

seems to be one explanation of the tortuous nature of the committee's report.

With these reservations, the committee does seem to ask that there should be a more deliberate federal policy for the use of research and development expenditure as an instrument of regional development. The committee in particular suggests that the Government should establish a number of "Exploratory Centres for Regional Development" to explore the possibilities of the direct application of technical innovation. For the rest, there should be a deliberate policy of helping less fortunate universities to grow, especially at the graduate level.

UNIVERSITIES

Towards a Swann PhD

ALMOST a year ago the universities were criticized in the Swann Report for their almost complete lack of imagination in the development of higher degrees with some bearing on the requirements of potential employers. The Swann Committee urged the universities "to start experimenting boldly with the PhD" (*The Flow into Employment of Scientists, Engineers and Technologists 1968*, HMSO, 17s 6d). The Science Research Council took up the gauntlet and earmarked a small number of postgraduate awards for the Interdisciplinary Higher Degrees Scheme drawn up by a joint committee of the Science and Social Science Research Councils under the chairmanship of Professor H. Kay of the University of Sheffield (*Nature*, **222**, 421; 1969).

The scheme, to its credit, has demanded a much more thorough rethinking of traditional university ideas than the now well established SRC Cooperative Awards in Pure Science (CAPS) which require close liaison between university and industry but are not interdisciplinary. In contrast to CAPS students, holders of the so-called Swann awards are required not only to spend part of their time in industry but also to be involved in, for example, an economic or sociological aspect of the technical problem they are working on. At the University of Aston in Birmingham, where Professor I. F. Gibson and his colleagues are supervising several PhD projects of this type, postgraduate students are doing such work as a manpower planning project for an engineering company and a study of a possible investment in a transportation system for a group of Caribbean islands. The employment prospects for these new style PhDs seem bright; companies apparently look forward to recruiting from scientists who appreciate the overall problems that industry faces. For its part, Aston is hoping to increase the number of interdisciplinary projects to about ten next academic year and to include a team research project of the sort often encountered in industry.

The department of liberal studies in science at Manchester, which, under Professor F. R. Jevons, is rapidly making a name for itself, has also taken advantage of the interdisciplinary awards scheme and has research students working on the international collaboration aspects of the Dragon high temperature nuclear reactor and a study of the Route 128 phenomenon. The department has also persuaded the UGC to back interdisciplinary MSc courses. A few other universities, notably Loughborough and Stirling, have also started experimenting with the Swann PhD.

UNIVERSITIES

Medical Schools Integrate

THE contradictions in medical training in London today, which the latest step in the implementation of recommendations of the Todd report are designed to alleviate, can be traced back several hundred years. The principal teaching hospitals looked for their standards to the professional associations such as the Royal College of Physicians or the Royal College of Surgeons. The colleges opposed the foundation of the university in the nineteenth century and since then the tendency has always been to ignore it.

As a result, medical training is something of a compromise: most students spend their first two or three years learning human biology at an ancillary medical school associated with a teaching hospital, and then a further three or more years with surgeons and consultants in the wards. These schools, if only because they are inadequately equipped, are not where the rapid advances in medical science are now being made. Neither do they run courses in the newer university curricular subjects, such as biophysics and social science, which are increasingly being seen as relevant to medical practice.

The changes announced last week in a joint statement by the University Grants Committee and the University of London are designed to alter all this. Following the recommendations of the Royal Commission on Medical Education, they ask that, where conditions permit, all possible steps should be taken to implement the ideal of "a unified medical teaching centre embedded in a university complex". The students will probably enjoy it more because they will be able to mingle with other faculties. They should be able to choose from a wide range of subjects, perhaps even including arts, and to opt for either an express course of essentials, taking about 18 months, or longer courses, leading to a BSc, and taking 3 years.

As plans stand, University College Hospital Medical School and the Royal Free Hospital Medical School are to be integrated as a matter of priority. Indeed, students at University College Hospital seem to be extremely fortunate, for they already get their pre-clinical training in the science faculty of University College. The Royal Free Hospital Medical School should be incorporated here at almost any price and not transferred to Hampstead as proposed earlier. The preclinical department of St Bartholomew's Hospital and the London Hospital will become part of the enlarged biological sciences complex at Queen Mary College. Because of limitations of its site, Bedford College cannot incorporate the medical schools of the Middlesex and St Mary's Hospitals and some compromise will have to be worked out. Guy's and King's College Hospital Medical Schools will form a fourth pair and St Thomas's and the Westminster Medical School a fifth. One of these will be linked to King's College, possibly through the development of a biomedical centre. The other two teaching hospitals will remain unpaired.

