

ciently to completely restore the pre-mining conditions. Mining in the Mawddach estuary, however, will probably cause no such wholesale destruction as RTZ's plan is to sift the estuary sands for gold washed down from the mountains by the Mawddach River.

There is no doubt that if substantial gold and copper deposits are found they will be regarded as mixed blessings. Britain's imports of non-ferrous metals cost £600 million annually and any reduction in this bill is to be welcomed. Nobody has a figure for the value of keeping the national parks unspoiled.

## EDUCATION

### Curriculum Analysis

AFTER five years of quiet but rather troublesome rumination, the Department of Education and Science has finally produced the second volume of results of its *Survey of the Curriculum and Deployment of Teachers 1955-56* (HMSO, £2.50). The first volume, published in 1968, covered the qualifications and deployment of teachers in the various types of secondary schools; the second completes this aspect but concentrates chiefly on the second aim of the survey, documenting detailed statistical information about the structure of the curricula and the sizes of teaching groups.

A total of 448 grammar, modern and comprehensive schools were selected for the sample and the information was obtained from the teachers by questionnaire. The returns yielded two million separately recorded items of information concerning 218,747 pupils. It is hardly surprising, therefore, that a large number of errors came to light as the individual curricula were constructed and it was the eradication of these apparently that took the time. In spite of the delay, the department hopes that the analyses are still generally relevant to the present structure of education.

The survey starts by analysing the science curricula of pupils in all types of schools during their first five years, revealing that some science is included in the curricula of at least 85 per cent of the students in schools, and continues with a breakdown of the percentage of pupils studying specified subjects. It was found, for example, that in the grammar school sixth forms, 15 per cent chose to study biology, botany or zoology at advanced level, 21 per cent chose chemistry, 32 per cent chose mathematics and 28 per cent chose physics. The corresponding figures in the comprehensive schools were biology 8 per cent, chemistry 12 per cent, mathematics 20 per cent and physics 17 per cent.

As far as the balance between science

and arts teaching is concerned, the survey provides a clear picture of the situation as it was five years ago and it is therefore a good starting point for further study of the recent trend towards the arts and social sciences. In 1965, there seems to have been a slight bias towards science subjects in the grammar school sixth forms. Approximately 28 per cent studied science subjects alone, 25 per cent studied arts subjects and 8.5 per cent studied a mixture; of the rest, 1.8 per cent studied social sciences alone, 22 per cent combined social sciences with science subjects and 9 per cent combined social sciences with arts subjects. Comparable statistics are given for the other types of schools, maintained and non-maintained, and for boys and girls separately.

## GLASSHOUSE CROPS

### Laboratories Opened

from a Correspondent

NEW methods of pest control will be one of the primary concerns in two new laboratories for research in plant physiology and plant pathology at the Glasshouse Crops Research Institute, Littlehampton, which were opened on July 14 by the Secretary of State for Education and Science, Mrs Margaret Thatcher. The laboratories, which together with equipment have cost £250,000, comprise the plant physiology laboratory and the adjoining controlled environment building. They will provide facilities for the study of the growth and development of glasshouse and other protected crops. The scientific approach is multidisciplinary and includes plant physiologists concerned with biological aspects of crop response to the environment, and physicists studying both physical aspects of crop growth and the factors that affect the interaction between crops and the environment. The same building houses biometricians who simulate the various growth processes of crops, using mathematical models to achieve a better understanding of how to exploit the crop environment to give maximum productivity.

In the controlled environment building, six cabinets provide precisely controlled environments for the study of plant responses to light, temperature, humidity and carbon dioxide concentration. There are also three larger airtight cabinets in which groups of plants can be studied, so that the carbon dioxide exchange of the growing crop can be measured. There are naturally lit growth cabinets in which the conditions are less precisely controlled but the environment is more natural. For studies of post-harvest

physiology there are six controlled-temperature stores and two "keeping quality" rooms in which harvested produce, including cut flowers and mushroom, can be held.

The laboratory complex for plant pathology was designed to extend existing facilities to house all the staff in the entomology, nematology, virology, and mycology and bacteriology departments. The research programme is concerned with improving techniques for the control of glasshouse and mushroom pests and diseases and especially with the development of integrated methods which harmonize chemical and biological control. The use of insect diseases as biotic pesticides is being studied in a new insect pathology unit which occupies separate laboratories designed to facilitate the handling and culture of pathogenic organisms in sterile conditions. The staff of this unit have come from the Agricultural Research Council's Unit of Insect Physiology at Cambridge and from the Pest Infestation Laboratory at Slough, to give the institute the largest centre for research on biological control of agricultural and horticultural pests in Britain. They will aim to exploit arthropod predators and parasites, nematodes, viruses, bacteria and entomogenous fungi as agents of biological control.

Recognizing the advantages of concentrating the work at one centre, the Agricultural Research Council has taken into account concern about unwanted side effects of chemical control. It has approved a programme of research which will provide for the development of biological and integrated control methods for any agricultural or horticultural pest and will not be restricted to pests of glasshouse or mushroom crops.

## NUFFIELD FOUNDATION

### Sponsoring Innovation

THE Nuffield Foundation has earmarked £95,000 to support a new project which it modestly hopes will yield "some coherent sense of what . . . higher education comprises". The plan is that a group headed by Liam Hudson, professor of educational sciences at Edinburgh University, will, starting this autumn, study a number of university departments to identify the chief problems which crop up in undergraduate teaching. The foundation aims, furthermore, to go some way towards solving these problems, principally by providing funds to enable the staff of the departments to design teaching innovations and put them into practice. The last step in the Nuffield group's programme will be an appraisal of the consequences of these innovations.