scientific knowledge is in fact only a part of the ideology of bourgeois society....its pretensions to objectivity are alleged to be baseless. The detachment that has long been a source of pride for scientists would then be simply a pleasing fiction. An important school of the sociological study of science takes the position ... that practical interests and "social position" enter into the very categories and the criteria of validity of knowledge (Shils, 1986, italics added).

This quote summarizes much of the concerns of the current critics of antiscience, particularly Gross and Levitt, but unlike the latter, it singles out scientists as the leading force behind "the antiscience movement."

Here we also see a early attempt by a warrior against antiscience to connect the SSK program in sociology of science to an antiscience stance. For Shils, then, the different criticisms of science together formed something that he called 'the antiscience movement.' Although Shils went on to say that "only a handful of those who swim in the currents of antiscience do so equally in all of them," still, he maintained that " these various currents do represent a *coherent body of beliefs*" (my emphasis). Shils' and Davis' fundamental concern with antiscience had to do with the possible negative consequences of this type of beliefs for science itself, that is, the public support of science, the recruitment of scientists, and the very morale of scientists.

From the context of Davis' book, it is clear that what Shils had in mind when he talked about "a small group of scientists" were scientists vocally opposed to such things as sociobiology, behavioral genetics and mental testing. For him (as for Davis) the mere fact that these scientists were *critical* of research in these fields was proof enough that they were against *science*. The question of interest now is: Were these scientific opponents to recent research in heredity and behavior really *anti*science, or were they merely *critical* of science? If one scrutinizes the people typically pointed to – Gould and Lewontin – one can find many instances where these purported antiscientists themselves have spoken up *for* science. For example, Gould has often explicitly stated his belief in science, saying things such as "As a practicing scientist, I share the credo of my colleagues: I believe that a factual reality exists and that science, though often in an obtuse and erratic manner, can learn about it" (Gould, 1981). The point is rather that these critics have protested against what they consider *"bad" science*, which for them is exactly some of the fields that people like Davis, Shils, and Wilson have been enthusiastic about. (For a discussion of clashing conceptions of "good science" in regard to sociobiology and related fields, see Segerstråle, 1986, 1992).

Thus, Gould is not a credible antiscientist, if antiscience means adopting a constructivist attitude. And there is also clear evidence that Lewontin should not be connected to social constructivism. In fact, together with two other critics of "biological determinism," he is on record as explicitly voicing his disapproval of the Strong Programme in the sociology of scientific knowledge (in *Not in Our Genes*; Lewontin, Rose and Kamin, 1984). Just like the current critics of antiscience, Lewontin also believes in the existence of a "true" science. (Indeed, it was just because they believed in true science that the authors of *Not in Our Genes* likened themselves with a fire brigade, who had to put out now this, now that, dangerous piece of scientific nonsense; Lewontin, Rose and Kamin, 1984, p. 266).

This means that *all* parties, both the critics of antiscience and the scientists they singled out as promotors of antiscience, worry about the contamination of science by ideology – it is only that they all mean different things with 'ideology.' For Gross and Levitt, 'ideology' is the whole set of views among the "cultural left;" for Wilson it is particularly Marxist ideology threatening objective sociobiological scholarship, and for the critics of sociobiology and related fields, 'ideology' is bourgeois ideology aimed at buttressing a social belief in innate inequality.

Let us now go back to Michael Ruse's charge that the authors of *Higher Superstition* do not criticize Gould and Lewontin for being antiscientists, even though the latter are notorious political critics of science. It is hard to tell what Gross and Levitt think about Lewontin, because he does not appear in their book at all. (It is instead Wilson who currently does his best to link up Lewontin with "antiscience," Wilson, 1995). However, Gross and Levitt have nothing but praise for Gould. Gould is presented as a model for "incisive" historical and cultural criticism of science. Indeed, for Gross and Levitt, Gould, although leftist, is an acceptable critic of science, and as such is duly contrasted with *unacceptable* ones, such as constructivists (Gross and Levitt,

1994: 56). But this is interesting, since Bernard Davis, the late comrade-in-arms of the current proscience fighters, had singled out particularly Gould and his critique of IQ research in *The Mismeasure of Man* (Gould, 1981) as an example of "antiscience" – even worse, of "Neo-Lysenkoism" (Davis, 1983). And even more interestingly, exactly the Gould book that inspired Davis to write a whole article about "Neo-Lysenkoism," is recommended by Gross and Levitt for its "analytical sanity" (Gross and Levitt, 1994: 263)! Thus, within the anti-antiscience position, there appears to be some internal disagreement as to who and what exactly should be included under the label 'antiscience,' and the political lines do not seem to be clearly drawn in this respect. We will return to this in the last part of this article.

Academic Discourse and Its Effect on the Science Budget.

So are postmodernists, sociologists, feminists, environmentalists and others somehow responsible for the current climate of criticism of science? This seems to be what the current warriors against antiscience are in fact suggesting.

