

LETTERS

College teaching

I am somewhat surprised at the replies (*Physics Today*, May 1965, p. 92-4) to my original letter in the March 1965 issue (p. 60). There appears to be some controversy over my statement that small-college teachers work 8 months per year, 25 hours per week during these 8 months, are not required to do any research, and make enough money for a living. I sincerely believe (and personally know) that there are many hardworking small-college teachers. Often, the budget is so tight that there is not even enough personnel to do the teaching. However, at least in some cases, there is a reasonable opportunity to do research. Let us compare the chemistry departments of the University of Chicago vs. seven state universities not well known for their research (averaging 0.5 publication per faculty member per year vs. 3 at Chicago). The average state university has 60% of the staff and 80% of the enrollment of Chicago. If we use the teaching load of 0.5 course per quarter per person at Chicago as standard (and most people will agree that Chicago is at least adequate in teaching), the teaching load at these state universities should be one course per quarter per person. It may be argued that these universities must fulfill teaching requirements different from those of Chicago. Even allowing such discrepancies, it seems fair to say that there is something wrong somewhere. Let us face a problem, and not merely by-pass it by catch-all statements like "survey indicates small-college professors work more than 50 hours per week" (the 25 hr/wk. professors will usually either skip the survey or not tell the truth). In some cases, the effort of the hard-working professors may be more than counterbalanced by their lazy colleagues. More often, however, the problem is more complicated and should be studied more carefully. I have not made any detailed studies, but certain possible

improvements are fairly obvious. Sometimes the curriculum needs to be streamlined; haphazard departmental expansion can lead to a proliferation of courses neither well taught nor sufficiently different from one another (Parkinson's law: courses are expanded to fill the teacher's time.) Whereas Oberlin, Reed, and a few others should concentrate on statesmanship in science as J. H. Millen [*Am. J. Phys.* 29, 272 (1961)] suggested, an active research program at most colleges would keep the faculty from becoming stagnant and also help to train the students. Expensive equipment is not always necessary for good research. For example, Mössbauer, semiconductor, and molecular band-spectra experiments often require only modest investments, some theoretical problems even less. At many colleges, mass production is a dirty word. Whereas Oberlin and Reed can afford not to mass produce, I believe a compromise should be reached at most institutions. The average age of a typical set of first-year graduate texts, Condon-Shortley, Kittel, Schiff, Morse-Feshbach, Goldstein, and Eyring-Walter-Kimball, is 17 years. The half-life of undergraduate lecture notes should be even longer, and the necessity of yearly revisions could be questioned. Without yearly revisions, time required for lecture preparations can be drastically reduced after the first year or two. Advanced students should also be used to some extent as teaching and laboratory assistants. (Given the best materials, the highly skilled craftsmen and the utmost abundance in time, a Rolls-Royce is better than a mass-produced Chevrolet. Lacking any one of the three, a Rolls-Royce may not be as good. Let us not frown on mass production blindly!)

With certain compromises, working 25 hrs./week excluding research may not be completely ludicrous. If a genius like Einstein can be highly efficient and spend 25 hrs./week to do an adequate job in teaching and the rest of his time on relativity, he should be encouraged, not fired.

The lack of interest among creative scientists to teach in small colleges has often been mentioned. This is a positive feedback problem. (The

creative scientists are attracted to the better institutions because of the institution reputations, and their creativity further enhances the reputation of these better institutions.) The supply-demand picture is, however, favorable for the small colleges at present. Although the supply and training of creative scientists have increased greatly in the past several years, the demand has actually decreased. Neither the large universities nor the large research centers are expanding. In addition, a properly administered small college can be an ideal compromise between Einstein's patent office and the large-university rat race. At least the faculties are under no worse handicap than Einstein in his patent office days, and we shall expect to find National Academy members, if not Einsteins, among their faculties. With vigorous recruiting and careful screening of creative scholars, an active research program to prevent the stagnation of creative scholars, and a streamlined curriculum to reduce teaching loads, the potential to do research in many small colleges can be very good indeed. Sometimes the present theme that small colleges should be interested first and foremost in good teaching deserves more careful study; occasionally the complete exclusion of research in the name of good teaching can lead to stagnancy of both faculties and students.

Tung Tsang

Argonne National Laboratory

Scions, fermions, un-ions

Professor Green is to be complimented on his analysis of scientists' salaries ("Scions Are Fermions", *Physics Today*, June 1965, p. 32). This is the first new attack on the problem in many years, so far as I am aware. It displays an imaginative and creative approach which all practitioners in the field of salary administration would be well advised to emulate. Professor Green uses LASL data as representative of salaries of scions, who are identified as scientists in industry involved in two-body interactions and defined as "industrial scientists compensated at levels dictated by the open market place". As he