

SCIENCE

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LETTERS

Asteroid or Volcano: Have the Volcanists Been Heard?

In the great Cretaceous-Tertiary (K-T) extinctions debate about whether an asteroid impact or volcanism killed the dinosaurs, which in the past decade has become one of the most exciting controversies in the history of science, *Science* has served as a forum. However, has *Science* given both sides of the debate, the asteroid majority and the volcanist minority, equal opportunity to be heard by the reader? The record indicates not. The record seems to be one of indefensible favoritism toward the asteroid and virtual censorship of the volcano extinction theory.

Since 1980, *Science* has published 45 pro-impact manuscripts and Research News articles and four strictly nonimpact items. Since 15 November 1989, *Science* has published eight pro-impact manuscripts and none that is provolcanism. In the same time period, eight Research News articles were pro-impact, and one hinted at the possibility of volcanic influence in the K-T extinctions.

Science, with its prestige and vast readership, has been perhaps the major force in shaping public and scientific perception of the K-T debate for the past decade, yet it has hurt the volcanists in the scientific marketplace. The First Amendment was designed to prevent repression by the majority. One might argue that *Science* has helped an asteroid majority repress a volcanist minority.

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Response: Debates about the interpretation of incomplete or equivocal data occur in many areas of science. Our objective at *Science* is to publish reports of major advances and new data that bear on these questions. On average, the publication of new research reflects the number and quality of submissions and the pace of research. In our news coverage of such advances, we take into account the weight of the evidence and the balance of scientific opinion. Our news writers go beyond simple accounts of the statements of the various sides in a debate and provide context and close scrutiny to help our readers understand developments in a field.

For our peer-reviewed papers, however, “freedom of speech” cannot mean “equal space” for all points of view. Papers are

evaluated by reviewers on the basis of scientific credibility and importance and are accepted by *Science* on that basis. Therefore, providing equal space for opposing interpretations in any major debate is neither a goal nor a necessary outcome of our selection process or our news reporting, but we do provide a variety of formats—review articles, policy forums, letters, and technical comments—in which dissenting points of view can be presented.

As McLean states, the K-T debate has been an exciting and important controversy, but *Science*, in my opinion, has been impeccably fair and has accepted papers from both volcanists and those in favor of the impact hypothesis. If, over a period of time, the balance has shifted, that is because of the new data that have come in. The news coverage has necessarily reflected this shift.—Daniel E. Koshland, Jr.

Basic Research and Society

Congressman George E. Brown, Jr. (D-CA), states (Policy Forum, 9 Oct., p. 200)

It may be true that certain basic research done today will enable some future application or innovation, but it is commonly argued that we cannot foresee these innovations and should support basic research on faith. This argument ironically exempts the very process of basic research from rigorous scientific analysis.

Later, he says

The scientific community must accept the inconvenient fact that freedom of scientific inquiry can flourish only within a larger system of often chaotic and seemingly irrational pluralistic government.

Brown appears to be saying that politicians of necessity function chaotically (as we all know from observing the political process) but that scientists do not and are required to function under a hierarchy of orderly and pragmatic rules and constraints.

Proof resides in logic, but the creative process (perhaps like creative politics) does not. It is one thing to say that we should analyze the genesis of basic research and its innovations and quite another to say that they must follow prescriptions and a planned agenda. Scientists need pluralism and freedom just as much as politicians do.

What Congress can and should do to