

LETTERS

More views on the job crisis

In the current furor raised by the June editorial in *PHYSICS TODAY*, I cannot escape the uneasy feeling that a rather central point has been buried under words like "freedom," "opportunity," "responsibility," etc. Namely, the reason why a student pursues a PhD in physics is being confused with the rewards he might anticipate when he completes his doctoral study. It has been my observation that those students who elect to pursue doctoral work, thereby forfeiting the immediate financial rewards of employment at the BS level, do so simply because the experience itself is something they must try, like climbing a mountain for example. In fact, the students who enroll in graduate school for other reasons don't seem to have the tenacity to stick it out. Nor are these observations limited to just the physics discipline.

Now to say that society or anybody else "owes" the recent PhD such-and-such rewards for all the time and money he's lost is putting the shoe on the wrong foot, since obviously he wasn't dragged by the hair screaming into a five-year concentration camp called graduate school in the first place. Rather, one could probably make a good case for the fact that society should extract its debt for paying some part of his freight.

All of this is not to say that the AIP should abandon its PhDs as soon as they are born, or that it should not feel concerned about the current job situation. What I am arguing for here is a little more honesty; an honest realization that any graduate education involves risk simply because it is so specialized and that risk must be assumed by the student himself who has voluntarily forfeited a low-risk position to further his education and become specialized. In other words, is a job in a patent office all that bad?

W. N. LAWLESS
Corning, N. Y.

The three letters by Messrs. Kerwin, Levine, and Greenberg in the November issue discuss the problems faced

by recently graduated physicists with PhD degrees who are seeking employment. Perhaps of even more interest, they show the prevailing attitude of a significant part of the physics community toward the purpose of an education in the field of physics.

This attitude is basically that of the professional or trade school, that a person obtains a research degree in a specialized field of physics so that he can spend his life as a research physicist in that field. Thus, Kerwin asks: "Would you let me know how I could put, e. g. a year's course work in quantum electrodynamics to use in the Peace Corps?"

I submit that it is just as reasonable to consider study for a PhD in physics as a liberal education as it is to consider it as a professional education. If considered as a liberal education, the study of physics implies that the graduating student has prepared himself to enter his society wherever his interests and training can be utilized. Considering our technological culture, it is hard to find a course of study better suited than physics for preparing students for participation in our society. The broad range of courses taken by all physicists through the MS degree (leading to a firm grasp of quantum mechanics) is much to be preferred to the specialized approach of the engineers. The final two years of work for the PhD are primarily for the purpose of learning how to pursue independent work, not to learn specialized techniques. With this unmatched combination of a broad training in the fundamentals of science and the demonstration of independent work, the physics PhD should be a most attractive candidate for many positions in society. That he is not results from experiences in industry with physicists who insisted that the only problems worthy of their attention are those relating to the field of their PhD theses.

Because of its fundamental nature, physics is similar to the liberal arts in that it can be a vehicle for a liberal education. We err if we discourage students from electing the subject; we also err when we teach them (as

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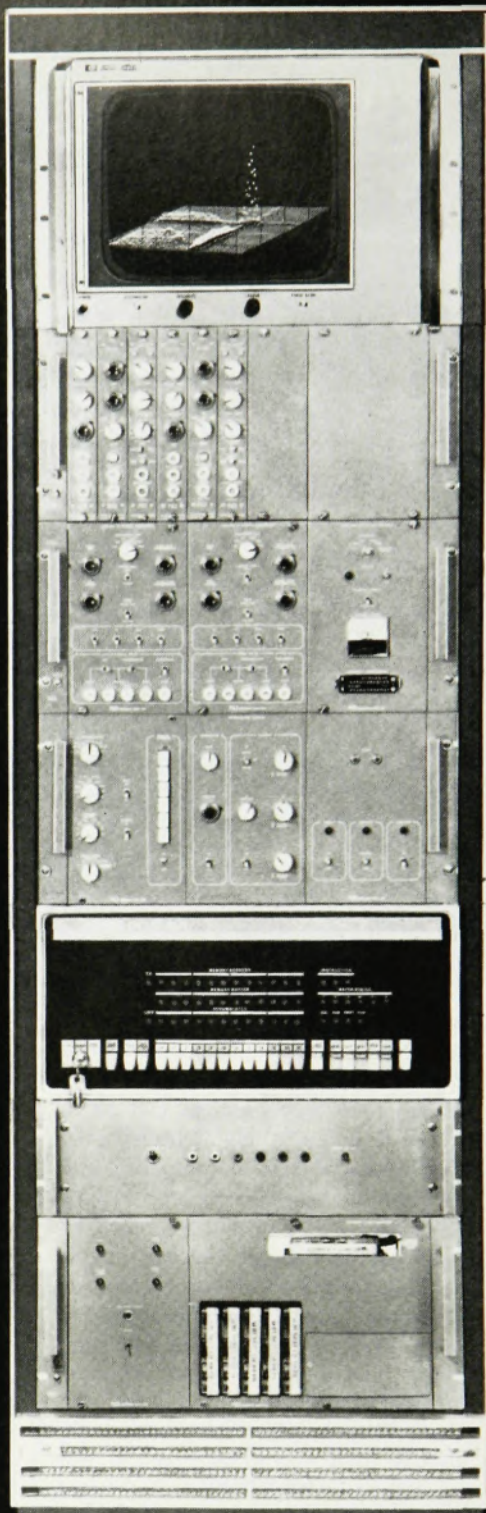
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we have) that the only rewarding life is that devoted to its study. If our graduates entered society with the enthusiasm and open-mindedness of the liberal arts and engineering graduates they would find that their devotion to the study of physics was well repaid.

