

## letters

- ▶ Physics is too masculine
- ▶ No other girls are in physics classes
- ▶ Physics too obviously requires intelligence (It's OK for girls to be intelligent if it's not too obvious).

If you really want to know the reason why girls don't enter science classes in greater numbers, I'll tell you. No girl likes being the only girl in the class. It's for the same reason that few boys major in nursing.

One last point; Betsy Ancker-Johnson said that some men in physics consider a woman in physics to be husband hunting. I wish someone would point out that in our society a physics major is a handicap to a husband-hunter, not an advantage. Due to the nepotism policies at many universities and laboratories, marriage to a physicist is a decided disadvantage for a woman physicist. Very few areas have more than one adequate physics department in commuting range.

Judith Wood-Kyrala  
Arizona State University  
Tempe

### A physics generation gap?

Session FA (Panel Discussion: "Graduate Education in Physics") at the 1971 New York APS-AAPT Meeting saddened me.

The panel was originally composed of distinguished senior scientists and administrators. Before the session, a group of graduate students asked to have two of their representatives added to the panel. The graduate students were first ignored, next refused, then haggled with, and finally reluctantly added to the panel. The graduate-student representatives then said things that were no less interesting than the observations made by the other members.

The original panel and the organizers of the meeting on the one hand, and the graduate students on the other, were placed in the positions of adversaries. Some conflict was inevitable, but it was aggravated by the insensitive and clumsy approach of the elders.

Those who have had recent close contact with students are very fortunate. They have been granted a few years to acclimate to styles that can seem a little abrasive, have learned how to look through these styles at the essential content, and have begun to understand that student participation is useful in discussions of education. Those elders of the APS who live in different environments are in an unenviable position: They are asked to learn these things in a few minutes and in public.

Let us hope that everyone makes the requisite discoveries rapidly and grace-

fully. Physicists claim to be in the business of innovation, of living by their wits. It might be a troubling inconsistency if the APS develops a spectacular generation gap. It might even be bad public relations.

Rolf G. Winter  
College of William and Mary  
Williamsburg, Virginia

**Seitz comments:** Rolf Winter, who is an old and valued friend, apparently failed to note that, as chairman of the panel, I not only worked out the compromise to the previously unannounced confrontation, but listened with great intentness to see if the graduate students had constructive comments to make. Others will have to judge on their own, but I felt that they were rather barren of constructive ideas. One of the constructive suggestions made was that the older generation of physicists, including those on the panel, abdicate, so that the old mess could be cleaned up and a new one started. A second concrete suggestion was that no new graduate students be admitted into physics departments until those now in graduate work have obtained jobs. There was more or less unanimous agreement among the young people on the first point. I was pleased to see that there was some disagreement on the second, since an embryonic Einstein may be waiting in the wings.

As I understand the matter, Winter feels that to some extent abrasive encounters between generations are good things in themselves, quite apart from the rationale of the discussion. That is a very popular view these days, and it probably has merit. I have had endless meetings with our own graduate students and nontenured faculty in the last three years, and will agree that, at least in our own case, the result of the discussions have been to put some matters in a more realistic mode.

Frederick Seitz  
Rockefeller University  
New York

### Drugs versus science

In response to your editorial "Drugs versus Science" (March, page 88) I suggest that such a comparison is a poor one to make in so far as influencing our young people toward a rational approach to major problems is concerned. For years we have described the excitement of the scientific enterprise and yet today we are faced with a serious antiscience movement, as you pointed out. I believe that the thinking young people today, especially those who are turning toward an antirational approach to living, are not so unaware of the satisfactions that can come from scientific research as they are suspicious

of the ends to which further technological developments can take us. They do not seek addiction either to drugs or to creative work; many fear it. For addiction means more than being compelled "to generate feelings of excitement and well being." It means an inability to withdraw from a practice or habit even when that activity is known to be harmful. For many of our youth, this is a serious indictment of science and/or technology (unfortunately, they do not differentiate between these). To them we seem unable to give up any aspects of technological development even when they are almost surely leading to destructive ends. Thus to draw a parallel between science and drug addiction can play right into the hands of those who lead the antirational movement.

