

The Undergraduate Curriculum

THERE ARE NOW ABOUT 800 colleges and universities in the United States that offer physics courses at bachelor-degree level. There are therefore about 800 physics curricula, most of which are either new and to some extent experimental, or old, unsatisfactory and due to be replaced soon.

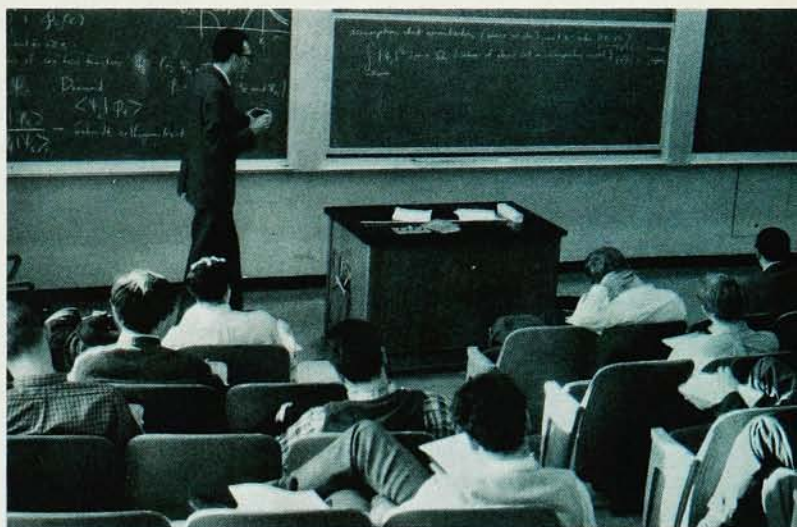
To investigate the current state of physics programs PHYSICS TODAY planned this special issue, a sequel to the issue on Introductory Physics Education last March (reprints of that issue are available on request). It is meant to be representative of schools of all sizes, from small four-year colleges to large universities with graduate schools, where physics is taught as a major subject. Our 11 contributors were invited to explain the philosophy underlying their own choice of curriculum, and we have gathered and tabulated statistical information from a random sample of American colleges and universities to see if there are any significant differences between large and small schools.

We invited contributions from five four-year colleges that provide an unusually high proportion of PhD candidates. Emphasis on student research and special projects at these five schools may be one reason for their success although, clearly, any program can be only as good as the faculty that teaches it. Charles A. Fowler Jr and William L. Parker write about student research activity at Pomona College and Reed College. Robert A. Reitz explains the unusual three-term year at Carleton College and tells us why he finds it a satisfactory basis for his physics curriculum. Swarthmore College has an honors program for bright students, described for us by William C. Elmore; Villa Madonna College has strong ties with its alumni, and George K. Miner explains in his article how he finds their suggestions useful when designing his curriculum.

We invited articles from physicists at some large universities, too, to see how their curricula are planned. Burton K. Moyer, of the University of California at Berkeley, is currently examining upper-division courses to ensure a good match to the introductory Berkeley Physics Course. Mark G. Inghram, University of Chicago, Thomas R. Carver, Princeton University, and Hugh T. Richards, Uni-

versity of Wisconsin at Madison, are all concerned with the provision of a sufficient variety of courses to suit students with different aims: graduate study, direct employment in industry or high-school teaching.

Our fifth contributor from a large university is Clifford C. Butler of Imperial College, London. His article illustrates the differences between American undergraduate courses and those in England, where specialization at high school enables the universities to teach more advanced topics at undergraduate level and to lessen the load of course work on gradu-



ate students. Imperial College would be called an institute of technology in the US as there are no humanities departments; it has long been known as a difficult college for a student to get into but an easy one for him to drop out of; so if the courses that Butler describes appear to be exceptionally advanced and concentrated, we must remember that he has only the very best students in his classes.

Finally John M. Fowler, of the Commission on College Physics, reports on interdisciplinary curricula that are being used in some schools. He tells us of courses that have succeeded and of courses that have failed; success appears to depend on the quality of the teaching staff as much as on details of course design. □