It is not hard to understand that committed scientists may become possessed by a holy rage when science seems to them unfairly attacked. Indeed, today science criticism has become something of a form of entertainment – scandals of any kind do sell (for an analysis of the recent scandal around the Nobel laureate David Baltimore, see Segerstråle, 1993). Books from the 1980s and early 1990s had titles such as *Betrayers of the Truth* (Broad and Wade, 1983), *False Prophets* (Kohn, 1986), *Impure Science* (Bell, 1992), and in 1991 a front page of *Time* magazine (26 August) was devoted to "Science under Siege." Older cases in the history of science are being reexamined and relabelled and used as "canned" case studies in articles and books about fraud (cf. Segerstråle, 1995). Now the turn has come to electronic mail and to e-mail mailing lists such as SCIFRAUD. Here is a small piece of information showing the seriousness with which the warriors against antiscience take their mission. According to a recent issue of *Lingua Franca* (a bimonthly popular journal which calls itself "The Review of Academic Life") Gross is said to have taken upon himself to rebut messages on the SCIFRAUD mailing list. The journal quotes Gross as saying: "I started off as a lurker. But these idiots pissed me off so much, I just had to respond." After that, Gross was responding daily, refuting "every paranoid charge" (Zalewski, 1995).

Still, a real question is: Why are Gross and Levitt interested in antiscience in *academia*? Why did they not, unlike Holton and Kurtz, concentrate on "obvious" cases of antiscience in the general public, clearly stated antiscience, such as creationism? In the United States, the prevalence of religious fundamentalism is a real challenge. According to recent polls, about half of the United States population currently believes in some version of creationism (Numbers, 1992: ix, quoted in Hollinger, 1995: 453). When it comes to general science literacy in America, the situation is bad enough (e.g., Lawler, 1996), and it is not helped by the media, whose sensationalist reporting often do not make a difference between fact and fiction. (This has been noted by *The Skeptical Inquirer*, too, who is keeping constant media watch). A recent incident which was reported on in *Science* was a Sunday evening television program called "The Mysterious Origins of Mankind" (National Broadcasting Corporation, 25 February, 1996), which in a factual way presented the creationist argument about the simultaneous existence of humans and dinosaurs on Earth and suggested that the scientific establishment was suppressing the evidence (Holden, 1996). (Incidentally, in regard to creationism, Gould has been doing a valuable one-man job defending science/evolutionism against antiscience/creationism).

One explanation for Gross and Levitt's surprising focus on academia could be that

they belong to a type of scientists that I have called "weeders." Weeders believe that "bad" knowledge products ought to be weeded out inhouse before such things get out to the public (cf. Segerstråle, 1992). In this respect, Gross and Levitt would be similar to the critics of sociobiology and IQ testing, who believed in debunking of "bad" science, or why not, to Ned Feder and Walter Stewart, two scientists at the National Institutes of Health, who took it upon themselves to weed out errors and fraud in science (e.g., Segerstråle, 1993).

As to the objective situation, it is clear that science is currently in some trouble, with the recent closing down of the Superconducting Supercollider and the Congressional Office of Technology Assessment, and the cutting of research budgets. Still, the enormous Human Genome Project is going strong. But what is the empirical relationship between various types of purported antiscience sentiments and the real situation for science? The current situation of science may have nothing to do with antiscience attitudes, even if they were widespread in the general public. (Incidentally, the results from several recent studies indicate that contrary to the belief of some, the American public does trust science, despite the fact that it is rather ignorant of science; Lawler, 1996, Woolley, 1995). The real problem may be simply that the Cold War has ended, and with it an exaggerated science budget. Indeed, as a recent *Science* article about "the changing ecology of science" suggests, many assumptions about science which were developed during the unprecedented growth of science after the Second World War may now have to be completely rethought (Byerly and Pielke, 1995; see also Cholakov, this issue, for examples of the close connection between wartime interests and national support for science).

Although Gross and Levitt and others do hold the "academic left" responsible for spreading antiscience sentiments, they do not explicitly accuse these academics for closing down the supercollider, or blame them for cut-downs in the science budget. But, incredible as it may sound, something like this was in fact argued a decade ago in Great Britain. In 1987 in a lengthy commentary in *Nature*, two physicists, T. Theocharis and M. Psimopoulous did indeed declare that the decreasing funding for British science was a direct consequence of the prevailing negative attitudes in the philosophy of science! So who was the main culprit? While currently Gross and Levitt identify Paul Feyerabend as "one of the thinkers directly responsible for initiating the chain of ideas leading to the cultural constructivist view of science," and Thomas Kuhn as "the most often cited" (Theocharis and Psimopoulous 1987: 49), the British physicists went one step further. For them, the root of all evil was Karl Popper.

In the 1980s, the situation for science in Britain was much the same as the current one in the United States; the cut in science funding just happened there a decade or so earlier. The *Nature* piece by Theocharis and Psimopoulos was a clear bid in a larger ongoing discussion about proposed drastic changes in British universities and funding of research. Surprisingly, these physicists started out by suggesting that the bad situation was really due to the lack of vigilance on the part of the scientific community:

> Public spending on science has declined in other countries, too. But a combination of reasons peculiar to Britain has made the situation perhaps the worst in any advanced industrial state ... [O]ur objective is to identify and endeavour to combat what we consider to be the most fundamental, and yet the least recognized cause of the present predicament of science, not only in Britain but throughout the world. ... In this article we argue that the British scientific and philosophical communities, and in particular the RS [Royal Society] have to their cost neglected one important factor in implementing their policies, and that therefore the financial crisis is to a considerable extent self-inflicted (Theocharis and Psimopoulos, 1987).