Our task, as I see it, is to dispell the myth of the scientist as one so carried away by his research that he is oblivious to the problems of our society and unable to respond to human needs. To attract the youth of today we must make it clear that we are not addicted to science but instead are fully capable of halting those activities that worsen the human condition. It is no longer sufficient to say that "the scientist gets his kicks from activities that *can* bring about significant changes in the real world and *have the potential*, at least, of improving the human condition" (my italics) without demonstrating to our idealistic youth that we also take responsibility for the possibility of worsening our environment and the human condition. If we are to counter the antirational movement we must emphasize some of the many case histories of men who have coupled scientific activity with responsible social service and also point out cases where scientists have given up exciting careers in research to serve humane causes. When we succeed in convincing our youth that even though we may pursue creative work with passion and dedication we are not addicted to it, then perhaps they will turn away from drugs as an escape from what they consider a hopelessly messed up world and join in a rational assault on our problems.

Graydon D. Bell  
Harvey Mudd College  
Claremont, California

The editorial fails to mention that we are aware of the many problems of the day because the youth started asking the right questions. Some will disagree and say that there were a few wise men within the established institutions who first pointed out the problems which caught the appeal of the young. Perhaps. I think we should give credit to the young for their aware-

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## letters

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ness and their enthusiastic attempts to communicate their awareness and to force the reluctant established order to change peacefully. In my opinion, the youth helped start a revolution in human thought that, I hope, will bring about a transformation of our materialistic society into a humanistic society. It seems that such a transformation can be greatly aided by vigorous interdisciplinary studies until every field of human endeavor, physics too, is totally permeated with humanistic ethics.

Anatol Zinchenko  
Indiana University  
Bloomington

## BS accreditation

I was very pleased to read William Silvert's letter (March, page 9) proposing accreditation for graduate physics departments. Something of this sort is sorely needed at the bachelor's degree as well as at the graduate level.

At a university that, even in palmier days, had trouble recruiting from the better US undergraduate programs I have seen some remarkable specimens, and I would like to offer that the real abuse is at the BS level. Most persons who possess a PhD seem to have a fairly respectable education, but there are institutions where one can get a BS (and sometimes an MS) without learning anything at all about physics.

One point, however, is that an accreditation scheme must reflect the real quality of the output, and not merely represent the fulfillment of certain paper requirements. A good example of this problem is the accreditation scheme in metallurgy, where several weak southern schools are accredited, whereas Yale is not.

M. B. McNeil  
Mississippi State University  
State College

## The humble cathedral

In his recent letter (March, page 13) Robert Karplus quoting from Thomas Von Foerster's review of both of our books asks if it is well that students should "... 'stand, perhaps in awe, before the 'cathedral-like' structure of physics,' as Von Foerster expects from Cooper's text." Since this statement has now been printed twice in *physics today*, I feel obligated to explain, before somebody gets the wrong idea, that it was not my intention to make anyone stand in awe of anything—just the reverse.

I do admit that a photograph of the

flying buttresses of a well known cathedral appears on the cover of my book and that there is a certain use of a metaphor (with which I was much taken at the time) relating the structure of physics to that of a cathedral. I would like to add, however, that I personally do not stand in awe of cathedrals—even the most magnificent. They are sometimes impressive, occasionally beautiful and often open, so that they can be entered, looked at, understood and even enjoyed. It was not my intention, nor did it occur to me, that anyone should regard them otherwise.

I wrote my book in the fond hope that with it the reader could enter for himself (to use that metaphor a last time) our humble cathedral, to find there a structure as well fashioned, as comprehensible and as pleasing as that of any actual cathedral, and to be able to reassure himself of its earthly origins by "touching the stones themselves."

Leon N. Cooper  
Brown University  
Providence, R.I.

## Roentgen correction

The encyclopediae tell us that Roentgen discovered his rays while physics professor at the University of Würzburg, not the University of Giessen, as mentioned in "We hear that," March, page 75.

Harald W. Straub  
Bethesda, Maryland

## Impedo duality debate

There is a well known but rarely mentioned historical analog for the much contemplated questions of wave-particle duality and determinism in quantum mechanics (see "Dualism in Quantum Theory," by Max Born and Walter Biem, August 1968, page 51 and "Quantum Mechanics and Reality" by Bryce S. DeWitt, September 1970, page 30). In the days of Galileo it was agreed that a moving body was endowed with something a resting body lacked, something akin to Phlogiston, Electrification or Chalic. The something was commonly called "Impedo." But further description of Impedo presented complication. Two schools of thought arose. An English school took the description of Impedo to be  $mv$  (inertia and velocity conjointly) while the rival German school proported  $mv^2$  the proper description.

Surely one must prove right and one in error, because a single quantity, Impedo, can not have two clearly different descriptions, behaving to satisfy one description in certain situations and the other description in other situations. As Edward Routh<sup>1</sup> has written: "It is