

EDUCATION

Craft Training Examined

A MUCH needed inquiry into the relevance of school teaching in industrial training is to be undertaken in a four year research project at the Centre for Science Education, Chelsea College of Science and Technology. The project, financed by a grant of £45,580 provided jointly by the Engineering Industry Training Board and the Leverhulme Trust, is to be directed by Dr Erica Glynn, who also directed the one year feasibility study that led up to the formation of the present project.

One of the objectives is to see how the performance of industrial trainees depends on training at school. In particular there will be an attempt to relate the performance of trainees who have studied science by an innovative scheme—for example the Nuffield scheme—to those who have learnt their science in a

more conventional way. A further objective is to obtain information on what training best suits school leavers of differing educational backgrounds.

Perhaps the most important by-product of the inquiry will be to forge an association between school and industry and to correlate teaching methods and training. It is this aspect of the work that has attracted the support of the Engineering Industry Board, which hopes that the inquiry will lead to a more efficient and practical training scheme for industrial trainees.

The impetus for the new study comes not only from the one year feasibility study, but from a similar study of the training of craft apprentices started in 1966 at the Perkins Engines company which was also supported by the Engineering Industry Training Board. This report, published earlier this year, suggests that the choice of methods open to the craft instructors is considerably

wider than previously assumed and that "guided discovery learning" is particularly effective.

The study team plans to concentrate its investigations in selected areas where the project team and people in education and industry will cooperate to define the problems to be studied to minimize any misunderstanding.

The research programme will be in three phases:

- Local in-depth studies to develop tests and questionnaires.
- The testing of detailed hypotheses, making use of information obtained in the first stage of the investigation, by following the performance of potential trainees from their last year in school through their first year of training.
- Analysis and evaluation with continuing study of the performance of some craft trainees into their second year of training.

SCIENCE POLICY

Lord Rothschild Says It Again

THE Royal Society of Arts, more fully known as the Royal Society for the Encouragement of Arts, Manufactures and Commerce, heard from Lord Rothschild himself, on Wednesday this week, of the philosophy underlying his proposals for the reorganization of the British government's interests in civil research in Britain and in particular for the redefinition of the relationship between the research councils and government departments. Quite apart from the claim on public attention which his report (see *Nature*, 234, 169; 1971) has established, there is also a chance that Lord Rothschild will become the most amusing civil servant to work for the present government.

The classification of research attracted a good deal of his irony. He complained of those "ex-research workers who are the high priests of the cult" who have kept the "taxonomic bandwagon" rolling and in particular of the concept of "pure basic research". But what about research on the nature of the immaterial world? Is that impure? "One had better ask Zuckerman" for, as Lord Rothschild pointed out, Lord Zuckerman's co-author of the Gibbs-Zuckerman report in 1961 "is no longer with us". On that classification, there was also "objective basic research" which is relevant to known objectives in technology, applied project research with a practical goal, applied operational research which is the improvement of the devices which exist already, and development, to bridge the gap be-

tween research and production. "One wonders for whom this elaborate taxonomy was necessary and to whom it is useful."

The taxonomic point is important in Lord Rothschild's argument because it is the starting point for his principal conclusion and on Wednesday he complained of the taxonomy put forward by Sir Frederick Dainton's committee, with its concepts of basic research, strategic research and technical research. In practice, he said, it is not possible to make distinctions like these with any accuracy.

Basic research, however, does have a place in Lord Rothschild's scheme of things. Basic research "is done solely to increase knowledge". Researchers must be competent but need not justify their activities "on the grounds that they may help mankind". It may happen that basic research turns out to have practical value, but that is not essential. Society will back good people "provided what they want is not too obviously anti-social. Whether society will go on backing every Tom, Dick and Harry who is inquisitive but not too gifted, and let them do what they like at public expense for three or so years at a university after graduation, is a matter on which we would do well to ponder. We do not want to have too many lift attendants, taxi drivers or uniformed commissionaires with PhDs in the natural sciences . . .". The strength of Lord Rothschild's taxonomy is its simplicity—there are only two

categories, the second of which he calls applied research and development. "It is indistinguishable from pure research as regards how it is done. The distinction lies in why it is done and who wants it done." Applied research needs an objective—putting men on the Moon, providing blind people with artificial eyes, making cars less noisy and noxious, reducing collisions in the English Channel, providing three-dimensional colour television screens. Indeed, the choice of technical objectives is so great that, in Lord Rothschild's view, it is no longer true—if it has ever been true—that what "can be done will be done". On the contrary, "we have, in fact, got to the end of the road, where the man who determines the objective for which applied research is necessary has got to justify the objective to a form of shareholder, whether it be the electorate and their representatives in Parliament or that somewhat elusive and inarticulate person, the shareholder in a company."

In Lord Rothschild's view, outside scrutiny is also required for basic research projects. Some kind of basic research "might have dangerous consequences or side effects" and society could not be expected indiscriminately to acquiesce in the conduct of work like this and the dissemination of the results. ". . . Sooner or later we shall have to control those types of basic research whose indiscriminate exploitation would or might be harmful to society. Interference with the liberty