What was this factor that the scientific community had neglected to its peril? The answer was: the general spread of antiscience sentiments, or, as Theocharis and Psimopoulos formulated it, of "epistemological antitheses." They went on to mention several recent BBC television programs and popular articles devoted to themes such as "Science ... Fiction?" and "The Fallacy of Scientific Objectivity." According to the two physicists, all of these programs came to the same conclusion, namely that "[t]he gradual recognition of these arguments may affect the practice, the *funding* and the institutions of science." And what was the result? As Theocharis and Psimopoulos told the readers of *Nature*: "At least in Britain, the repercussions of these mistaken arguments are already happening. Scientists in other countries be duly forwarned." (Theocharis and Psimopoulos, 1987).

One piece of evidence which was held up as demonstrating the direct link between declining government funding and a climate of doubt about science was a statement made already in 1971 by a Parliament member, who later (1976–1979) became the Secretary of State for Education and Science:

> For the scientists, the party is over ... Until fairly recently no one has asked any awkward questions ... Yet there is a growing suspicion about scientists and their discoveries ... It is within this drastically altered climate that the dramatic decline in expenditure on scientific research in Britain is taking place (Shirley Williams 1971, quoted in Theocharis and Psimopoulos, 1987).

1971 sounds rather early for identifying a "growing suspicion" about science. At that time, the social constructivists and postmodernists were not yet on the move: they were just discovering people like Kuhn and Feyerabend and largely still engaged in a rear battle against Mertonian norms. What occupied the social sciences at this time was, rather, a debate about values and ideology in social research. But within philosophy there did exist a vigorous discussion about scientific epistemology, objectivity, rationality, and the like. In this general discussion about the nature of scientific reasoning typically participated also some scientists, like Nobel laureate Peter Medawar, who contributed such spirited popular articles as the famous "Is the Scientific Paper a Fraud?" (Medawar, 1963), and a long discussion on the contrast between traditional statements about method and what scientists really do (Medawar, 1969). And, of course, this was the time of James' Watson's publication of *The Double Helix* (Watson, 1968), which provided a surprising back-stage glimpse of creative scientific work.

What is interesting is the clear structural parallel between the mid-1980s initiative by Theocharis and Psimopoulos and Gross and Levitt's actions less than a decade later. As we have seen, both these sets of scientists wished to alert their "innocent" fellow scientists as to what was really going on. However, the British duo went one step further than the current anti-antiscience warriors in the United States. They directly criticized the Royal Society and other scientific bodies for not having responded to media programs propagating what they called "epistemological antitheses" of science. They also admonished the scientists who had participated in these programs for ignoring the fact that such programs could contribute to a climate of opinion which might threaten not only science but also society.

The greatest difference, however, is that the British physicists saw the decreasing public funding for science as a direct result of the academic discussion about the nature of scientific epistemology. While the idea of blaming epistemology for the cuts in research support for science was their own, the British duo had borrowed the idea of epistemological antitheses from the philosopher Davis Stove. (It was also he who had originally, labelled Popper an "irrationalist;" Stove, 1982). They listed the antitheses as "skepticism, agnosticism,

'criticismism' [a term invented by Stove], cynicism, relativism, anarchism, nihilism." And just like Gross and Levitt, also Theocharis and Psimopoulos snidely remarked on the widespread popularity of such antiscience attitudes ("the endorsement of these antitheses saves one from the painstaking effort of discovering new truths"). They also warned that the antitheses had potentially serious consequences for science and society. Here the British duo was more specific than the current American critics when it came to the direct causal connection. They boldly declared:

i) Intellectual bankruptcy entails financial bankruptcy.
ii) Epistemological anarchism entails social anarchism.
iii) Epistemological relativism, 'criticsmism' and nihilism entail scientific chaos, confusion and stagnation (Theocharis and Psimopoulos, 1987).

But what was the actual mechanism through which such "isms" were producing a cut in the science budget? The authors realized that this had to be made clear. According to them, "the logical steps leading from the antitheses to the inescapable conclusion that the funding of science should be cut are not usually spelled out in detail. We spell them out now." Their logic went as follows:

> In the golden age of science, it was believed that verified theories of science were true and everlasting. But with the increasing acceptance of the antitheses, these exalted old ambitions of science are seen as bogus. According to epistemological relativism, science should no longer claim superiority for its method and the knowledge that it produces. ... Scientific theories are now considered to be temporary and dispensable. Furthermore, *by denying truth and reality, the antitheses reduce science to a pointless, if entertaining game*; a meaningless, if exacting exercise; and a destinationless, if enjoyable journey...
>
> *Having lost their monopoly in the production of knowledge, scientists have also lost their privileged status in society* ... It is the duty of those who want to save science, both intellectually and financially, to refute the antitheses, and to reassure their paymasters and the public that the genuine theories of science are of permanent value, and that scientific research does have a concrete and positive and useful aim – to discover truth and establish reality (Theocharis and Psimopoulos, 1987, italics added).

Thus, we might say that at the very least, Theocharis and Psimopoulos provided a detailed model of the *possible* connections between academic discourse and financial support for science, something that had been left largely implicit in the current American discussion. Meanwhile, Gross and Levitt can be seen as forcefully responding to Theocharis and Psimopoulos' call to scientists to respond to the challenge of the "antitheses."

