How Santa Cruz Faculty Built Itself Up

I would like to clear up a misunderstanding that occurred in connection with the report "Could a Silver Lining Lurk in Cloud of University of California Cuts?" (September 1993, page 59). A paragraph on our physics department states that "at Santa Cruz . . . the physics department is highly geared to its teaching responsibilities, drawing recruits largely from the ranks of its own graduates." While it is true that the Santa Cruz physics department built itself up largely by *promoting* young faculty from its own ranks, it is not true that it has *recruited* them primarily from the ranks of its graduate students. Only one of our former graduate students, Abe Seiden, is a faculty member in our department. Incidentally, the report mentions the recent appointment to the faculty of the University of California, San Diego, of one of our former graduate students, Kim Griest, but his last name was misspelled "Grieft."

While the statement that our physics department "is highly geared to its teaching responsibilities" is correct, Santa Cruz is also a strong research institution. For example, in a study[1] of the number of citations per published research paper in the physical sciences, UCSC ranked first in the US, followed immediately by Harvard and Princeton.

Reference

1. Science Watch, November 1990, p. 1.

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Teach Nonscience Majors 'Real World' Physics

In his Opinion column "Science Literacy at the College Level" (January 1993, page 69), F. Curtis Michel reiterates the obvious need for successful college science courses for nonscience majors and describes briefly his approach at Rice University. Although it is hard to judge from his short description of the course, I'm led to believe that it represents an approach so fundamentally different from my own textbook writing and college-level teaching (at small liberal arts colleges such as Wellesley and Swarthmore as well as large universities such as Stanford) that I'm compelled to present my alternative view.

Despite his recognition that some students may come to such courses with "outright hostility," Michel spends some (perhaps much) of his course time trying to lead students to become interested in certain topics. I know of no nonscience students who come to class with an interest in "Bragg scattering" or whether "radioactivity itself produces more radioactivity" or "the natural abundances of radioactive isotopes" or "spectral lines of mercury" or *any* of the topics Michel describes as part of his course. Nonscience students (and even physics majors) typically have no intuition concerning these topics, since few of them are amenable to direct experience. Even some of the most "obvious" ones (obvious to trained physicists), such as seeing the spectral lines of mercury, require abstract visualizing of microscopic entities.

In my optics courses for nonscience majors, I concentrate on real-world phenomena with which the students are familiar and *already* have interest. I have found this quite successful. Students don't have to be persuaded to be interested in many questions surrounding rainbows, reflections in mirrors, color, movie projection, eyeglasses and so forth. They've all watched TV, played video games and used cameras.

Paradoxically, often *more* science is conveyed when describing such real-world phenomena than the more standard ones Michel describes, because the students can concentrate on the science and explanations rather than on the raw phenomena themselves. And make no mistake about it, one can give an explanation of these phenomena as deep as one wants.

Even the experiment Michel chooses to begin his course with—"how a metal rod can be made to ring with various pure tones"—is not one students are interested in or will ever see again (though it is admittedly one that can gain attention). This experiment is, moreover, more challenging than instructors steeped in science might imagine: The students cannot even *see* the vibration of the rod. Michel thus unwittingly reinforces the misperception by nonscience students that physics is something done in a lab, divorced from everyday life.

Why not instead take a Polaroid instant photograph in lecture, project it and ask simply, "How does that work?"

Some educators will ask, "How can we consider a student literate in physics who does not know the second law of thermodynamics, special relativity, wave–particle duality, quarks, quasars, the Big Bang, chaos, . . . ?" But as Michel admits, in his course he can succeed only in "giving the students

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