down the scales" and permitted work on atomic energy to go ahead.

If Bronowski had any information concerning the former Prime Minister's opposition to the atomic studies other than his own peculiar interpretation of the White Paper, he should have stated it. If he did not have such information, his remarks are an example of drubbing a straw man, and their influence may not be merely "mischievous" but baleful, unless perchance they alert politicians to the need for educating scientists in politics, government, and similar matters.

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Causes and Effects

A comment may perhaps be in order on one point in the argument of Robert B. MacLeod, in his article on "Teleology and theory of human behavior [*Science* **125**, 477 (15 Mar. 1957)]. MacLeod is discussing the possibility of reintroducing the idea of teleology into science and suggests that the theory of relativity may permit us to relax the ideas of cause and effect that have prevailed since the Newtonian revolution. He says:

"If, however, we question the absoluteness of time and play with the idea that, in different frames of reference, the relationship between antecedent and consequent may be reversed, we may be left free to think that something that has not yet happened may be an essential condition of something that is about to happen. If the temporal relationship is relationally, rather than absolutely, determined, we might conceivably reincorporate purpose as a natural fact into the stream of natural causation."

It is here suggested that the theory of relatively cannot be strained to permit such a thought. Even though the "absolute" idea of time may have been overthrown, it is still not true that effects can, in any conceivable frame of reference, precede their causes. It is true that the time-order of two events may be reversed for two different observers, but it must be noted that this can happen *only if* the two events are in each other's "absolute elsewhere." The two events must be so far in space and so close in time that no signal from either event could possibly have arrived at the other in time to cause it. If two events are related in this manner for one observer, they are related in this manner for all observers. Such a pair of events could be described as "not possibly causal." But if two events are related so that a signal from *A* could have got through in time to cause *B*, then they are "possibly causal," and they have this "possibly causal" relationship, and in the same sense, *A* to *B*, for *all* observers.

It may be true to say, as MacLeod

does, that "space and time have ceased to be absolutes," but unfortunately this generalization is all too often misunderstood. Under certain circumstances, it may permit a reversal of apparent time-order, but under no circumstances does it permit a reversal of causality. We may indeed speculate whether something "might conceivably reincorporate purpose as a natural fact into the stream of natural causation," but this speculation should not be based on a misunderstanding of relativity.

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Science, a Worth-While Endeavor

The mixed reactions, on the editorial pages of the newspapers [*Science* **125**, 269 (15 Feb. 1957)] (editorial), to the report of the Interim Committee on the Social Aspects of Science were no doubt duplicated in the mind of the general public. Science is widely considered to be amoral, being, in itself, neither good nor bad. Most of the practical applications of science are good, whereas a few of the applications are unquestionably evil. But in the mind of the public, amoral science is confused with its applications, and, depending on personal prejudice, "science" is seen as a good or as a potential evil.

Scientists can never hope for complete control over the applications of their work; the policies now being developed within the AAAS are based on this reality. It might be profitable, in order to further the development of these policies, to depart here from the obvious and indulge in a little speculation. A reexamination of the purposes of science may disclose a way to promote a more favorable attitude toward science on the part of the general public. As a start, it is proposed that the primary purpose of science is the attainment of certain knowledge of things by knowing their causes. All men, by their nature, desire to know. And if it is innate in man to wonder, to be curious, then surely the attainment of knowledge, however proximate or incomplete it may be, is, in itself, a good.

In a word, science, abstracting from its applications, is not amoral, it is a worth-while endeavor. If this point can be successfully taught to the general public, perhaps scientists, as a group, would be more easily able to recommend actions that seem, from the point of view of science, to be desirable. Perhaps, even, if it were eventually accepted as part of our cultural milieu that science is not amoral, that it is good in itself, more young men and women might choose it as a career.

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