stand the technologies involved. The science student has some grasp of the applicable principles, or hopes to acquire such knowledge. Those in the third group, by far the majority, have a problem. They don't have any feeling for the underlying technology but, since they are intellectuals and should be running the world (they are told this weekly by Congressmen, university presidents and professors), they are very upset by their lack of comprehension. They can choose either to learn about science or to lash out against science. Almost all select the second, easier alternative.

The bombing of research facilities in general was predictable. The University of Wisconsin happens to have been among the first. The US Army, not the University of Wisconsin Physics Department, was the innocent bystander. It is a myth to suppose that transferring research support from the Department of Defense to the National Science Foundation will make physicists beloved of campus militants.

As Rigden points out, physicists need to put a more accurate image across to nonscience students. This proposal is a long-range solution but is needed at the heart of the problem. The current employment crisis is, aside from its extremely unpleasant effects on individual physicists, a tragedy because the already small fraction of university graduates having *any* knowledge of physics will doubtless diminish, which is hardly conducive to building a "constituency" for science (unless some type of image-projecting courses are successfully implemented).

For the short term, physicists must stop agreeing so readily with the anti-science forces simply because such people are labeled "Liberal" or "Progressive." This tendency is especially pronounced among those in academic positions. American society, if not perfect, represents a fairly successful social organization. Physicists should bear in mind that many critics of science don't want to see research redirected but abolished—not for the greater good of humanity but for selfish emotional reasons. Clarion calls for "relevance" are often thinly veiled cries for research curtailment.

The editorial "The Fall Elections Need You", I am afraid, might be interpreted as calling for the support of "Liberal" candidates in general—potentially a very dangerous course of action. The funding crisis facing physics is largely a result of the erosion of confidence in science caused by incessant attacks from the Left. Electing officials amenable to the views of "bearded, long-haired, alienated students" means choosing those likely to make research cuts for deeper psychological reasons than the cuts imposed by the present Administration. In other words, Spiro Agnew is to be preferred to Senator Mansfield.

GARY W. STUPIAN
Palos Verdes Estates, Calif.

Pro nuclear power

Kudos to Walter H. Jordan for his rational, "air-cleaning" approach to the problem of nuclear-power applications (May, page 32). It seems obvious that every possible precaution should be taken against the potential short-term and long-term hazards associated with nuclear-power stations. From firsthand experience with the nuclear-power critics, however, I have been made painfully aware that they will find no nuclear-power plant acceptable, no matter how thoroughly all the safety features have been incorporated into its design. It was a great relief, therefore, to see the objective analysis presented by Jordan appear in print.

T. J. MENNE
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Our experience in the Southwest strongly supports Jordan's thesis favoring nuclear power plants to minimize pollution. His critics are no doubt right when they urge less use of power, having a lower population, and so on, but these are not pragmatic alternatives that we can apply for immediate effect.

Our problem is that Western power companies have discovered a cheap way to burn hitherto unuseable coal and ship the power to distant population centers. Essential to this plan is the fact that the several governments, state and federal, have no effective laws against air pollution, for the method of burning is to grind up the coal, impurities and all, and blow it through the furnace, the ash

PHYSICS TODAY, a publication of the American Institute of Physics, Incorporated, is published at Mack Printing Company, Easton, Pa., USA. Editorial, circulation and advertising offices are at 335 East 45th Street, New York, N.Y. 10017, USA. Subscription rates: United States and possessions, Canada and Mexico: $7.00 a year; airfreight countries (Europe, Middle East, North Africa): $10.50; elsewhere: $8.50. *Change of address:* Provide at least six weeks advance notice. Send old and new addresses to Circulation Department. Please include address label from one of your recent issues.

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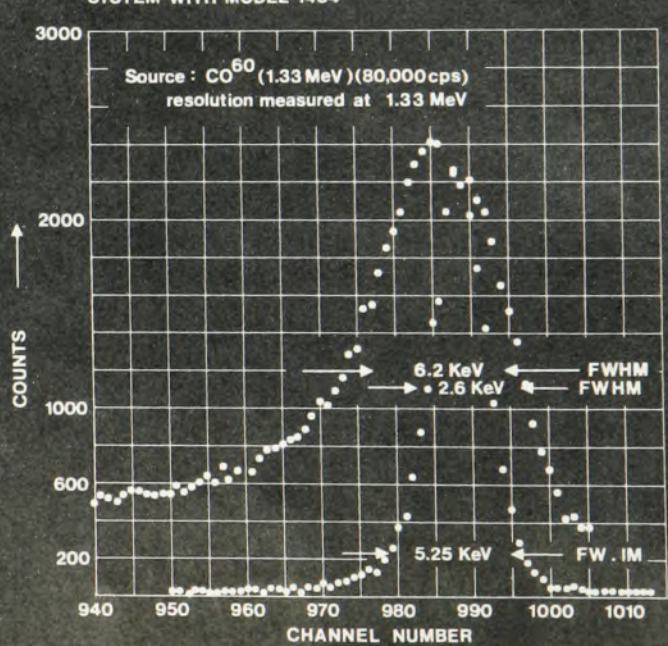

