

SIR—The diagnosis by Theocharis and Psimopoulos of the crisis in science is persuasive. It is less easy to see how the erroneous and harmful ideas which, they say, sabotage the scientific method are to be replaced by adequate definitions of objectivity, truth and rationality. There are three immediate difficulties. The first is that of rebutting the charge of vested interest; if 'objective' arguments as to the value of truth actually spring from an urge to preserve jobs, then truth itself is compromised. The second difficulty is posed by Gödel's theorem; it is vain to hope that science will ever provide 'the truth, the whole truth, and nothing but the truth', for every axiomatic system must contain propositions that are undecidable¹. The third difficulty is the problem of self-reference; how may it be possible to provide a scientific justification for doing science?

For the resolution of these difficulties we must look to areas of scholarly endeavour which lie outside science. Theocharis and Psimopoulos have already noted that a meaningful definition of truth needs observations that are context-transcendent. The problems of objectivity, completeness, and self-reference can only be resolved by invoking a value-system that is context- (that is, science-) transcendent. Although this takes us out of science, it takes us into the company of those who are skilled in manipulating and exploring theories of the transcendent — that is, theologians. Theocharis and Psimopoulos remark that scientists are obliged to undertake the task of rebutting the "erroneous and harmful antitheses" themselves; I conclude that they should not attempt it alone, and that it would be prudent to read the literature of theologians and moral philosophers, and even to seek their collaboration.

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1. Gödel, K. *On Formally Undecidable Propositions* (Basic Books, New York, 1962).

SIR—Theocharis and Psimopoulos's attack on the philosophy of science and, though it was not named, the sociology of science, was a mediocre affair.

To single out one failing among many, this article all but ignores the debates about the nature of truth that have gone hand in hand with the development of science throughout history. The almost completely unanalysed idea of truth that crops up like a rash all over this article would have been alien to nearly all the great scientists of the past. In fact, in all but one case the word "truth" could apparently be replaced throughout the article (except where it appears in inverted commas) by the word "tradition" without changing the sense at all. The exception is "objective truth", but since in the

authors' terms that is merely a tautology, the same point still holds.

The fact that there is no proper analysis of any of the terms of the argument serves to underline the poverty of the authors' case. They create an extraordinary strawman opponent, compounded of Popper, Kuhn, the British Broadcasting Corporation and the pre-socratics to name but a few, and ascribe to it views which none of the sources named would necessarily hold. Then, rather than join in argument with this construction, they just inform us that the "antitheses" in question have been adequately "exposed" in a "debunking" elsewhere.

Finally, the sort of attack on philosophy and the human sciences as they impinge upon the natural sciences that this article represents is worrying. The argument that an entire body of knowledge should be suppressed because it interferes with the funding of "proper" science is one that leads to intellectual stalinism. The idea that science should be immune from serious criticism, or even serious analysis, is one that must be seen for what it is: dangerous absolutism.

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SIR—Aside from philosophical arguments, it is difficult even on empirical grounds to support the thesis of Theocharis and Psimopoulos that the decline of British science is the result of the denial of objectivity in scientific research. As two of the discredited four "irrationalist" thinkers are Americans, one would have thought that the malaise affecting British science would have spread to the United States. Yet on objective grounds (such as research funding for basic research) this is plainly not true.

There are, however, more serious grounds for rejecting Theocharis and Psimopoulos's thesis. The first is that to accept it may well be in itself an unscientific act. Whether one agrees with their conclusions or not, they have failed to produce any rational argument as to why we should reject the arguments of the anti-objectivists. Their own argument itself rests on a subjective assertion of three stated antitheses, and it is certainly not good science to reject a theory because one doesn't like the conclusions.

And what of the conclusions themselves? In contrast to the authors, it can be argued that "by denying truth and reality" science in fact offers the world one of the great philosophical realizations of this century: that we cannot logically make any assertion with complete confidence. More, we cannot afford to. Truth and tolerance are tightly linked concepts these days, as (largely as a result of the ideas of thinkers such as Popper, Lakatos, Kuhn and Feyerabend) the most basic truth is that there can be no objective truth. And once one accepts that,

it is essential that we tolerate, and even respect, the ideas of others.

The problem with science is really that it is misunderstood. We learn from an early age that science deals in concrete (yes/no) answers, and the consequences of this can be dire in the face of the complex problems of today. We come to expect concrete achievements and in the end believe that all of the world's problems will be solved by the relentless application of the so-called scientific method. But they will not. Perhaps the solution is to give rather more emphasis to the thoughts of the anti-objectivists, rather than suppressing them on anxious subjective grounds.

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SIR—Theocharis and Psimopoulos may be more correct than the philosophers they criticize, but to imply that science deals with truth 100 per cent of the time will not restore it to its previous status of credibility. Science works very well, but in spite of error. It does, however, produce firm and lasting contributions to knowledge. Does anyone seriously say the defeat of smallpox was chance? Or that the theories and observations of the Manhattan project will ever be proved erroneous? Although theory may sometimes bias observation, the aim of science is to reduce bias to negligible levels.

So what can we say to the sour puzzlement of philosophers, who cannot understand why the principles of science work? We reply that the principles of science are natural, essential to everyday life. Consider children, who are built to observe, experiment, learn and apply. Their progress is real enough, even though they apply the principles haphazardly. Adults also apply the principles haphazardly, but the fact that the human race continues to exist shows that the principles work surprisingly well. Science uses the same principles, but with a rigour and uniformity rare in history. It is hardly surprising, therefore, that science works and that it works the better for those who use the principles efficiently. But it is difficult to sell this principle to nonscientists for funding purposes.

Why do scientists think very little about the philosophy of science? Because the activity of science is basically natural. Indeed, the success of science may be merely another application of the Anthropomorphic Principle. Whether it will continue to be so powerful with phenomena far removed from normal human experience is another question.

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