of cereals. Percentage moisture content of timber is obtained by relating it to electrical conductivity by a direct-current method. Four needle electrodes are designed to penetrate the specimen to a depth of approximately 5 mm., and the conductance of the wood fibre between the electrodes is compared with known standards within the instrument. Specialized electrodes are provided for use where penetration of the surface must be avoided. Surprisingly enough, for an exhibit at an electronics exhibition, the circuit of the moisture-in-cereals meter is a development of the Wheatstone bridge and is independent of valve characteristics. It is, of course, also independent of voltage variations. The test cell applies great pressure to the specimen, thereby reducing it to a uniform state.

The *EM*3 electron microscope was shown by the Metropolitan-Vickers Electrical Co., Ltd., which also showed the electrostatic clutch. Another exhibit was an electronic speed-control apparatus, in which the speed of an electric motor is controlled by electronic equipment using thyratrons actuated by a valveless magnetic amplifier. The motor is controlled against a constant torque throughout a wide speed range, the accuracy obtainable being 2 per cent of the maximum speed. Using thermionic amplifiers, the accuracy claimed is 0·1 per cent. A current-limit feature prevents overload.

The same firm has under development a radiation pyrometer for the recording and controlling of temperature. A thermocouple exposed to the heat radiated by the source is used to record the temperature, and the control is exerted by a photo-electric cell which is sensitive to infra-red radiation. The output from the cell actuates a Schmidt trigger circuit feeding a relay which is connected in series with the source supply. Since the thermocouple is not in contact with the source, there is no temperature limit.

Muirhead and Co., Ltd., showed an acoustic strain-gauge ; this instrument, which measures strain in structures in terms of the change in frequency of a vibrating wire, is robust and portable. A valve-maintained tuning fork for use as a mains frequency stabilizer was also on view. The frequency is maintained constant to 50 parts in 1 million.

A new industrial viscometer and the ultrasonic generator were exhibited by Mullard Electronic Products, Ltd. The viscometer is for the continuous monitoring of viscosity and operates on the drag disk principle, employing an electronic method of torque measurement. The instrument measures from 0 to 10^6 centipoises in three ranges using three interchangeable heads. The ultrasonic generator is of the high-frequency piezo-electric type developing from 600 watts to 1 kilowatt. As a demonstration experiment a stable emulsion of mercury and water was produced.

The Plessey Co., Ltd., demonstrated its two-stage electromagnetic electron microscope. It also showed samples of a soft magnetic core material having a finely laminated structure ; one grade has a maximum permeability of 1,000, whereas another grade, although not having such a high maximum permeability, has remarkable machining properties and high strength.

A new and interesting instrument suitable for many problems of industrial control and measurement was shown by F. C. Robinson and Partners, Ltd. It is the proximity meter by Fielden, and is unique in that it is possible to carry out the operation without physical contact with the specimen. The instrument may be applied to any problem which may be resolved into a minute change in electrical capacitance relative to earth, and can measure dimensions and distortions of an order not possible by mechanical means. On this stand was also shown a neat and attractively finished high-speed pen recorder. 'Teledeltos' paper is driven by a synchronous motor, and the frequency response of the instrument is uniform up to 60 c./s. The same firm represented the Baldwin Instrument Co., Ltd., which is now developing an X-ray method for the continuous gauging of sheet metal.

It has been possible to mention only a few of the many interesting exhibits, and lack of space precludes any attempt to make more than a passing reference, in conclusion, to the pleasing finish of the products and the attractive way in which they were displayed.

H. STEEPLE

1816

OBJECTIVES IN THE EDUCATION OF COLONIAL PEOPLES

AN afternoon session on September 2 of Section L (Education) of the British Association during the meeting at Newcastle upon Tyne was devoted to a consideration of objectives in the education of Colonial peoples. The session was opened by a paper read by Mr. W. E. F. Ward, deputy educational adviser at the Colonial Office. Mr. Ward pointed out that most of the problems commonly met with in Colonial education—isolation, malnutrition, parasitic diseases and imperfect communications—are common to Colonies and Sovereign States. The core of the problem is to educate one race in an alien culture, in order that it may attain full world citizenship. So far as British territories are concerned, responsible self-government is an accepted aim of Colonial policy, and education must accordingly be planned with this in view.

Education for citizenship often presents greater problems than it does in Britain. In all Colonial territories there are indigenous political and social systems and cultures, often ill-fitted to compete with Western ideas ; while in many territories there are the special problems of a plural society. Education must be recognized as an instrument of social change, and must make its contribution towards the solution of social and political problems.

It is important to use indigenous culture as a basis for education, since a pupil will be better fitted to appreciate Beethoven or Shakespeare if he approaches them with a knowledge of his own native music or poetry. Education must begin with matter familiar to the child, and must grow gradually towards the unfamiliar and alien culture. Efforts are being made to keep the schools in touch with tribal life in regions where this exists as the basis of society ; much damage could be caused if education resulted in a cleavage between the traditional elements of society and the educated youth. The education of women, so important everywhere, is particularly important in countries where social change is going on and where the school is so badly in need of the co-operation of the parents.

