

Dr. R. A. Butler presented a paper entitled "Parts Per Million and All That" in which he first described his work on anaesthetics, indicating the importance of knowing the concentration of anaesthetics in tissue, the rate of its elimination from the tissue, and equilibrium values of the various substances used. He queried the accuracy of calibration standards made from volatile substances, and consequently the accuracy of a detector calibration using such standards. He felt that some absolute figures often quoted in papers were at the least rather optimistic, and his paper was obviously designed to stimulate a discussion on the quantitative aspects of gas chromatography. It was unfortunate and disappointing that it failed to do so.

A contribution by Dr. T. R. Phillips described how, during the analysis of Arcton 12 (dichlorodifluoromethane) in Arcton 11 (monochlorotrifluoromethane), the calibration of the apparatus had to be carried out with synthetic mixtures of the substances and the samples taken at a fixed pressure. The sensitivity of the apparatus for Arcton 12 expressed as peak-height/partial pressure was shown to vary with the total pressure of the sample and with the partial pressure of Arcton 11. It was thought that this effect could occur in other systems where a small amount of a weakly retained substance was being analysed in the presence of excess of a more strongly

retained one. Dr. Phillips's suggestion that the effect would not be observed if integration of the peak were used instead of the measurement of peak height was confirmed by other contributors to the discussion.

The concluding paper on electron capture was given by Mr. N. L. Gregory. He described a detector to which a potential of only 10–20 V. was applied and which utilized recombination effects to measure compounds having an affinity for free electrons. It was extremely sensitive to halogenated compounds, a typical application being to the detection and determination of insecticides in foodstuffs. Another application was to the determination of tetraethyl lead in gasoline, there being no response to the hydrocarbons present. Apart from halogenated compounds, polycyclic aromatic hydrocarbons, unsaturated fatty-acid esters and quinones were also good electron acceptors. The possibility of the affinity of organic compounds for free electrons in biochemical processes was mentioned.

Members of the Group were also privileged to view apparatus, watch demonstrations, and discuss gas chromatographic techniques with workers in various departments of the College, and also in the adjoining Nuffield College of Surgical Sciences. This was much appreciated by those present.

C. E. H. KNAPMAN

INDUSTRIAL TRAINING IN EUROPE

SPEAKERS from Belgium, Holland, Sweden and Switzerland joined colleagues from Britain at the annual conference of the British Association for Commercial and Industrial Education which was held at the University of Nottingham during September 14–16, when an examination was made of education and training on the continent of Europe, with particular reference to the effects of economic integration. The theme of the conference is of special significance since free movement of labour among Common Market countries may lead to standardization of systems of education and training, or at least a levelling up of standards.

One common thread ran through all the papers—the need to direct more attention to general education in modern schemes of training. All the countries present are now beginning to examine their training systems from this point of view.

Among the contributors were Monsieur R. Grandbois, inspector-general of the French Ministry of Education, who stated that all differences concerning apprenticeships are a consequence of the past. They are the result of local habits and customs; they represent the embodiment of a way of life, the outcome of an evolution both social and administrative. All the similarities are either a consequence of the present or a result of the pressure of things to come. The various systems of apprenticeship have evolved slowly to their present-day form and crystallized behind innumerable frontiers and in confined surroundings, but they are now and will henceforth be subjected to influences for which barriers and remoteness do not exist. It can be assumed that the apprentices of to-morrow will have to be educated in much the same way whatever the country to which they belong.

Monsieur G. C. M. Hardebeck, secretary of the Bemetal Foundation in Holland, believes that more

attention must be directed to general education because it is our responsibility not only to give young people the necessary technical training but also to prepare them to live in a democracy.

In his paper, Mr. H. A. Warren, principal of the South-East London Technical College, explained how in Great Britain at a time in the 1930's, when thousands of man-hours were being idled away in unemployment, the young apprentice was asked to work 48 hours a week and in addition, three evenings at college and two more on homework. A few million pounds extra expenditure on day release at that time would have meant that Britain to-day would no longer be suffering from a lack of skilled man-power. Warren suggested that the wholly evening course, except for recreation or for advanced refresher course studies, is as out of date as the steam locomotive; despite this, Britain has the administrative arrangements which, to meet the challenge of the changing nature of skill, stand out as far superior to anything in continental Europe. "Nowhere in Western Europe is the sandwich course at the C.A.T. [college of advanced technology] level and standard growing to full and recognized stature as it is in Britain".

The pattern of industrial education might have been greatly strengthened had the City and Guilds of London Institute been entrusted also with the General Certificate course at least up to the Ordinary Level of the General Certificate of Education.

The British system is weak because of its lack of incentive. Since no end-of-apprenticeship tests are insisted on, the studies for apprentices in a technical college are voluntary both in the sense of attendance, and in the sense of acquiring a qualification. When, in addition, little recognition will accrue in wages or promotion, the student not unreasonably asks himself why he is pursuing his studies.