As we saw, the British physicists in their "logical" search for the real culprit went all the way back to Popper. What was the rationale for this? For them (following Stove), it was Popper who originally abandoned the idea of verifiability in favor of falsifiability and who, with his conjectures and refutations, introduced the notion of scientific truth as temporary. From there it was all the way downhill to Kuhn, who abandoned the idea of truth in favor of transient paradigms, and finally to Feyerabend, who declared that science had no other foundation than the principle "anything goes!" However, it is odd that in 1987 Theocharis and Psimopoulos were *not* attacking the then quite vocal social constructivists and relativists (for instance, Harry Collins was one of the contributors to the "Science ... Fiction" program on BBC; Collins, 1987). It is even more remarkable that these physicists should have upheld their own "logical" *model* against the well-known *fact* that Popper himself saw an intimate connection between his epistemology of falsifiability and its social

consequences (e.g., Popper, 1976). (Indeed, as he said in his autobiography, he was looking for an epistemology which when applied to the social realm would have desirable consequences. Thus, his ideas of conjectures and refutations, and falsification have their direct parallels in democratic ideals as against totalitarian regimes).

To their credit, many readers of *Nature* protested against Theocharis and Psimopoulos's attack on Popper as unfair. And, not surprisingly, Popper himself was quite unhappy with the later developments in contemporary philosophy, history and sociology of science. In an interview in the *Scientific American* a couple of years before his death, Popper described the overall situation in the field of science studies as "terrible" (Horgan, 1992).

In contrast to Theocharis and Psimopoulos, who felt justified in using their logically derived model as a basis for moral condemnation, Gross and Levitt seem quite willing to exculpate the theorists of science "who started it all." For instance, even if they mention Kuhn as the most quoted authority among the cultural left, they note that Kuhn's work has "so often been vulgarized and distorted by the cultural constructivist school" (Gross and Levitt 1994: 56). In fact, they suggest that it takes a special reading to misunderstand Kuhn's message so badly. As a defense of Kuhn, they invoke the fact that he himself in his reply to his critics in the second edition of his book (Kuhn, 1970) denied that his book lent support to relativism (Gross and Levitt 1994: 139). (They might have added that Kuhn himself has ever since been deeply unhappy about the unintended consequences of his ideas and tried to retreat to a more conventional-sounding position – after all, *The Structure of Scientific Revolutions* initially appeared as a contribution to the *International Encyclopaedia of Unified Science*, Otto Neurath's grand logical positivist effort). But if Kuhn's intent was so obvious, how come a whole philosophical symposium on Criticism and the Growth of Knowledge was devoted to trying to figure out exactly what he was saying (Lakatos and Musgrave, 1970)? We also learn the surprising piece of information that Feyerabend "now expresses deep reservations about the outcomes of this line of thought" (Gross and Levitt 1994: 49). The basis for this assertion is a 1992 article of his, entitled "Atoms and Consciousness." But again, this is not the Feyerabend most scientists or other people know (for one of the last interviews with Feyerabend, see Horgan 1993).

Antiscience and the Battle between the Two Cultures

Theocharis and Psimopoulos may have spelled out a possible train of thought when it comes to the connection between the financial situation of science and prevailing antiscientific sentiments in the general public, but such a reasoning is not what we directly hear from the current fighters against academic antiscience in the United States. Those who have gone farthest in allegations as to real effects on scientific research are rather some scientists who have declared other scientists supporters of antiscience. We have also seen that many opponents of antiscience appear particularly concerned with antiscience sentiments in academia, rather than with the widespread phenomenon of creationism or the poor state of scientific literacy in the general public. It seems that they believe that by forcefully debunking recent postmodern and constructivist critiques and analyses of science, they will be preventing the spread of antiscience sentiments in academia and the general public and thus restore the natural state of affairs, which is pro science and reason.

An obvious way to look at all this would be to say that the scientists are now finally striking back against the recent criticism of science from humanists and social scientists. We have here one of C. P. Snow's *The Two Cultures* vigorously protesting against the abuse it has suffered at the hands of the other. But we have to look farther back in

history to understand what is going on. Indeed, from a perspective of the last twenty-five years or so, the current situation may seems as the scientists striking back. But it may as well be characterized as the scientists trying to *recapture* science's now threatened cultural hegemony and its role as a progressive social force.

Recently the historian of science David Hollinger addressed the central cultural role of science in the United States during and after the Second World War (Hollinger, 1995). Although this proscience period is well-known, what is less known is that it was in fact the the outcome of a larger social struggle, a veritable *Kulturkampf*. In this cultural battle, the internationally-minded scientific community was opposed by two other forces: the Protestant establishment and the then fascist-leaning Catholics. In this larger struggle between cosmopolitans and particularists science was seen as the embodiment of democratic values and rationality (here Robert Merton figured prominently as a carrier of this message). And science won the cultural battle. After the war, it was the values of science (objectivity, disinterestedness, fact-orientation, etc.) that were upheld as the model for culture in general in American society. Science became so much the model that an emigré logical positivist like Hans Reichenbach's could seriously proclaim that most moral questions were potentially empirical questions which could be resolved with the help of science (Reichenbach, 1951, quoted in Hollinger, 1995: 447).

