LETTERS

Equivalent Megatons

R. Jeffrey Smith's article "They have more EMT than we" (News and Comment, 2 Apr., p. 32) is pertinent when one considers President Reagan's stated concerns with respect to the alleged Soviet nuclear superiority. I certainly agree that nuclear superiority lost virtually all significance many years ago, when both superpowers passed the 200 to 400 equivalent megaton (EMT) level.

However, Smith's estimate of our equivalent megatonnage appears low by a factor of 6. By my estimation, we have more than 6000 EMT, compared to Smith's 1000.

Even 1000 EMT constitute overwhelming deterrence, but an examination of our nuclear arsenal shows that each leg of our strategic triad by itself could deter Soviet attack. In particular, the submarine leg has more than 800 EMT and will grow larger as the Trident submarines are added. Thus the invulnerable, highly mobile submarine force could provide all of our deterrence capability. Sole reliance on our submarine-launched ballistic missiles would also remove the nuclear military targets from the U.S. landmass.

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A 1979 report by the Office of Technology Assessment, relying on a 1978 study by the Congressional Budget Office, estimates that the United States has 4894 "equivalent megatons" in its present arsenal. Submarines *alone* possess roughly 1000 EMT, the bulk of which would survive a preemptive Soviet attack. Even without the MX and the B-1, the United States has more than enough EMT to destroy the Soviet Union in a retaliatory strike, by the standard set by the Pentagon itself.—R. JEFFREY SMITH

Reactor Decommissioning

In his article "A long-term problem for the nuclear industry" (News and Comment, 22 Jan., p. 376), Colin Norman identifies but ignores the most likely and most promising option for reactor decommissioning: safe storage. This is perhaps understandable when one considers that reactor decommissioning is today pertinent primarily to small, isolated reactors that represent early federal government initiative: Elk River, Shippingport, Big Rock Point, and Yankee Rowe. These federal demonstrations are not viable in the long run. But they also do not typify the nuclear utility industry. For the most part, the utility industry has established nuclear operations at robust sites that are unlikely to be decommissioned in the foreseeable future. How long these sites will be needed by society is unknown, but certainly it is for several generations and almost certainly it is for as long as U.S. society requires thermally generated electricity. More than three-fourths of the nuclear sites being established by the utilities are scheduled for more than one reactor (*1*). When a reactor is no longer serviceable, its replacement is likely to be located at the same site. In these circumstances, "safe storage and surveillance" of decommissioned reactors is a small additional burden to the utilities' main purpose of power generation at that site. Indeed, the decommissioned structures are likely to be used as on-site repositories ready-made for low-level radioactive wastes produced during operation of the replacement reactor.

"Safe storage" on an operating site *may* not be the final solution for decommissioning, but for the next several decades it is clearly preferable to a mindless policy of early dismantlement and transport of the unneeded facility when it is still quite radioactive. The cost comparison reported by Norman seemingly to favor early dismantlement is misleading because the major cost for deferred dismantlement occurs 30 years in the future, and therefore its present worth is much smaller than he implies.

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Reference

1. C. C. Burwell, M. J. Ohanian, A. M. Weinberg, *Science* **204**, 1043 (1979).

Nonrandom Bubbles

M. Mitchell Waldrop must not have spent much time in well-lit pubs. For if he had he would not have said about Gott's bubbles (Research News, 26 Feb., p. 1082) that "[they] form just like bubbles in a glass of beer—randomly." Bubbles do not form randomly in beer; they emanate from a small number of definite nucleation sites: cracks in the glass and bits of foreign matter. Moreover, strings of bubbles in which the bubble spacing increases regularly with height above these nucleation sites are easily observed in any glass of light (colored), gaseous American beer. For discussions of the finer points of the physics of bubbles in beer I refer Waldrop to articles by Bohren and Brown (*1*) and by Walker (*2*).

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References and Notes

1. C. F. Bohren and G. M. Brown, *Weatherwise* **34**, 221 (1981).
2. J. Walker, *Sci. Am.* **245**, 172 (December 1981).

Animals in the Laboratory

Constance Holden, in her article "New focus on replacing animals in the lab" (News and Comment, 1 Jan., p. 35), states "The fact is . . . a massive shift away from the use of animals in research will not be possible in the foreseeable future. . . . Far more knowledge gained from basic research will be required before any quantum gains can be made in replacing animals." This perspective, apparently endorsed by the House Science and Technology Committee, is inconsistent with the trend in animal use over the past decade. The specter painted by animal rights activists of an inexorable increase in the numbers of animals sacrificed at the altar of science is simply false.

