Letters

Scientific Data: Public or Private?

Blade (Letters, 14 Jan., p. 123) thinks it too extreme to demand that scientific data must be public in the sense that they "are available for review." Instead, he proposes that science is public in the sense that everybody can feel free ". . . to offer their criticism, constructive or otherwise. They are even free to actually repeat some or all of the work according to their own style, to conclude from it what they will, and in turn to display their own *results* [italics mine] in public for whatever further criticism may come from still others, and so on." I question if valid scientific practices can be built on such loose, if gentlemanly, rules.

While a free exchange of views is always desirable, scientists, speaking as scientists, exchange not opinions, but seek to arrive at accurate estimates about a "true" state of nature by application of rigorous methods. Thus, the crucial words in Blade's proposition are the display of "results in public." If results are raw data, then Blade and I have no quarrel. If they are inferences based on these data, then most practicing scientists may disagree with Blade. The vulnerability of the scientist to prejudices in the analysis of his data and the selection of results to satisfy a large variety of conscious and unconscious factors is no longer a matter of debate.

Blade has called my position extreme —I would call it conservative. The public nature of science has not been established through the divinely inspired wisdom of philosophers or of scientific committees but has been bought by bitter experience—experience which has taught the scientist to take a skeptical view toward all interpretation of data, including his own. It does not mean (nor did I imply) that anyone who wishes shall be able to *subpoena* (the term is Blade's) a colleague's data to see whether or not he treated it wrongly. The issue that gave rise to this debate was the legitimacy of a request that a number of points be clarified about data linking smoking to disease, under the guidance of ten recognized scientists serving as arbiters. In this situation, duplication of data was almost impossible by legitimate means (*1*). It is true that the conditions have not ever been specified under which public review or review by concerned scientists may take place under such circumstances. But these are details that can be worked out in a fair and unbiased manner.

The public transactions of scientists include the methods by which they obtained information, the nature of that information, the analyses they perform, the inferences they derive. They may reach even into their personal lives. Scientists who are called upon to review issues for the National Academy of Sciences must furnish statements of conflict of interest. This principle has been further extended by Philip Handler, who has demanded that scientists called upon to operate in the area of public policy state their "prejudices" as well as their financial involvements (*2*). To give credence to reports based on procedures that remain hidden from view destroys the validity of the scientific method.

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References

1. T. D. Sterling, *Science* **173**, 676 (1971).
2. *New York Times*, 20 Dec. 1971, p. 18.

Cloud Seeding

Deborah Shapley's report "Rainmaking: Rumored use over Laos alarms arms experts, scientists" (News and Comment, 16 June, p. 1216) is admittedly based on rumor. If the rumor is true, U.S. planes, at the request of the Laotian government, seeded rain clouds in order to render the roads and paths less passable for infiltrators. Shapley's report seems to be concerned, almost exclusively, with this effect of the rain—she mentions other effects only at the end, and only obliquely. It seems to be based on the premise that it is not permissible for the United States to help the Laotian government in its efforts to hinder infiltration. Certainly, it does not propose substitute measures against this mode of warfare.

The preoccupation of the report with the success of infiltration is most eloquently articulated in the sentence "In effect, weather is no less humane a weapon than bombing or gunfire." To most people, muddying of the roads will appear a relatively humane method of warfare, but, of course, it does make infiltration a more arduous undertaking.

The 16 June issue of *Science* also contains a technically and scientifically informative article on cloud seeding by R. A. Howard, J. E. Matheson, and D. W. North (p. 1191). Shapley's report, on the other hand, is a political diatribe against U.S. help to Laos in its campaign to repel infiltration.

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In Shapley's report on the use of rainmaking as a weapon in Indochina, a number of scientists express their opposition to such practices. Although one can sympathize with scientists who see their research put to ends other than those they envisioned, it is shortsighted to carp against each new technique for warfare.

Wars seem to be part of human existence, and there are degrees of inhumanity in the way wars are fought. It would seem that causing a rainstorm to turn a terrain to mud is a more humane way of fighting than bombing the area. In World War I, millions of soldiers were ordered to leave their trenches and charge the opposing lines, whereupon they were gunned down. Should we return to that mode of fighting as a more humane method?

We may wish that there were no wars. But we may wish that in vain. A more useful approach may be to study how to conduct wars in ways that destroy or maim fewer people than has hitherto been the case.

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