

accepted. The analysis and the conclusions are sensible. In the Willis Jackson Report the consideration of "technical supporting staff" is most important. The career structure and adequate training of these essential technical people (and there are nearly 2,000 of them in my university alone) is a matter of great concern to the universities and to our technical colleges whose fine work with these people is not always properly appreciated.

It is clear from the report of the Swann Committee, which clearly needs broadening, that it has been infected by some of the misconceptions of industrialists about graduates and higher degree courses. The idea that it is the Ph.D. course which swings the young man away from an industrial career is utterly wrong. It is at the Honours degree stage that the brighter young people wish to follow the path of academic freedom in order to help humanity and perhaps to win a Nobel Prize. A tough Ph.D. course brings most of them to earth. The others know that they must serve a further year or two in a postdoctoral apprenticeship before they have a chance of a moderately paid lectureship. Good recruiting, on the American industrial pattern, could catch many more young men for industry.

It is doubtless the presence (in large numbers) in universities in Britain and the United States of the "postdoctorals" which has caused the scarcity in industrial laboratories. But this same exceptionally fine group of well trained young scientists has also enabled the new universities to be staffed smoothly and has filled the considerable gaps in the older universities as well. There has been a healthy 30 per cent turnover of my own staff in the past three years. That stage is now passed, and a stream of similar young people will surely flow into industry.

The reports are misleading in that they do not make it clear that graduates who "entered higher education and research" mainly did so for a temporary period of further training.

I view with alarm the recommendation of the Swann Report for the possible cutting down of Science Research Council studentships for Ph.D. training—these were all too few this year—for this will be the surest way of driving more young men to the United States. Young graduates who qualify well have come to regard the award of a research studentship as a right, for they know full well that they cannot be trained to be scientists and engineers in a three year course. We must, of course, introduce new kinds of graduate courses—sandwich, business, or industrially delayed type, if you like. These must not, however, be stuffed up with lectures and course work, for they must teach the graduates how to think and create. It is hoped that there will be the fullest consultation with universities before any drastic changes are made in the pattern of S.R.C. awards.

The real answer to the question of how to get a better flow of scientists into industry is to establish a much closer liaison between industrial and university laboratories. Industrial concerns must be prepared to bring in university staff as visitors and consultants on a much bigger scale—even to the extent of appointing some to their boards of directors—and they must be prepared to trust academics with their precious secrets and policies. Universities must make many more industrial scientists into part-time lecturers and professors and put them on to faculty boards and senates. If this can be done, then we can share laboratories and supervisors for Ph.D. and postdoctoral research work.

The domination of top management of British industry by financiers and accountants will need to be changed radically before we can convince the very brightest of our young people that an industrial career is the best to follow. In regard to the future supply of teachers—the dons, real and potential, could persuade many more young scientists to become teachers if the financial rewards of the profession were better.

The reports will cause a good deal of re-thinking by academics.

M. STACEY

*From Dr. Geoffrey Templeman, Vice-Chancellor, University of Kent, Canterbury.*

THE Swann Report makes plain that universities must now take very seriously the problem of how and for what purposes postgraduate studies in science and technology ought to be organized. The need to do this is the direct consequence of the remarkable success universities have had in raising their postgraduate numbers in science and technology over the last few years to which the Jackson Report bears witness. Yet this great increase has been achieved without much attention to the problem of what the folk so trained were to do afterwards. It was assumed that most of them would follow the well tried form of apprenticeship to research leading to the Ph.D.; a consideration not uninfluenced by the fact that team research, like medieval industry, has come to rely heavily upon the services of indentured apprentices and journeymen for its continuing prosperity. The growth of graduate courses has hitherto been a very *ad hoc* business. They have mostly sought to meet the highly specialized need of new applications in science and they have oscillated uneasily between trying to provide for new graduates and for those with post-university experience in industry or elsewhere.

I think universities, industry and the professions now have a chance to deal constructively with this whole situation. I only hope they will take it quickly. I would like to see the matter handled broadly as follows.

First, all concerned ought to recognize explicitly that the three-year undergraduate course in science and technology is not of itself a direct preparation for anything. As the Swann Report shows, this is already tacitly assumed by a high proportion of those who complete the normal undergraduate course, for they now undertake further training of some kind. If we could only be clear about this, then we could concentrate on the essential business of establishing a range of recognized and well signposted outlets from the undergraduate course into research, industry, teaching and the like.

I am convinced that the graduate attitude to industry and school-teaching, which the Swann Committee rightly deplores, is much more influenced by the present failure to provide acceptable training outlets from the undergraduate course than the report will allow. I suspect this point has an even wider relevance. It is at least arguable that the present strong, if unavowed, professional slant of many undergraduate courses in science and technology leads to the congestion and lack of intellectual challenge which, so far as I can make out, deter many able boys and girls who ought to enter them.

Second, I think we ought to try to establish three main outlets from the undergraduate course, each of broadly comparable standing. Obviously the first would be into research and it would be restricted, as the Swann Report says, to those who "can demonstrate a clear potential for continued original work". The second would lead to industry, and here surely is a large opportunity for that real collaboration between universities and industry which both sides, so I think, genuinely want. The third outlet should be to teaching, not only in schools but in the range of other institutions where the need is great and growing. Here I think there is considerable scope for change and improvement. I should like to see the content of the present postgraduate certificate course in education for intending teachers of science and technology very drastically overhauled. I think it would be helpful if it ceased to be the monopoly of university departments of education, so that the appropriate academic departments could contribute to this last year of the intending teacher's university course.

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