Prof. G. Dunand of the International Labour Organization showed how economic mutual penetration has been practised in Europe on a minor scale for centuries. For such exchanges it was accepted and convenient to use mainly one language, Latin, and later French, and more recently English, and also German in Eastern Europe. The universal use of French or English for European relations has, however been increasingly questioned since language has become an essential element of conscious nationhood and indeed nationalism. Nowadays, supremacy would not readily be granted to the language of any one of the great powers, as, for example, English or Russian. Hence the multiplication, in particular since 1919, of bilingual treaties and multi-lingual international conferences, which have given birth to the profession of conference interpreter and to an extraordinary development of translation for international relations.

From this historical review, Dr. O. G. Pickard, principal of the Ealing Technical College and School of Art posed the question: "Do we then ask the schools to devote less attention to French and take up other languages in its place?" This has been tried; during the interim period of the two World Wars there was a determined attempt to introduce a great deal of Spanish to English schools for commercial reasons in place of French. The immediate result of this attempt was to antagonize the teachers of French all over Britain, who clearly saw their vested interest in the teaching of this language threatened by the proposals to introduce Spanish in its place.

So far as the schools are concerned, the question is "whether a third foreign language should find a place in the school curriculum so that it might be possible for school children to learn say, French, German and Russian, or French, Spanish and Swedish, as a normal practice during their school careers. With the growing close association between the economy of Britain and that of Western Europe, it may be necessary to do much more language teaching in schools than has been the practice hitherto [in Britain].

This in turn may lead to a lengthening of the secondary school course as happened on the Continent where it is unusual for the secondary school course for the grammar school stream to finish before 19 or 20 years of age". Neither the schools nor the Ministry of Education have taken kindly to this particular view. The place for teaching the less common languages may be in further education.

Dr. M. B. Brodie of the Administrative Staff College, Henley, and Dr. Walter Goldberg of the Gothenburg School of Business Administration, Sweden, were both concerned with management development. Brodie stated that businesses which expand and grow more complex in character require relatively more managers. While quantitative estimates must be cautious, since they are likely to transpose present-day notions and assumptions too readily to the future, one estimate which attempts to allow for qualitative changes suggests an increase of about 50 per cent in the number of executives needed over the next ten years.

Throughout Europe, the shortage of staff of calibre for teaching and for research in management is widespread and serious. Weakness on the staff side cannot but jeopardize the whole quality and character of any programme. "The limitations of educational ventures run with second-rate staff are too manifold to need enumerating."

Dr. Goldberg gave details of important Swedish developments in the field of management education. In 1957, for example, an investigation showed that the relative number of academically trained top-level managers since 1944 had increased from 58.5 to 84.5 per cent in industry, and from 43 to 54.5 per cent in other enterprises. Sweden proposes to increase its intake of students in business schools to 700 in 1970—more than double the 1955 figures of 325.

All the papers have been brought together in a publication, *Continental Comparisons*, which can be obtained from the British Association for Commercial and Industrial Education, Publications Department, 26a Buckingham Palace Road, London, S.W.1, price 10s.

PERUVIAN ORCHIDS

THE appearance of Part 4 of Charles Schweinfurth's *Orchids of Peru** marks the completion of a task which has necessitated continuous and concentrated research over a period of many years. At last we now have a comprehensive modern account of the orchids of an Andine country, a region which is not only one of the richest in orchids in the world, but which is the original home of the parents of many of our finest cultivated orchid hybrids. This excellent account will not only be of service to students or visitors wishing to identify Peruvian orchids but will also facilitate the study of orchids from the neighbouring Andine countries of Bolivia, Ecuador and Colombia which have many species in common with Peru.

This final part contains among others the important genera *Odontoglossum*, *Miltonia* and *Oncidium* (including *Cyrtorchilum*), the last-named being represented by more than 70 species. Like the three preceding

parts, Part 4 is well illustrated, containing thirty-three charming line drawings and one half-tone plate of representatives of all the more important genera, thus bringing the number of illustrations in the whole work to 194. Of special interest are the three pictures of the remarkable alpine genus *Teliopogon* most members of which are found only above 2,000 m. altitude.

Closer examination of the text in all these parts shows, however, how much more collecting is necessary in Peru before a really satisfactory final account of its orchid flora can be prepared. The author has in many cases not seen any specimens of the species dealt with, having had to be satisfied with descriptions or photographs of the original specimens scattered in various herbaria. Here then is an evident field for future work, since it cannot be doubted that with really good field collections available many of the outstanding problems could be solved and a more complete account given even of those species which are comparatively well known. V. S. SUMMERHAYES

* Chicago Natural History Museum. *Fieldiana: Botany*. Vol. 80, No. 4: *Orchids of Peru*. By Charles Schweinfurth. Pp. v + 787-1005. (Chicago, Ill.: Chicago Natural History Museum, 1961.) 4.50 dollars.