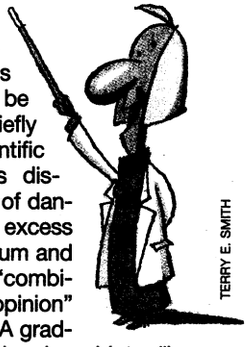
LETTERS

Labor intensive



A proposal is made to require "the contributions of all authors to be baldly and briefly stated" in scientific papers. Readers discuss the degree of danger posed by excess weapons plutonium and methods for the "combination of expert opinion" to estimate risk. A graduate student union is said to "have fought for, and won," benefits for teaching assistants. Researchers say that "one should be conservative" when considering growth hormones as possible therapeutic drugs. And the contributions of a physicist and former president of the Estonian Academy of Sciences are said to have been "remarkable."

Multiple Authorship

The recent case of fraud in the laboratory of Francis Collins has elicited proposals for ensuring that authors share responsibility for the data they report in scientific papers (Letters, 6 Dec., p. 1593). These proposals have focused principally on imposing conditions for authorship. An alternative means of allocating responsibility for the contents of a paper would simply require the contributions of all authors to be baldly and briefly stated. Such a statement could conveniently be placed in the acknowledgements or in a footnote of a paper giving each author's initials and contribution—for example, "A.B., immunohistochemistry, wrote paper; M.B., polymerase chain reaction and Northern blots; E.L., physiological recordings; M.E., donated antibodies; B.S., intellectual contributions, co-authored paper, provided funding and lab space."

Such a practice would also serve the scientific community by publicly allocating credit for published work. The information would be widely useful in judging work submitted for doctoral theses, making hiring and tenure decisions, and evaluating grant applications. To encourage the fair allocation of credit, other useful practices could also be adopted. For example, in cases where two authors have contributed equally to a paper but cannot both be listed as primary authors, their names might be separated not with a comma but with a subscripted equal sign. This convention would allow the relative contributions of authors to be evaluated at a glance.

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May I bring to the attention of *Science*'s readers what the American Association of University Professors Committee B on Professional Ethics had to say concerning the responsibility of co-authors? In a 1990 "Statement on multiple authorship" (*1*), the committee observed:

> that scholars who take part in a collaborative project should explain forthrightly—to disciplinary peers as well as to academic colleagues and such members of the public as may have occasion to inquire—the respective contributions of those who put their name to the finished work. This clarification might be accomplished in a preface, an extensive footnote, or an appendix: no one format can serve every scholarly combination. But a candid statement would do much to establish degrees of responsibility and authority, to ensure fair credit to junior or student colleagues, and to avoid unseemly later disputes about priority, real or alleged errors, and plagiarism. Purely formal association with the enterprise (such as the headship of a laboratory where no direct research involvement was present) would be noted for what it is, to the benefit of the participants as much as of those outside the field.

Making plain the actual contribution of each scholar to a collaborative work may not be easily achieved in every academic field, but it is a goal worth striving for.

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References

1. *Academe* **76**, 41 (September–October 1990).

"Clear and Present Danger"?

Wolfgang K. H. Panofsky's thoughtful letter "Disposing of excess plutonium" (3 Jan., p. 11) properly emphasizes the need for

delinking weapons material disposition from the role of plutonium as an energy resource for the future. I was, however, surprised to see the chair of the National Academy of Science's (NAS's) Study on Management and Disposition of Excess Weapons Plutonium use the phrase "clear and present danger" in his letter. This was a catchy phrase generously provided by the NAS committee without justification. By repetition, the phrase seem to have acquired the status of truth. Yes, there are *potential* dangers of proliferation and safety associated with plutonium. These dangers have been well managed during the past 55 years, and they can be even better managed if state-of-the-art technologies are used, should society so desire. The solutions proposed by the U.S. Department of Energy for the disposition of excess plutonium will take time—maybe many decades. So it is not clear how they can be described as the solutions to a "clear and present danger."

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Graduate Students' Rights

The News & Comment article "Grad students press for right to strike" by Constance Holden (29 Nov., p. 1461) includes the assertion that the desire for unions exists mostly among teaching assistants in the humanities and social sciences. This is true. Science graduate students have not generally been part of the union struggle.

At the University of Michigan, graduate student instructors (GSIs) are represented by the Graduate Employees Organization (GEO), the second oldest graduate union in the country. A majority of GSIs in physics, chemistry, biology, and biophysics are union members. They have been active in every aspect of union organizing and negotiations, including participation in our 2-day work stoppage last April.

GSIs are real employees of the university and perform 40% of the classroom teaching at Michigan. The university would not function adequately without our crucial services. We have fought for, and won, adequate health care, tuition waivers, and salary increases, and we would not likely have these benefits without the GEO.

Another group of graduate students, the research assistants, are not represented by the union here at Michigan, despite their important contributions. How much of the research in this country is performed by graduate students? I'm not sure, but it's usually at low pay and with few benefits.

Graduate students in any field face an uncertain future, and many come to feel like undervalued laborers in the scholarly enterprise. Graduate students from all fields recognize that it is crucial to have the power to negotiate for the conditions of their employment.

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EMF Statement

I was somewhat astonished at the apparent suggestion by Keith Florig (Letters, 29 Nov., p. 1449) that the electromagnetic field (EMF) committee of the National Research Council should have reported the conclusion that "no conclusive evidence shows that EMFs are safe" because the proposed conclusion is void of content. It is true for all *x*'s that "no conclu-