

Military research and development

About half of the annual budget for the Atomic Energy Commission is devoted to military expenditures. Research and development for nuclear weapons exceeds all AEC support for nonmilitary physical research.

It would seem more appropriate to charge expenditures for weapons to the Department of Defense budget. First of all, these are strictly military expenditures and thus belong in the DOD share of the national budget. Secondly, to continue to incorporate such military items in otherwise peaceful appropriations is a deceptive practice, which tends, among other things, to camouflage the proportion of military allocations of our nation. Thirdly, there are those of us working on peaceful applications of nuclear energy who feel uncomfortable about association with continued nuclear-weapons development within the same agency.

The AEC operating expense authorization for fiscal year 1970 is 2220 million dollars, a reduction of 350 million dollars from the previous year. It is commonly mentioned that this is a decrease of 13%; what is not usually brought out is that the military portion of the budget was diminished by only 1.3% while peaceful applications were reduced by 25%.

Perhaps it is time for the AEC to relinquish its role in research, development, production, maintenance and effects-testing of nuclear weapons. If divested of responsibility for weapons enhancement, the Commission laboratories could benefit the public better by independently evaluating the safety of nuclear weapons systems and the efficacy of peacetime compliance to nuclear test bans. For example, in the controversy regarding the safety of siting nuclear missiles near populated areas, it would have been of considerable value to the civilian sector of the population if the AEC could have provided an autonomous review of the technical issues.

In a similar vein, management of Plowshare by the AEC should be reconsidered. Although there have been a number of technical and political objections raised with regard to

peaceful uses of nuclear explosives, there are also unassessed possibilities for immense benefit to mankind. Perhaps foremost among the political objections is the complication of clandestine nuclear weapons testing. Thus continuation of Plowshare in its present form endangers both the Non-Proliferation Treaty and any agreements that may come from the Strategic Arms Limitation Talks. A solution to this dilemma could be in turning over operational management and allocated nuclear devices to an international agency, such as the IAEA, under a dual-control arrangement.

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If someone argues that a scientist should be condemned when he is doing war-related research, he condemns all science because there is no such thing as war-unrelated science ("Congress requires relevance for DOD research," February, page 63). Research on shoes or medical progress in the fight against influenza can definitely be war-related. But if someone cares to enumerate the disadvantages of a particular technology, he should be fair enough to also cite the positive effects.

All modern technologies have to be assessed carefully with respect to their conflict with the human and natural environment. And science is the only discipline that can lead to rational control of our environment and resources (see: A. M. Weinberg, "In Defense of Science," *Science*, 9 January, 1970).

The "Schwartz amendment" as newly broadened in its aim (February, page 13) is an attempt to draw the science community into the decision process. As long as the purpose is an advisory form of influence on public decision makers, this seems desirable, but when Schwartz wants to blame the scientists for the results of their research he puts himself in line with the uninformed irrational onlookers. Human knowledge of, and interest in, all natural phenomena is the root of all progress, but can also be made the

root of all destruction. There is no way to choose only "good" knowledge. All knowledge without discrimination is useful if rationally applied. If our political world is still so far back in the Stone Age that we may say that it would have been better not to have known the wheel, or gunpowder, or atomic power, or bacteriological studies, and so on, we had better start educating politicians. The physicist and, generally, the scientist is only a contributor to human knowledge and can-



not be considered a superpower within society. But, despite the present job crisis, it would be desirable to increase considerably the number of those knowledgeable in science. What humanity needs are not less, but more, people who are able to argue rationally and to understand better where technology will lead us when pursued without scientific and conscientious control.

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Public suspicion justified?

The May editorial smugly writes off public distrust of the nuclear-power experts as "simply one example of the more general suspicion of science and technology." However, an important part of this general suspicion stems from the past failures of such experts to recognize and control effectively the environmental impact of new tech-

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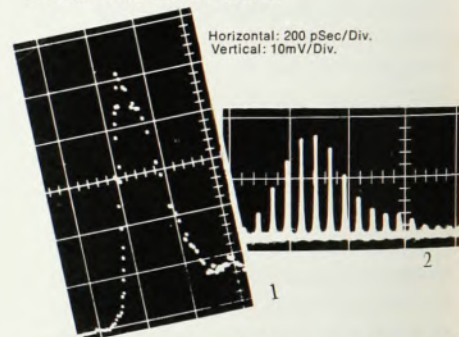
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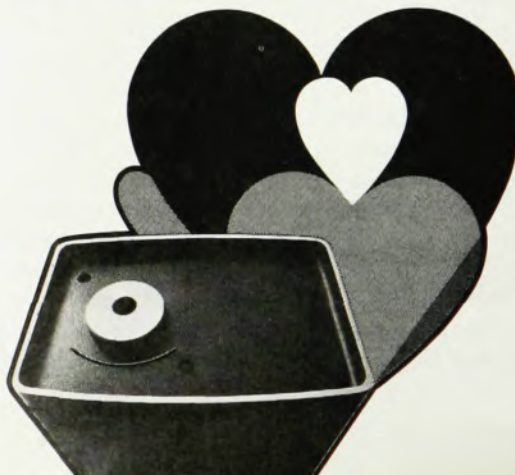
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nologies, and thus is quite relevant to the issue at hand. It is by no means unreasonable to evaluate the pronouncements of the Atomic Energy Commission's experts in the light of the abysmal record of the Food and Drug Administration, the Agriculture Department, or the Interior Department in regulating food additives, persistent pesticides and off-shore oil drilling, respectively. Moreover, AEC not only claims the exclusive right to regulate in this area, but also is charged with the promotion and advancement of atomic energy, an arrangement that hardly can be expected to inspire confidence.