The Institute of Laboratory Animal Resources of the National Academy of Sciences reported (*1*) a 35 percent decline in the number of laboratory animals acquired by U.S. research organizations between 1968 and 1978. If one considers the species most frequently cited by animal welfare organizations as objects of ethical concern, one finds that the use of cats and dogs decreased by 32 percent and the use of nonhuman primates by 47 percent. The U.S. Department of Commerce and the Department of the Interior reported (*2*) a spectacular 79 percent decrease in the number of primates imported between 1969 and 1980. Are these not massive reductions? Are they not quantum gains? Is there not every reason to expect that they will continue?

According to present projections (*3*), the proportion of scientifically approved competing projects that the National Institutes of Health are able to fund will

have declined from 52 percent in 1979 to 27 percent in 1983. To continue deliberating whether the biomedical research community should devote $45 million to the self-resolving "problem" of animal use (as legislation currently under congressional consideration would do) is to fiddle while Rome burns.

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1. Committee on Laboratory Animal Facilities and Resources, Institute of Laboratory Animal Resources, National Academy of Sciences, *National Survey of Laboratory Animal Facilities and Resources* (National Institutes of Health, Bethesda, Md., 1980), pp. 20–21.
2. *Primate Rep.* (No. 8) (1981), p. 31.
3. *Fed. Am. Soc. Exp. Biol. Newsl.* **15**, 1 (1982).

Cost of New Journals

I write to seek discussion of a growing problem for our university and institutional libraries. Many of these libraries, caught between increasingly restrictive budgets and an uncontrolled growth of primary literature sources, are turning to both conventional and user-oriented fund-raising campaigns. This tactic may only exacerbate the problem.

The new sources are largely proprietary, for-profit ventures that depend upon the free, goodwill services of the very universities that must pay inflated rates for the final product, a journal or symposium. Journals are a particular concern because subscription implies a long-term investment. All of these journals carry heavy page charges for the authors as well.

Printers ("publishers" is hardly accurate in these cases) exploit universities for editors, charge for publication costs, and distribute thin volumes at exceedingly high cost to university and institutional libraries. Hard-pressed libraries in turn are soliciting students, alumni, and faculty for funds to maintain and expand the market for these profitable ventures. The scholarly community should seek to limit the growth and profitability of these ventures.

In some cases new journals truly fill a much-needed gap. Editors of both reputable society-based and university press journals must compete for manuscripts with the new journals. The more rigorous journals, proprietary or not, impose high standards that lead to accompanying delays for revision. When challenged by the 4-months-to-publication cycle of quickie, nearly unrefereed proprietary journals, editorial boards may compromise standards to attract sufficient manuscripts. A general dilution of quality in published research is certain. As scholars and scientists, we must protect the integrity of our disciplines and our libraries. I propose the following.

1) Universities and other scholarly institutions should impose a nominal fee for the services of editors and associate editors of proprietary journals. After all, the time and services of these persons is already paid by the institutions. The concept of public service is stretched when those services provide a healthy margin of profitability to a private company. These fees would be accumulated into a fund to support library acquisitions. This procedure would restrict the prospect of profitability to the printers and assist libraries in keeping up with the new journal flood. I suggest $2000 to $5000 per year for primary editors and $1000 per year for associate editors and board members. Society, university, and not-for-profit publishers would be exempt from a fee. Those printers who currently pay honoraria for editorial services could shift the payment from the editor to the institution.

2) Committees of evaluators could simply discount publications in proprietary journals in much the same way popular publications are discounted in scholarly evaluations. This would be in lieu of actually reading and evaluating the publications of candidates for appointment or promotion, which seems distasteful and has led to counting papers rather than evaluating them.

3) Some scholars refuse to referee manuscripts for proprietary journals because they see a conflict between the free dissemination of knowledge and the economics of proprietary publication. More scholars could consider taking this position as a means of both pressuring journal publishers to reduce the cost of journals to libraries and inhibiting the start-up of unnecessary new journals.

4) Journals of major circulation, like *Science* and *Nature*, could encourage publication of reviews of new journals a year or two after they are founded. The reviews would focus on the quality of the published papers and include an evaluation of the need for the new journal.

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Erratum: Arthur Schawlow should have been identified as a Nobel laureate in physics, not chemistry, in Eliot Marshall's article "Gould advances inventor's claim on the laser" (News and Comment, 23 Apr., p. 392).