

UNIVERSITIES OR PROJECTS

I was brought up to believe that the chief purpose of science departments in universities is to train more scientists. Since coming of age I have learned of two other jobs they are supposed to do. The other departments, and the university alumni, expect them to impart a modicum of scientific vocabulary to non-science undergraduates, a task not easy and not trivial. In addition the science faculty, and their professional colleagues, consider basic scientific research to be an essential part of their assignment.

Which of these tasks is the more important is not easy to decide; on the surface they seem to be mutually exclusive. Indeed it is not surprising that many university physicists begrudge time spent in class room, in view of the close relation between published research and professional advancement and because of the lack of appreciation of "pure teaching". In a somewhat deeper sense, however, the assignments are complementary, if properly balanced. The research keeps the teaching fresh and inspiring, the press of new students, with new ideas, keeps the research vigorous and imaginative. The experience of a quarter-millennium is that a well-proportioned mixture of teaching and research is really the most effective, produces the best pure research and the best training, even for the undergraduates.

There have always been tendencies to change the balance between teaching and research, pressures resisted by some institutions and yielded to by some, to their ultimate detriment. But in the past ten years forces of a new sort have built up which may throw the balance out of kilter in a hurry. In the first place the utility and the peculiar flexibility of academic research have been universally recognized and it is being subsidized to an extent undreamed of twenty years ago. Some of the subsidy is wisely granted, with an understanding of the reciprocal balance between training and research in institutions of learning. Some of it is unwisely used, being granted as though academic science were a cheap form of industrial research. Even if all of it be wisely administered, it is an unbalancing force,

which requires careful planning on the part of the universities if its eventual effect is not to be harmful both to pure research and to training.

A second new pressure, at least in physics, has come from a much greater demand for trained scientists and a much greater interest in science as a career on the part of the next generation. Graduate enrollment has doubled or trebled in ten years and still more young men wish to be enrolled. At the same time, many more jobs are available than there are trained men to fill them.

This second pressure to some extent counteracts, to some extent reinforces the first in its tendency to change the balance between academic research and training. Training more students takes time away from research. But graduate students need financial aid while they are being trained. So part of the subsidies are naturally used to support the additional students; the more good students the greater the urge for more subsidies.

But the use of subsidies, which are given primarily for research, to support graduate students while being trained, is a two-edged affair. If the pressure for specific results from the research is too great the student assistant may be used as a cheap pair of hands; his training may be curtailed. If the pressure is relaxed too much the project may become a boondoggle, permitting poor students to get undeserved degrees. On the other hand, if any project does not use part of its funds to support students it becomes an alien body in the university, drawing strength away from the training function. It is possible that if less of the subsidy should come in support of specific research and more should come in support of a student or a professor, the balance could be more easily maintained. The fellowships and grants-in-aid of the Science Foundation are urgently needed to help here.

The adjusting of these new pressures and the reaching of a new balance must, in the end, be done by our institutions of higher learning themselves. They cannot train the larger number of scientists without additional financial aid; they must see to it that this aid does not

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interfere with their mutually complementary duties of training and research. Their first task is to measure their present position. Has the balance been displaced? Which way is it moving? What percentage of the research scientists on the campus are completely tied up in research projects, so that they are not giving courses? What fraction of the undergraduate training is carried on by junior assistants? Are graduate students, on the average, taking longer to get their advanced degrees than heretofore? Are they being assigned routine jobs in projects, which have little training value? What is the ratio of full-time to half-time assistantships? What fraction of projects requires special clearance before a student can be employed in them? What percentage of the project facilities are available, as a matter of course, for use in connection with thesis research? It is not difficult to measure the trend, if we so desire; it is much more difficult to decide what to do about it.

For ten years now these new pressures have been considered as temporary inconveniences, to be dealt with by makeshift expedients. It should be clear by now that they are not temporary; they will be with us for a long time. Our universities must learn to live with them, neither rejecting the subsidies nor being overwhelmed by them. The resulting new equilibrium probably will not be the same as the old. It may be that a certain fraction of the faculty will have to be immersed in project work; it is possible that a certain percentage of projects will have to be classified, or otherwise will become unsuitable for the assignment of student assistants.

Nevertheless the new balance must not slight any of the three tasks of the university. Whether we are in for a period of international crisis, as at the end of the eighteenth century, or one of general peace, as at the end of the nineteenth, our universities must continue to expand the frontiers of research, to train new generations of scientists, and to keep laymen aware of the broader import of science.

Philip M. Morse

Institute doings

The so-called "Annual Meeting" of the AIP was held February 16, complying with New York corporation law. The Member Societies of the American Institute of Physics, Inc., gather in the shape of accredited proxies. The election of the Governing Board is their primary function and they are guided by a slate of nominations from Member Societies. The By-Laws state how many nominations each Society may make. It goes by size. There are now on the Board 5 from the Physical Society, 4 from the Association of Physics Teachers, 3 from the Optical Society, 3 from the Acoustical Society, and 1 from the Society of Rheology. The new roster of the Board appears on the title page of this journal. Those elected in February were from APS, G. B. Pegram to succeed himself and C. C. Lauritsen to succeed J. R. Oppenheimer; from OSA, W. F. Meggers to succeed Wallace R. Brode; from ASA, Hugh Knowles to succeed C. Paul Boner; from AAPT, Mark Zemansky to succeed Paul Kirkpatrick and R. M. Sutton to succeed H. K. Schilling. Also by popular ballot one Member-at-Large is elected each year. This year Karl K. Darrow was elected and the term of J. W. Beams ended.

The new Governing Board met all day March 15. After conducting general business, it re-elected G. R. Harrison as Chairman and W. Waterfall as Executive Secretary. G. B. Pegram continues in office as Treasurer and Henry A. Barton as Director. The Board being too large to meet often, it named, as usual, an Executive Committee: G. R. Harrison, G. P. Harnwell, G. B. Pegram, John C. Steinberg and Mark W. Zemansky.

Actions taken by the Board on the agenda items will be reported after details are worked out. Much time was spent on a new basis for that part of financial support of the AIP which comes from Member Societies, and this must be studied further. There was general assent to the idea that *Physics Today* should go to all AIP members and this will be worked out if possible. There was discussion whether reserve funds of the AIP should be invested exclusively in Government bonds and savings bank accounts, or whether a trust should be set up, with investment advisory service, to include industrial securities also. The former practice was adhered to for at least one year.

The possibility of joining with other organizations in a Natural Sciences Manpower Commission was considered, and the question of the Societies' desire to hold a joint meeting in 1956, possibly in New York, was raised. No final conclusions or actions resulted on these matters and they will be considered further.

Henry A. Barton