Starting already in 1945, the idea of science-as-a-model-for-culture was strongly established in American academia. New science studies programs were institutionalized and "scientific" approaches to society were the order of the day (Hollinger, 1995; see also Barber's article in this issue). In 1945, a famous Harvard report, which became the basis of American higher education for the next two and a half decades

> "explictly identified "science" as the foundation of "the spiritual values" of a democratic humanism and declared that American democracy needed citizens with "the habit of forming objective, disinterested judgments based upon exact evidence." (Hollinger, 1995: 445)

But this scientific or scientistic cultural ethos was not to go unchallenged for long; already in the 1960s it met its first opposition from the "counterculture" movement, inspired by Theodor Roszak (1969), Herbert Marcuse (1964) and others. Roszak particularly clearly spelled out the opposition to "technocracy," scientific experts, and the root of it all: "objective consciousness." Interestingly, however, it does not seem that the scientific community perceived this as more than a passing nuisance. And it certainly does not seem to have affected the social position of science; even against the background of criticism, the scientific growth curve continued.

Thus, the culture of science was strong in postwar United States and the battle for universalism had been, at least temporarily, won. But what about those traditional carriers of culture, the humanists? Hollinger depicts the humanities as staying out of the larger wartime cultural struggle altogether and sticking to strictly academic affairs. Meanwhile, in their actions (such as the awarding of literary prizes) they were in fact supporting just those reactionary values which the scientific community with its universalistic orientation abhorred. It was just this kind of contrast between the culture of the humanities and the culture of science that C. P. Snow was depicting in his *The Two Cultures*, Hollinger tells us. This book, published in 1959, struck quite a nerve. Because in his book Snow was not only saying what most people believe he said, namely that there was an unfortunate gap between the two cultures and that humanists had better learn thermodynamics. According to Hollinger, what Snow really argued was that that in these two cultures, it was the *scientists*, not the humanists, who were the carriers of the true humanistic spirit. Snow accused the academic humanists of

nothing less than betraying their cultural mission:

> He attacked a highly particular literary culture, the literary culture of modernism ... The faults he found with this culture, moreover, were less cognitive than moral. Snow accused the literati of perpetuating and celebrating a mythology of blood and history that had politically reactionary consequences. The modernists were basically cryptofascists, Snow implied, while the scientific professions carried "in their bones" a humane and democratic orientation toward the future... Scientists are the vehicles for the open-minded, liberal-democratic, egalitarian values the whole world needs (Hollinger, 1995: 448)

This was quite a charge. Obviously, the humanists were not letting Snow or anybody else get away with such a pronouncement. Indeed, as Hollinger points out, they soon enough struck back, with the help of people like Kuhn and Foucault. Now it was finally the humanists' turn to tell the scientists that, far from being a liberating force of rationality, as they maintained, science was in fact restricted by prevailing dogma, or represented an oppressive Foucauldian knowledge-power system. And if that was so, then it was after all the humanists , now revealing the clay feet of the not-so-rational and power-related science, who were the true representatives of freedom and democracy (Hollinger, 1995).

Thus, we could understand the current criticisms of science within the humanities as part of the humanists' delayed *counterattack* against the post-war cultural hegemony of the sciences. And, in turn, it is just against this counterattack of the humanities that Gross and Levitt and other fighters against antiscience are currently reacting. Against this background, it is also easier to understand the strong direct resentment of science which Gross and Levitt say is pervading the contemporary cultural left, and which they found puzzling (Gross and Levitt, 1994, p. 27).

There is, however, a third player in the current cultural wars, and that is the fundamentalist Christian churches, particularly the creationist movement. It seems that these conservative Christians, too, have recently picked up Kuhn and Foucault. For them, people like Kuhn and Foucault can be used as "proof" against the epistemological authority of science and for the cognitive legitimacy of the Bible (Hollinger, 1995: 453). Indeed, the creationist strategy has long been to exploit any existing criticism of traditional science, particularly in regard to evolutionary biology. Thus, it does seem that in order to have some real impact, it is creationism rather than postmodern academic humanism that ought to be the real target for those scientists who now criticize the humanists once again for antiscience. In the same way, despite a possible sense of sweet revenge, should not the cultural rather address society 's power structures directly, instead of focusing on science as a symbol of power? Paradoxically, it appears that both sides in the current *Kulturkampf* have identified the wrong target for their criticism.

Heuristic Concerns in the Current Culture Wars

But there may be a simple explanation for this apparent misidentification of targets on both sides. One reason why science has become such a popular subject for various postmodern exercises in fields such as literary criticism and studies of rhetoric may be simply that humanists need something *new* to analyze. Having exhausted standard subjects in literature (and, conceivably, the secondary literature on these as well), there is a desperate need for new material of some kind. And here, brilliantly, the humanists' newfound analytical tools were extended to scientific texts, a potentially inexhaustable source of ever new objects to study. However, although the humanists in this way decided to piggy-back on science, their strategy as such was not novel at all. Indeed, we may say that postmodern humanists in fact acted just like many scientists: they took

exciting-sounding new theories and methods and applied these to new fields of inquiry. Thus, what to some seems like a serious antiscience movement might just be the outcome of a professional innovation on the part of career-conscious humanist academics.

What might, then, be a comparable more mundane reason for the current opponents of antiscience to attack what they call the academic or cultural left? Although the fighters against antiscience can be said to be loosely united around a traditionalist belief in the integrity of science, also they seem to have their own *practical* reasons for forming a united front against the academic left. One reason is that by joining the National Association of Scholars, academics from widely different fields who are being attacked by critics can find moral support and fellowship and present themselves as fighting the common enemy of "antiscience."