JOHN A. MCINTYRE
Texas A&M University

Insofar as the discussions to date in this column have focused upon the difficulties of the new or recent graduate, they address the least serious part of the job problem. The scientist with 10 or 20 years experience is more and more frequently, in these days of support cut-backs, finding that there is no market for his skills.

Any response by the editors or readers to the effect that the "good" man is in this situation only by his own choice is applicable only to Nobel Prize winners. Mortals are finding that, when a company is having financial difficulty, the rain falls upon the just and the unjust alike.

The problem is hinted at in the limited employment advertising in *PHYSICS TODAY*, and is spelled out in detail in the extensive newspaper advertising for engineers and scientists, where the most common phrase is "... 0 to 5 yrs experience." I would guess that the AIP Placement Service Register regularly contains the same phrase, either explicitly or implicitly.

The position of the employing company appears to be that the salary of the senior man was based upon his experience in a field that is seldom directly and completely applicable to the job opening. A new graduate will probably do approximately as well or

better work in the available spot, and will work for \$5000 less. (The senior man would, they are afraid, be so insulted by the prospect of a pay cut that the subject is not broached.) This position is hardly unassailable, but there is enough truth in it that there is little point in trying to demolish it. But what is the fortyish man, with family responsibilities, to do after having found that he was in the wrong place at the wrong time?

ARNOLD E. GALEF
Altadena, California

The letter from Kerwin (November, page 9) was touching and pathetic; the government is no longer providing a guaranteed and very comfortable living for physicists! Of course, for guaranteed incomes there are the civil service and the monasteries, but please don't expect high salaries. What some physicists are reluctant to realize is that science is now like other work where each person must exert himself to be gainfully employed, whether writing proposals and working overtime on projects, or selling insurance. It has always been this way for most disciplines. This is the kernel of a non-regimented society. I believe it would do many physicists good to get out and scramble a bit. The idea of a PhD is really to teach a way of thinking and the bag of intellectual tools to go along with that thinking.

A PhD is not a trade diploma which entitles the bearer to do research in that area ad nauseam. Many of us have worked in areas different from our PhD thesis, and I, for one, have found it mentally stimulating. As for physicists helping underdeveloped countries, no doubt quantum electrodynamics is not needed. However, I



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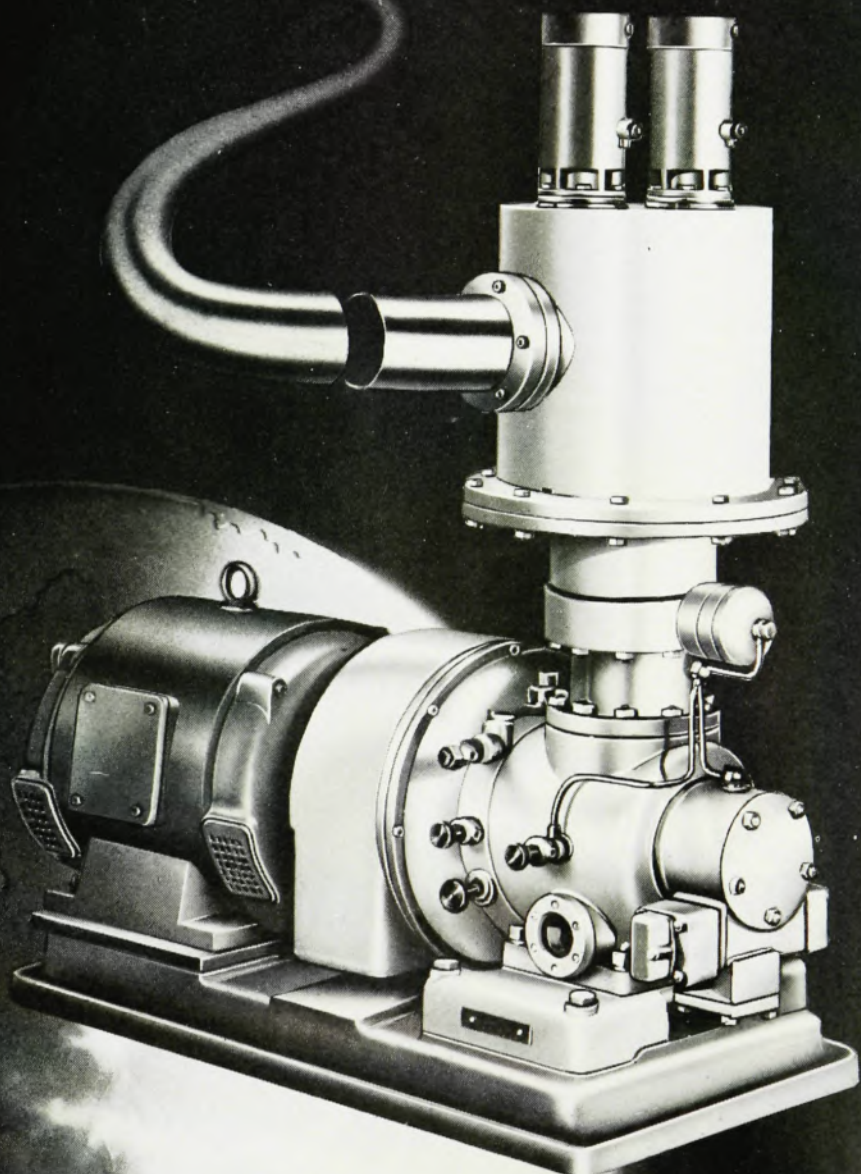
IS YOUR JOB UNUSUAL?