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then issuing from the stacks in a finely divided, very persistent, massive plume. One single plant, located west of Farmington, N.M., puts out from 10^{20} to 10^{22} submicron particles per day. These form a blanket of smog affecting four states. It is no exaggeration to say that the beauty of the Southwest and its parks and monuments, the heritage of all Americans, is being destroyed. Matters are rapidly to get worse, in spite of our efforts to add precipitators to the plants, for plans are afoot and abuilding to increase plant capacity by an order of magnitude. Thus far we have been absolutely unable to attract any national attention whatsoever to this problem.

I submit, therefore, that the choice before us right now is not: Can we stop further production of power? Rather, it is: How can we get the power for the least pollution? It is, I believe, inescapable that the best answer is to use nuclear fuels. Certainly there is a risk, but it is clearly foolish to reject a very small increase in our radioactive background and associated risk in favor of an increase in our toxic chemical background (and its risk) by many, many orders of magnitude. In addition the nuclear plant is smog-free, which the Southwest, alas, no longer is.

I hope physicists will undertake general support of nuclear power as our best *present* alternative to massive power-plant "smog" and chemical pollution. I further hope that someone, somewhere, somehow, knows how to alert the country as to what is happening to the Southwest. After four years of trying, I do not.

JOSEPH J. DEVANEY
Los Alamos, N.M.

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At the present time it is becoming abundantly clear that, with careful handling of wastes, nuclear fuel *must* replace fossil fuels—and in the 20th century. The pollution lessons taught by the sprawling smog of our great cities are being retaught in our most remote and desolate areas.

It has been shown many times that high-power fast breeder reactors will satisfy our power requirements for the forseeable future. But, these systems require a very high capital investment, $200 million or more, and produce a significant portion of the generating-system power. This clearly implies that uncertain performance and frequent or prolonged subsidy of noncompetitive choices can not be supported by industry. Another way to establish the quality of the energy source for long-term power production must be found. One such way is illustrated by the Southwest Experimental Fast Reactor Development Program, which has occupied the attention of a small group, at relatively small cost, from 1964 to the present. A second way should also be followed.

The National Laboratories were established to implement the will of Congress through research and development in the many fields of past and current interest, particularly the fields of nuclear energy. These laboratories use large amounts of energy, and have developed extensive facilities for research on nuclear physics, properties of materials, biological effects of radiation and many other aspects appropriate to and necessary for the development of commercial nuclear power and disposal of its waste.

Why are the National Laboratories being cut off from advanced-reactor development? Why are they not supplying their own power needs with nuclear reactors of types too new to be evaluated for long-term commercial-power production? Are not these places staffed with people who can anticipate fundamental difficulties, solve the new problems that will come with long-term nuclear-power production, optimize performance, and generally extend the frontiers of energy science? Are these not the most suitable and economical test beds for nuclear power?

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Case for in-house computers

As the educational marketing manager of Digital Equipment Corporation, I feel that the readers of your magazine have been given a very one-sided and inaccurate argument concerning the use of the commercial time-sharing utility versus the "in-house" small computer system. The argument presented by Hussein Elkholy (July, page 40) ignores very real economic considerations.

First, once a computer facility is installed in a department or on a campus, it becomes a fixture. And, as more of the faculty and student body become familiar with the computer, the demand for its use increases. Second, the task of applying the computer to physics courses, problems and experiments is easier than ever before. Digital Equipment Corp (and most other manufacturers) have developed easily learned, interactive languages for minicomputers that are used by physicists and physics students in all levels of education. This language can solve all types of problems including those typically found in high-school and college physics. Third, the absolute importance of adequately preparing physics students for industry and research is best accomplished by "hands-on" experience with a computer.

Then there is the argument: "The small computer doesn't have the power of the large computer:" Of course not!