As we have seen, the label 'antiscience' does not seem to be a good conceptual category. It groups too many heterogenous phenomena, and the fighters against antiscience themselves sometimes disagree as to just who belongs to the enemy camp. But, then again, who says that 'antiscience' needs to be a conceptual category? There may be no need to look for the true meaning of 'antiscience,' if the label 'antiscience' is interpreted as a constructed category, a collective *heuristic device* for protesting against a wide range of criticisms of science. Under the general cry of "antiscience!" otherwise unconnected academics can strategically unite and draw on a common repertory of anti-antiscience arguments. We saw already how E. O. Wilson reconstructed his sufferings in the sociobiology controversy as due to attacks by "postmodern" radicals. Undoubtedly, there are many other scientists who have been the targets of attacks and who have happily joined the protective pan-academic brotherhood of the National Association of Scholars.

It is interesting to compare the rationale for the attack on antiscience given by on the one hand Gross and Levitt and on the other the president of the National Association of Scholars, Stephen Balch. In their book, the authors of *Higher Superstition* admit that they themselves see "little *early* change in the teaching and learning of science on the basis of these politicized critiques." Still, they "judge it worthwhile to analyze at some length the animus against science currently expressed by the academic left." The reason is that "[i]ts existence has to be read as the manifestation of a certain intellectual debility afflicting the contemporary university: one that will ultimately threaten it." According to the authors, the health of the universities "has become incalculably important for the future of our descendants and, indeed, our species." (Gross and Levitt, 1994: 7). Presumably, then, this is why Gross and Levitt (and Holton) prominently figured as presenters and organizers at the National Association of Scholars' recent conferences in Cambridge, Massachusetts and New York City in 1994 and 1995, respectively.

However, the president of this organization himself expressed a less lofty and more practical view of the reason why the National Association of Scholars had recently turned to science. In 1994 Balch told a reporter that the move to science came about in part because an important part (15%) of the association's 3,300 members were in science or medicine, and scientists had proven to be useful allies in fights over curricular changes in some universities (Heller, 1994). Thus, according to the president himself, scientists needed to be courted because of their academic standing and good fighting spirit. There are in fact signs that the National Association of Scholars' interest in science per se may have been a rather temporary one. While, indeed, in 1994 and 1995 two conferences were held on the threat to science and reason, this year, the topic for the association's annual meeting was "The New Higher Education Reform Movement: Its Shape, Direction, and Future" – a topic closer to the association's central agenda (Leatherman, 1996). Fighting antiscience is by no means the central goal of this organization: its real mission is

defending objective standards and a traditional academic curriculum focused on "Western" values from the threat of multi-culturalism, "political correctness" and other current trends in academia. The critique of natural science is in fact a relative newcomer to this list.

It seems that the members of the National Association of Scholars so far form a small minority within academia, with little real impact on university campuses. In fact, they are often dismissed as reactionaries by other academics. These were some of the complaints at this year's conference (Leatherman, 1996). However, the very fact that the National Association of Scholars exists indicates the deeper split in current American academia between those who radically want to change the university curriculum and those who support a traditional content. And this split in regard to the criteria for "knowledge" has happened in many professional academic societies, too. For instance, a group called the Association of Literary Scholars and Critics has seceded from the leading force among humanists, the Modern Language Association (MLA) (Leatherman, 1996). There has also been talk about forming new organizations among anthropologists and historians (Heller, 1994).

"Antiscience" as a Political Concern

Even though I am skeptical of a category called 'antiscience' and question the existence of an 'antiscience movement,' I do not for a moment question the genuineness of the concerns of the warriors against antiscience. The question is only the exact nature of these concerns. Intellectually and "logically," the hypothetical chain of thought of many current anti-antiscientists was already identified in the British discussion in 1987–88. There the reasoning was quite straightforward: the academic critique of scientific epistemology caused the cut in science funding by undermining decisionmakers' trust in science. This may or may not have been true, but at least it was said, and could in principle be confirmed or refuted. In the current American discussion, Gross, Levitt and others do not go this far, at least not in tangible statements, and it is harder to get a grasp of the exact nature of their quarrel with the cultural left.

In the 1980s, one cause for Theocharis' and Psimopoulos' distress may have been that in regard to the epistemology of science, the burden of proof had surreptitiously shifted. In the wake of all the criticisms of traditional epistemology of science, it may have seemed to these physicists that suddenly and outrageously the *scientists* themselves would be required to do the unthinkable: convince a skeptical public that science was indeed different from everyday intuitions and that it could in fact produce reliable knowledge! And for them, all this had started because Popper had uncautiously pulled the plug out of the verificationist bulwark and thus opened up the questioning of the very foundations of science.

It seems that the current American opponents to antiscience take a similar stance: to even discuss the foundations of traditional scientific epistemology is to open the door to disaster. Boundaries between science and non-science must be kept and to question the possibility of scientific objectivity is to immediately open up science to any kind of nefarious values. But it seems that the present American warriors against antiscience are not as deeply concerned with epistemological questions as Theocharis and Psimopoulos. And it does not seem to be the financial support for science that is the ultimate concern for these scientists. Instead, what the present opponents to antiscience appear to be really fighting for is something as esoteric-sounding as *the cultural authority of science*, or rather, for a restoration of scientific values to their post-World War II social status.