Not all persons trained as physicists work as physicists in the usual sense of the word. A research analyst employed by a leading New York brokerage firm, for example, is a PhD plasma physicist; he evaluates technical and scientific companies as investment possibilities. Another physicist is employed by a legal firm to serve at trials as an expert witness.

PHYSICS TODAY would like to hear from those of our readers who have jobs outside the conventional area of physics. At this time of limited opportunities in physics research and teaching, we are planning a feature on these unusual careers. Please write us by 15 Mar., describing briefly your job and how you found it, how the job is related to your physics training (if it is), and what your job satisfactions are including approximate salary (optional). We will hold your name confidential if you request us to do so.

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urge some of these naive, protected physicists to get out into the world and see where their talents are needed, instead of expecting endless support of their narrow little research areas. There are too few smart people working on problems vital to society and too many smart people doing research; the research is still overemphasized in relation to the USA's and the world's problems.

R. C. HANSEN
KMS Industries, Van Nuys, California

The letters to PHYSICS TODAY concerning the problems of employment for physics graduates has centered on the failings (real or imagined) of the students themselves, the supporting agencies, and even the AIP! There is another set of culprits, the physics-department leaders in the schools, who are perhaps more to blame than any single group.

The physics departments are not producing a very marketable product for two reasons—they have opted out of certain "classical" fields (acoustics, fluid mechanics, electromagnetics, optics) that do have a market, and they have developed attitudes of purity and narrowness in their graduates that make these men and women less attractive to potential employers.

The arguments for opting out of classical physics sound convincing, but they are specious. It is said that engineering departments are housing these fields adequately. If that is so, the engineering departments are not doing their job—but that is another subject. There are problems in these classical fields that will benefit from the peculiar approach of the physicist, and there are problems in modern physics that will be advanced by analogies from "old physics."

Smaller schools argue that they must concentrate on one or a few areas of physics research because of their limited resources. Fine. But the sociology of physics requires that they choose an area of nuclear or high-energy physics so that they will be respectable. Thus, they contribute young graduates into already overcrowded fields of research.

Commitment to scientific achievement and singlemindedness of purpose are useful attributes when one is learning a subject as difficult as physics. There is a certain exclusivity among

those that are successful in it that is perhaps inevitable. Nevertheless, the physicist who wants to practice his profession must relate to the problems of others. Experienced professionals may do this, but the environment of the physics department is more likely to result in a narrow-minded attitude on the part of the graduate. It is this attitude, more than the specialized nature of their training, that is not attractive to employers.

I believe that physics departments are going to do themselves out of a job unless they are ready to do a considerable about face on their academic policies of the last decade or so.

RICHARD H. LYON
Belmont, Mass.

Superconducting priority

In the letters section of the September issue of PHYSICS TODAY (pp. 11 and 13), there appeared a discussion regarding the priority of the concept of transposed superconducting filaments embedded in a normal matrix. Priority was attributed to P. F. Smith who first discussed the concept in the summer of 1968. For the record, I point out that Richard L. Garwin and I explicitly proposed twisting or transposing small diameter superconducting wires in a normal metal matrix as a technique for fabricating low-loss, stable superconducting cable for power transmission in an article dealing with that subject. The article appeared in the *Proceedings of the IEEE* in April 1967 (55, 538, 1967). The same article also forms a chapter of a book, "Superconductivity in Science and Technology" (M. H. Cohen, Editor, University of Chicago Press 1968). To my knowledge this constitutes the first publication of the concept.

JURI MATISOO
Thomas J. Watson Research Center

Beyond the Schwartz amendment

While the defeat of the "Schwartz amendment" has been interpreted by many different people in many different ways, it is probably correct to say that the clear rejection of that proposal by members of the APS was the expression of a desire to "keep things as they had been." This meant above all that the professional society should not expand upon the narrow traditional statement of its purpose,

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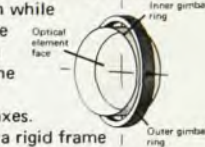
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