Clearly the sort of medical education offered depends on the sort of doctor the community thinks it needs. At the moment the consensus seems to be that hospital experience is not enough and that experience in first-class science is desirable, too. There may also be a case for sending students to work with a good GP for a

short period to experience the personal side of the work, although this is not as easy as it sounds, because of the tendency of GPs working near the teaching hospitals to refer to them all their difficult patients. But most people agree that medical education should not be determined by historical accidents, particularly as each doctor costs about £2,000 a year to train.

TRANSPORTATION

MoT Reorganizes

THE appointment of a new Director General of Research and Economic Planning and the setting up of a new Policy Planning Unit are the main changes in the organization of the Ministry of Transport which will come into effect in October. These changes have been stimulated partly by the need for overall direction of the rapidly growing research and economic activities of the ministry, and also by the recommendations of the Fulton Committee on Government policy planning.

Mr J. A. Jukes, who is at present a deputy Under Secretary of State in the Department of Economic Affairs, has been appointed Director General of Research and Economic Planning. Mr Jukes has spent most of his career in operational research and as an economic adviser to various authorities. There will be four main groups under his directorship: The Road Research Laboratory, the Directorate of Economics, the Directorate of Statistics and the Directorate of Scientific Studies. These groups have also been slightly reorganized in an attempt to increase the coordination between them. The Road Research Laboratory will continue to provide the major source of research, and it is hoped that the new organization will ensure that this is used to the full in solving transportation policy problems. The Directorate of Economics will work in conjunction with the Directorate of Statistics; the former will cover the expanding field of transport economics and provide general economic advice, and the latter will provide the statistical backing for the ministry's economic and scientific work. The Directorate of Scientific Studies will take over the work of the ministry's Chief Scientific Adviser and his staff, and will cover a number of studies in the area of operational research. The existing Mathematical Advisory Unit at the ministry will form part of this directorate.

The new Policy Planning Unit, under the directorship of Mr J. R. Madge, who is currently in charge of the Road Safety Group, will be responsible for longer-term planning and is a direct consequence of the Fulton Committee's recommendations. The committee was concerned that in all Government departments, long-term policy planning was being left to officials who were overburdened with more immediate demands. It suggested that planning units should be set up in every ministry in order that policy planning could be taken out of the everyday running of the ministry.

EXHIBITIONS

The First Geologist

WILLIAM SMITH is not called the "Father of English Geology" for nothing. He was not only the first

person to show that sedimentary rocks in different areas can be correlated and that each formation can be identified by the fossils it contains; he also constructed the first true geological maps and the first table of strata in England. This work established the branch of geology known as stratigraphy which revolutionized what was still an embryonic science.

To mark the bicentenary of Smith's birth, the British Museum (Natural History) has prepared a special exhibition. The most spectacular work on display is a hand-coloured geological map of England and Wales mounted as a single sheet drawn to the scale of 5 miles to an inch and measuring 8.5 feet by 6 feet. The map,



William Smith at the age of 68 (from a portrait by Fourau in the rooms of the Geological Society of London).

produced in 1815, is remarkable for its completeness and accuracy and was Smith's greatest work. This was not, however, his first geological map. His earliest attempts to construct them were probably made about 1793 and 1794, two or three years after he had started work as a surveyor in the coal mining district of northern Somerset, and by 1799 he had completed maps of the surroundings of Bath, the oldest geological maps of any part of Britain. For five years up to 1799, Smith had been occupied in surveying and superintending the construction of a canal linking the Radstock coalfield with Bath and, luckily for him, he was able to make extensive journeys up and down the country. During this time he made his geological observations and compiled for the first time a small geological map of the whole of England and Wales which he published in 1801. Other maps of increasing complexity were brought out in the following years, the best known being the large 1815 map. With this map, he also published a book which contained a short account of the geological formations to be found in each county and two tables of strata (one of which he had prepared in 1799). He followed these achievements with some more books, several charts of sections (the one on display shows a section from London to Snowdon),