

“Earth to Physics: Come in Please!”

In a previous issue of the MRS BULLETIN (July 1988, p. 56) we commented on an editorial by Albert A. Bartlett which was reprinted in the newsletter of the Forum on Physics and Society of the American Physical Society.¹ We noted that his facts were undisputed but his interpretation narrow in the context of connecting the decline of physics enrollment to its perceived relevance to society.

The editor of *Physics and Society*, Arthur Hobson of the University of Arkansas, has now authored a related editorial² upon which we are moved to comment. Below are reprinted excerpts, admittedly out of context, but faithful to their order of occurrence, which give the flavor of Hobson's point.

...“would all those physics teachers who devote significant class time to the global greenhouse or ozone problems please raise their hands?...Do we teach these topics regularly, in any physics course?...I would guess that the answer is an overwhelming ‘no’....But is it physics?...Physicists are purists by nature. In our teaching and our research, we strip away everything that is not ‘pure physics’ and hand it over to some other discipline or, more likely, to oblivion....Why are we so intent on being irrelevant?...Why then are we so professionally inhibited about interdisciplinary connections?...Knowledge has fractured, and there are few rewards and many dangers in trying to put the pieces together....these courses [physics for engineering and science students (Ed.)] are so full of mandatory technical topics that there is no time for trivial practical matters such as the destruction of our atmosphere....Can physicists find a way to be relevant?”

No argument about the importance of global atmospheric issues. No argument about the degree to which these problems contain technical issues that can legitimately be called physics. And, no argument that physicists can and should contribute.

But, where is the evidence that physics is not, or physicists are not, now involved? At the risk of repeating an earlier opinion, the absence of a topic in physics curricula is an observation about curricula only. The question might be posed, “Should the problems of the planet be exploited to reinvigorate physics curricula or should physics be exploited to solve the planet's problems?”

The problems do involve physics. Thus scientists (including transplanted physicists) are constrained to apply principles and methods of physics whether or not their relevance to the problems has been learned in a physics course. Physicists leave the practice of pure physics to join other fields, and students of other disciplines apply what physics they've learned. That physics *per se* has not captured many practical problems (atmospheric or otherwise) may worry those who bemoan a decline in support of the narrowly defined discipline—but the demise of our atmosphere does not hang in that balance.

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1. *Physics and Society* 17 (1) (January 1988) p. 10.
2. *Physics and Society* 17 (4) (October 1988) p. 16.

**[“Physics Teachers to Kaufmann: Come in Please!” (Ed.)
Comments in Reply to Those
of Elton Kaufmann**

Kaufmann and I are talking about two different, but related, matters. I had pointed out, in my editorial, that physics teachers are not sufficiently involved in teaching physics-related social problems to nonscientists. Kaufmann's article does not dispute this contention. Instead, he points out that many physicists are involved, professionally, in helping to solve social problems.

The tone of Kaufmann's article suggests that he does not consider questions of physics teaching to be terribly important, or at any rate that they are less important than questions of physics practice concerning social problems.

In my view, the teaching side may be more important. It is the teachers, not the practitioners, who directly influence the great bulk of the educated population. And the educated population will influence science-related social problems far more than will those scientists who are directly working on those problems.

For example, socially aware scientists knew decades ago that the global greenhouse was inevitable, and that we should reduce fossil fuel use, but nobody outside of that extremely small community paid any attention. So the problem continued to fester and got much larger than it needed to get. Today, there is nothing that practicing scientists can do to avert the problem. A 2°C warming is already in the pipeline, and there is probably worse to come.

If, instead, a significant fraction of the nation's academic physicists had taken it upon themselves to devote, say, one entire lecture to the greenhouse problem in every introductory physics course during the past few decades, that message would have reached millions of the nation's engineers, physicians, business people, teachers, artists, writers, etc. This would have made a really significant dent in the problem, because those people would have gotten our country busy solving it.

Kaufmann's main point is that physicists are involved, professionally, in social implications of science. He seems satisfied with the current situation. Although this question was not raised in my editorial, I am of the opposite opinion. Far too few physicists devote professional time to physics-related social questions—and not only “physicists” narrowly defined, but scientists and engineers of every stripe. All are far too eager to create new devices, [but] far too reluctant to explore those devices' consequences. Compared to the number of scientists involved in the development and production of chlorofluorocarbons during the past several decades, how many have been involved in studying their environmental effects? Far too few, surely. Until the belated discovery of the great ozone hole, the number was approximately zero.

And so I do bemoan the absence of socially and culturally conscious science teaching. I bemoan it not because I am worried about the decline of physics. I doubt if physics is declining, and it wouldn't bother me much if it were. On the contrary, I bemoan our non-aware science teaching precisely because the demise of our atmosphere, and of much else, does lie in the balance.

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