It may not be necessary to ascribe further motives to the anti-antiscientists than exactly what they say themselves, namely that they fear the flight from science and reason.

Why all this talk about science and reason? For the current cultural left, typically concerned with the different ways in which science's claim to objectivity may be undermined, it is probably not as obvious as for the anti-antiscience fighters that the claim to objectivity can be a formidable political weapon. In certain historical cases, upholding *objectivity* was the *progressive* thing to do, particularly in a climate of nationalistic, conservative academic tradition. Thus, we have Max Weber who in just this kind of situation advocated the importance of value freedom in the social sciences, and the scientists of the Vienna Circle, who established their logical positivist philosophy outside academic philosophy departments (for a discussion of the beliefs of the Vienna Circle, see e.g., Holton, 1993, chapter 1). And, as seen above from Hollinger's account, after the Second World War, the cultural role given science entailed just this idea of objectivity as a political force against ideology.

Thus, we may currently be dealing with two different total images of science, connected to two different assessments of science's role in society and the present political situation. For the combattants of antiscience science is more than a rational and efficient way of obtaining knowledge about the world – for them, science has additional meaning as a *secular belief system* (cf. Holton, 1993, chapter 1 and 6). Thus, for this group of academics, scientific objectivity is tied to strong emotional values. But, just in a similar way, science has emotional meaning for many of the diverse "postmodernist" critics of science, too, to the extent science has become identified with social oppression and elitism.

An illustrative example of the deep resistance some current left-wing academics may feel toward the very idea of objective science is the following recontruction of current "postmodern" anthropological reasoning, provided by Napoleon Chagnon, a subject of vicious attacks for his studies of the Yanomamo indians. He explains why it is that objectivist scientists are currently seen as the real enemy by some anthropologists:

> The logic I have heard goes something like this: Most people now being studied by anthropologists are victims of oppression and live in bad conditions. Fieldwork now means that you are present at a crime scene and should become a witness whose first duty is to report crimes. You should use "interpretation" to identify crimes, not empirical data. This oppression is, in turn, caused by states. States wield power. Power rests on authority. Science is a kind of authority that the powerful will appropriate for oppressive goals. Therefore, scientific anthropologists are oppressors and are to be condemned for ethical, moral and even criminal wrongdoing (Chagnon, 1995)

An indication of the fact that many members of the National Association of Scholars do indeed feel strongly about the value of scientific objectivity are the several comparisons between the current critiques of science and the values in Germany's Third Reich during both of its recent science conferences. In such a context at the earlier National Association of Scholars conference in Cambridge, Gerald Holton reportedly warned that "[w]e are now in a period in which there is a movement – not a well-synchronized movement – of delegitimizing science" (Heller, 1994). And David Guston, commenting on the more recent New York conference, noted

> the near-incessant analogizing between constructivists and their irrational allies on one hand, and all sorts of evil-doers, mostly of the highest order, on the other. A mere eleven minutes into the meeting, Paul Gross launched the first Nazi metaphor, linking the belief that "science is social" to Hitler's belief that "there is not such thing as truth." Although Gross immediately qualified his metaphor by denying any intention to assign membership in the National Socialist

> Party to social constructivists, the other speakers who rendered such analogies were not so polite. ... Among the persons or belief systems explicitly linked by speakers to constructivism were: Hitler and Nazism; Stalinism and state communism; Marxism and neo-Marxism; and Pontius Pilate (Guston, 1995)

What seems to unite the fighters against antiscience, then, is a *strongly emotional belief in the political importance of objective science*. This is in principle true also for bona fide leftists among the scientists who are opposing antiscience. And here we are coming to an interesting paradox. In the continuous redefinition of the left-liberal position in the United States, the "correct" left-liberal attitude to science has shifted as well. While at an earlier time science and arguments based on objective facts were seen as obvious political weapons for the *common* left-wing cause, this has more recently given way to a focus on the political interests of different social subgroups instead. And here science *criticism* is one of the possible political weapons. Thus, it is probably because an insistence on scientific objectivity is currently seen as going counter to the liberal credo, the members of the National Association of Scholars are often seen as conservatives by other academics.

What is, then, Gross and Levitt's own political stance? At a panel discussion in conjunction with the 4S meeting 1995 in Charlottesville, Virginia, it became very clear that although Gross and Levitt were highly critical of such things as feminist theory of science (on this panel, they were debating Donna Haraway), a more general reason seemed to be that they were *angry* with the current academic left. They seemed to feel that the left-wing forces in academia were being frittered away on unimportant bickering instead of concentrating on important issues. Levitt spelled out some of the issues. He wanted the left to study serious things that directly affected society: large-scale electric networks, regional planning, urban development, and so on, and the connections of these to money and power. After this, it was less hard to believe an early article saying that Gross and Levitt were in fact self-described *leftists* (Heller, 1994). Thus, the current situation could really at least partly be described as a clash between the "old" and "new" academic left. However, what badly confuses the issue is Gross and Levitt's insistence on calling the target of their critique 'the academic left.'

