

that this system will once again make the physicist the "jack of all trades."

LEONARD M. DEBALL
University of Illinois

Budget story misleads

I am distressed by the general tone of your article on the federal research budget (March, page 69). Just to say "Nixon Boosts Research Budget 5%" without pointing out that because of inflation the real dollars have decreased is to fail to draw attention to the serious plight in which basic research now finds itself. This decrease in real funding, coming on top of inadequate funding in previous years and the expansion in number of universities attempting to get into research, will work very real hardship on everyone. It is apparent from your figures that if Congress passes all these money bills as they stand, surely a dubious assumption, the real dollars in fiscal year 1971 will be substantially below the FY 1969 actual budget.

In my opinion a vigorous effort should be made to inform the Congress, the Budget Bureau and the Office of Science and Technology that great damage is being inflicted on this country's scientific strength—damage from which we will be slow to recover. Shortage of funds not only is forcing reductions in next year's entering graduate classes but also is causing this year's undergraduates to have serious doubts about going on to graduate school in 1972–73.

Incidentally, I am puzzled by the remark that "the Princeton-Pennsylvania Accelerator (PPA) will soon be shut down to release more money for research." No doubt your writer, TJ, was as hard pressed as I am to discover a rational reason for closing down a \$40-million laboratory, just as it is attaining full stature, and therefore seized upon the most unlikely explanation. I am sure that the 15 universities that make extensive use of this accelerator regard their work as *research* in the pure sense of the word, and without the PPA they could not perform their research. Far from making more money available for research, the closing of the PPA will result in many ruined PhD theses and increased costs for those groups lucky enough to get running time at some other laboratory.

We still hope to find sufficient

money, someplace, to run the PPA at a low but viable level, until this present period of confused priorities comes to an end, as it surely will. Meanwhile we will attempt to honor our present commitments to complete the 15 experiments now scheduled.

MILTON G. WHITE
Princeton University

THE EDITOR COMMENTS: We apologize for the implication that no research is done at PPA. The original statement of the Bureau of the Budget was that PPA would be shut down "to permit an increase in research associated directly with construction of two major new accelerators, more effective use of other new facilities, and expansion in controlled thermonuclear research."

The job scene

As one who was a graduate student in physics until six months ago, I would like to point out that quite a few who write letters to *PHYSICS TODAY* seem to have a pretty unrealistic notion of what graduate study means to a student.

The student decides to become a physicist not because he has a passionate love for physics to the exclusion of other subjects, but because it is a field in which he can exercise his intelligence and originality, tackle challenging problems requiring mathematical or mechanical skills, or both. (Even this is not true of all students. Physics, like any other discipline, has its quota of those who see it just as one of the less unpleasant ways of earning a living.) He could, with little regret or difficulty, study engineering, computer science or mathematics instead. If a prospective student in physics thinks that one of these other fields offers a much better chance of employment after graduation, there is little to keep him from turning to that field.

It is pointless to argue whether society owes something to the student or vice versa. Society provides a good deal of money for his education while he spends money, time and effort. Both do this because they expect to get something out of the investment. If, at the end of four or more years, he cannot get a job that will put his training to use, both are losers because of what amount to bad investments. The only way to avoid such waste is to find a method of making a reason-

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ably good estimate of how many physicists will be needed four to six years later. Controlling the output of physicists accordingly may be next to impossible, but at least the prospective student can be warned of what to expect.

It has been claimed that, even if his graduate study does not get him a job as a physicist, at least it makes him a more educated person in the broad sense. This is an ideal, not a fact. I have not seen anyone become a better human being by working toward an advanced degree in physics, and I do not see how taking qualifying examinations and then, say, measuring some cross sections can have this effect. All they teach him are perseverance and hard work, which he can learn in the nonacademic world too.

Graduate work does have one salutary effect. It destroys illusions. If the student thought research was an adventure of the mind, insight into the mysteries of the universe and so on, he finds out that this is true only for Einsteins and Fermis. For others it is more likely to be a rat race. If he thought studying physics would give him a better understanding of the physical phenomena he could see, he finds that that phase ended with his senior year. Now he essentially studies applied mathematics or electronics. His work for his thesis, as likely as not, actually reduces his interest in research, especially if it does not proceed smoothly. After all, not every advisor shows as much concern for his student as one might think. Ask any fresh PhD how much enthusiasm he now feels for his thesis topic, and the answer probably will be a wry face.

I am not pleading for sympathy, but let us be realistic so that perhaps later generations of students will find advanced education in physics more like what it can and ought to be.

D. R. DRUGI
University of Calgary
Alberta, Canada

You requested reports from former physicists on our new careers. I am now hard-core unemployed. More precisely, in the four months since expiration of my appointment as Visiting Scientist at CERN, my total in-

come from wages, salaries, tips and so on has been 30 US dollars and 83 cents.

It is not that I am unwilling to work. I have spent much more than the above sum in applying to prospective employers. Nor am I completely unable to work. Only a very few employers have suggested that I might be fully effective only after a brief learning period. Instead, the verdict I hear most often is "overqualified." I have not yet figured out what this means, but clearly if it is allowed to mean anything it is incurable. Occasionally an employer will say: "With all the wonderful opportunities open to you, why do you look at a job like this?" If I suggest, ever so subtly, that the only opportunity in physics is starvation, the session ends abruptly on grounds that applicant has shown acute mental derangement.

Name withheld

Views on Schwartz

Although I can add little to Charles Schwartz's comments (February, page 13) I would like to register complete agreement with him.

Simple logic tells any physicist that if any chain of events are possible there is a probability of their occurrence. Now it is up to the educated members of our society to examine these probabilities and determine whether the dangers they represent are a necessary peril to ward off a catastrophic situation. Every scientist must ask himself the question, am I contributing to an unnecessary increase in our perilous circumstances? The answer to this question can not be made in a social and political vacuum. It can only be arrived at within a socially responsible atmosphere that can be created through constant discourse through whatever medium happens to reach us. This is where Schwartz's suggestion could help. Though this kind of communication is seldom interesting and enjoyable it strikes me as a necessary addition to our busy lives if our children are to inherit a world worth living in.

GEORGE GLASS
Seattle, Washington

I could not help but notice the gross inconsistency in the January 1970 APS "Bulletin" in the form of Charles Schwartz's pledge and J. V. Kane's

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