It was indicated that experts generally regard the hazards of nuclear power as small compared to those of fossil-fuel stations. This is a rather ironic point, because one can usually count on "experts" from the utility companies and even the regulatory commissions to appear at hearings on air-pollution regulations or new power plants to testify to the insignificance of the health hazards of fossil-fuel power. This is not to say that such experts are believed, but they serve to demonstrate to the public how readily a scientist's integrity can be compromised for financial or political ends.

In short, the doubts of those who view nuclear power with alarm have a much more substantial foundation than the editorial acknowledged. Even those who prefer nuclear power should not sit back and complacently think that the environmental impact of electric power generation necessarily will become negligible in the future. The best guarantee of the safety of nuclear generating stations will always be constant public pressure based on a healthy skepticism towards those in industry and government who benignly seek to assure us that there is no cause for concern and that, if we want to see the public's interests safeguarded, we need only leave these matters in their hands.

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More ideas on refereeing

We have read with great interest the correspondence by Jacob Neufeld and S. A. Goudsmit on the subject of refereeing (April, page 9). In an attempt to overcome at least some of

the difficulties inherent in the "classical" system, the *Materials Research Bulletin* has, since its inception in 1966, offered a choice of refereeing procedures, and our experience as its editors may be of interest to your readers.

Authors who prefer it can have their papers anonymously refereed in the usual way, in which case the principles and procedures outlined by Goudsmit apply. However, although anonymous refereeing can and often does work well, it is not a universally effective safeguard, and there are situations in which other procedures are preferable. The more specialized research becomes, the greater is the chance that the best available referee is in some sense a professional competitor, rather than an independent assessor. Moreover, he knows who the author is, but the author does not know him, which introduces a special and all-too-familiar brand of awkwardness into the ensuing correspondence. If the number of specialists in a given field is small, an author may encounter the same referee again and again, and whereas the author is publicly accountable for what he writes, the anonymous referee is not, as Neufeld has pointed out.

Topics vary in complexity and authors in literary skill. As often as not, the problem is to find out what it is that the author really means. A referee, being human, is more likely to search for hidden merit if he is in basic agreement with the views advanced than if he is in basic opposition. As a result, the author who wishes to propose a highly unorthodox thesis fears that his paper will not be reviewed with the same degree of sympathy as it would be if it were within the accepted conventions. True, he can submit his rejected paper to the *Proceedings of the Physical Society of Tierra del Fuego* and is likely to see it in print, but in so doing he will be deprived of the effective hearing to which he is ordinarily entitled.

None of these arguments make anonymous refereeing irrevocably obsolete, but they increase interest in other ways of safeguarding standards. Authors who elect to submit their paper (to the *Materials Research Bulletin*) under our "Rapid-Handling Procedure" choose their own referee from the list of 25 Associate Editors. If he accepts the task, all subsequent negotiations are conducted on a personal basis and in an atmosphere

of mutual confidence. When the Associate Editor is satisfied that the paper is ready for publication, he forwards it to the editorial offices, and allows his name to be attached as "Communicator." This signifies that he is prepared to accept public responsibility not, indeed, for every single opinion expressed (which would be asking a great deal) but for the general academic standard of the paper. A system of this kind has been in use by the *Proceedings of the Royal Society* for a very long time, and has already proved its worth. Over half of our own authors take advantage of it and, by exercising their choice in this way, show that they approve of the procedure.

RUSTOM ROY

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Recent letters concerning the referee system used by the American Physical Society for determining what is to be published in its journals appear to have overlooked an important weakness of the system. The practice of using an "expert" to judge a particular piece of work necessarily introduces the possibility of conflict of interest. The referee, or more often a member of his group or one of his graduate students, may be working on the very problem he is asked to judge. Of course we must rely upon his personal integrity not to "sit on" the submitted paper, take unfair advantage of the prepublication information or be unduly critical of the work, thus "buying time" for his own people. He could, in fact, return the paper to the editor citing conflict of interest as his reason for no recommendation, but he cannot avoid the fact of being informed. The point becomes crucial in rapidly developing competitive fields and for publications such as *Physical Review Letters* or *Applied Physics Letters* where priority claims are important. The problem is only partially solved by the special editorial policy for experimental high-energy results submitted to *Physical Review Letters*. (Editorial, *Phys. Rev. Lett.* 13, 79, (1964).)

My suggestion to mitigate this problem is the following: *Physical Review Abstracts* should publish as quickly as possible the abstracts of articles submitted to *The Physical Review* and *Physical Review Letters*. All readers