Although they are rather cautious in their book, perhaps not to alienate more conservative academics, there are passages where their irritation with the present brand of leftism comes out quite clearly. According to them, "the left's flirtation with irrationalism, its reactionary rejection of the scientific worldview, is deplorable and contradicts its own deepest traditions" (Gross and Levitt 1994: 27). And towards the end of the book, they trace the "back-door utopianism" of the current academic left to a reactionary Romantic discontent and see "a tradition of egalitarianism falling under the sway of obscurantism and muddle" (Gross and Levitt 1994: 250). According to them, "*the left itself* – not only the peculiar ideological tribe we have dubbed the 'academic left,' but the far broader tradition of egalitarian social criticism that properly deserves such a designation – *is, potentially, one of the ironic victims of the doctrinaire science-criticism that has emerged* ..." (Gross and Levitt 1994: 252, italics added). Finally, they warn that "Scientists, and the scientifically well informed, will simply not accept any form of 'socialism' whose agenda include the subversion of legitimate science." Gross and Levitt 1994: 252).

However, what here makes many younger academic leftists and other academics regard Gross and Levitt and other fighters against antiscience as conservative is the latters' stubborn refusal to step down from their "traditionalist" belief that scientific epistemology is special and not on a par with other forms of knowledge. Furthermore, although these scientists are fiercely interested in democracy, they do not share the cultural left's belief that *science* can be

"democratized." Levitt and Gross said as much in an article called "The Perils of Democratizing Science":

> Some bright people, competent in their own areas, really believe that because they care about AIDS or the environment or energy policy their concern will substitute for substantive knowledge. Enthusiasts and their lawyers wade into disputes about electromagnetic fields, genetic modification of food crops, the toxicity of breast implants, with little idea of methodological constrainsts, of plausible inference, or of the difference between a hypothesis and a conclusion. Nor are the courts always interested in those diffrences: Their primary job is to decide who wins and who loses.
> Such people do not mean to be antiscience. Their error is to convert the understandable feeling that science ought to be democratic to the fancy that democracy is a product simply of 'getting involved' (Levitt and Gross, 1994)

And they went on to say the unutterable: that *science is not a democracy, and can never be.* The reason is that "the reliability and utility of science depends on content, not on politics." Furthermore, in their view science is necessarily elitist: "[F]or science to dispense with the meritocracy of mind and skills that has served it so well would be to subvert itself and render it, ironically, less useful to democracy." So much, then, for the hopes of uniting democracy and science at the participatory level.

Thus, what is at stake in the discussion about science and antiscience is really the nature of science, in a very broad sense. In a way, we are back to the 1960's and early 1970's debate about science and values, but the difference is that now some of the categories have been collapsed. It appears simple enough: The proscience side says that science cannot be anything else than it is. The antiscience side believes it can. But it gets more complicated. These two camps have largely different conceptions about the utility of science. For the first camp, science serves concrete social goals. It produces a reliable body of knowledge and the use of knowledge products is later negotiated within the democratic social process. For the other camp, the primary interest is social power relations – including power relations within science – and, for it, *criticism* of science can be a useful tool in the social struggle against political oppression of various minorities. What is at stake, then, in the current discussion may not really be science at all, but, rather, different conceptions of democracy.

Arguably, the cultural left does not really need this involvement with science: science criticism is just one of many possible tools to use; politics by other means. It is rather the more "traditionalist" members of the academic community for whom science is such a serious political matter. Because science is seen as so intimately connected to democracy, objective truth has to be upheld against "standpoint" epistemologies of various kinds. In this situation, however, it is in neither camp's interest to ask closer questions about the actual nature of science and scientific reasoning. In the first case, the black box of scientific knowledge is opened so wide that all the content flies away; in the other, the box is snapped firmly shut in the face of anyone daring to ask questions. The mystery still remains how science works at all.

The current black-and-white situation in which any critique of science runs the risk of being labelled 'antiscience' is, obviously, hardly healthy for science, since in this way also legitimate criticism of science may be dismissed by a rhetorical trick. Meanwhile, there may exist good grounds for critique of science. There is little doubt that science has been oversold, that much sloppy research is going on and that claims are often exaggerated. This is a particular problem in regard to tentative knowledge in sensitive areas. The question whether a scientific claim in such areas may require some kind of extra "internal" quality control before it is launched in the name of science was recently actualized in conjunction with the

uproar around *The Bell Curve: Intelligence and Class Structure in American Life* (Herrnstein and Murray, 1994; for criticism see e.g., Fraser, 1995). Thus, a problem for those who are so adamant about the objectivity of science that they almost viscerally label any critique as ideologically motivated, is that they may be implicitly protecting certain types of science from needed criticism. Pointing out that a scientific critic has political interests does not necessarily mean that the critic is not interested in "good science" – quite the contrary. Gross and Levitt would probably agree.

Thus, from the point of view of what is really interesting about science, the current discussion about antiscience is not very helpful. The polarized situation does not seem conducive to either serious epistemological investigation or moral/political analysis of science. Chances are that in the present climate, anyone who even tries to analyze science – or the very discussion about "antiscience" – will be identified as hostile to science (cf. Zürcher, 1996: 55). Meanwhile, empirical analysis of science is needed. It does matter in practice that the criteria for "good science" vary in different fields, and that there is internal scientific disagreement about research which may unproblematically be taken as the basis of social decision making. This is not the same as saying that science is contestable (cf. Segerstråle, 1994). A so far unresolved problem is how to integrate also considerations of this sort in a rational democratic discussion about science and its social role.

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