Colonial governments are too poor to develop educational facilities as rapidly as they would wish. This being so, it is essential that a developing educational system should within its limitations be a

balanced system, with primary and secondary schools of all types, and with corresponding facilities for university and advanced technical education and professional training. The aim should be to produce citizens of all types—professional and business men, administrators, craftsmen and technicians of all kinds —so as to enable the territories to take control of their economic and political affairs. Where it is not possible to provide schools for all the children, mass education must be provided to supplement the work of the schools, to raise the general level and make possible more effective co-operation between school and home.

Mr. E. E. Esua, general secretary of the Nigerian Union of Teachers, after contrasting the British tradition with its care for indigenous culture with the French tradition, which aims almost solely at imparting French culture, defined the main objectives in Colonial education as an attack on ignorance, poverty, malnutrition and disease, and rural squalor.

There must be, he said, a campaign for mass literacy, both in the vernacular and in English, and adult education of all kinds must be developed among the newly literate. He agreed that it is important to give full weight to indigenous culture in education, though this imposes a heavy burden on the pupil. In language training, for example, it is difficult not to concentrate effort on English in the higher classes; but on the other hand, the vernacular will not develop if it ceases to be studied at that level. The schools must be multiplied, though this is not likely to be possible unless teachers' conditions of service are improved. Women's education is especially important, and the teaching of hygiene and nutrition, with physical education, would help to raise the standard of living. Education should aim at producing people who are not merely developed as individuals, but also are conscious of their duty to society; spiritual ideals are all-important. In this connexion, something could be done to keep the schools in touch with the traditional community life by developing the native administrations into local education authorities on the English model; local initiative and control, especially in a large territory, is essential if the education system is to be in touch with the country's needs. The problem of poverty must be tackled by vocational training and by industrialization.

Sir John Russell, president of the British Association, stressed the difficulty of planning education for pupils of a different race. He spoke of the importance of improving the arrangements for the well-being of our Colonial guests who came to Britain as students.

The discussion was focused mainly on two points, the lack in the Colonies of economic resources for development, and the means of bringing about closer social contacts between the Colonial peoples and the people of Britain. One speaker thought that rapid industrialization might be too dearly bought at the price of disintegration of the old social system. Others queried whether business firms in the Colonies paid enough in local taxation; in reply to which Mr. Ward suggested that the total sums paid in dividends to shareholders would probably make little difference to the budgets of Colonial governments. The fear was expressed that too much secondary-grammar school type of education might lead to 'black-coated' unemployment.

Other speakers asked if teachers' exchange machinery could be set up, or other arrangements made for bringing Colonial students and teachers into contact with students, teachers or schools in Britain.

Sir Fred Clarke pointed out the intractability of the economic problem revealed by the discussion. While it was agreed that educational development is essential for economic progress, the annual revenues are unable to provide the educational staff needed, and the more teachers' salaries are raised, the fewer teachers will be available. Grants towards capital expenditure are comparatively unimportant; recurrent expenses are the great difficulty.

GERMAN TIMBER INDUSTRY DURING 1939–45

A REPORT* has been prepared by the Department of Scientific and Industrial Research, Forest Products Laboratory, Princes Risborough, dealing with the German timber industry during the Second World War. It deals with composite wood manufacture, wood bending, pencil manufacture, wood structural research, logging, etc., machinery and equipment, green wood preservatives other than coal tar, coal tar creosote for wood preservation during the War, and chemistry of wood and wood products. Curiously enough, Germany appears to have lagged far behind the United States and Great Britain in the development of many of the above. For example, coal tar creosote was by far the most common wood preservative in Germany prior to 1940, accounting for more than 90 per cent of wood preservative needs; during the War, it was absolutely restricted, and German pressure-treating plants were operated with water-borne preservatives such as flunax, basilit, wolman salts and zinc chloride. Flunax, specially prepared for war conditions, replaced creosote for more than 66 per cent of preservatives used.

Perhaps one of the most striking examples of the attitude of the Germans towards the new developments in wood utilization is evidenced in the case of plywood and allied products, which they regarded as of secondary importance in their preparation for war, few developments taking place during 1937–41. Their view then changed, but the pressure of events and allied bombing prevented them recovering the ground they had lost in this respect. Neither in the plywood nor the block-wood industries was any new plant found at the end of the War. The veneer handling, almost entirely of beech, was poor. In the case of laminated wood, however, useful information about the German practice in forming laminated materials from their beech veneers was obtained.

Another interesting point deals with fabricated houses, of which two types were under development—a low-cost house of timber frame and sawdust–gypsum mortar, and one constructed entirely of beech veneers made into plywood, laminated wood and compressed wood. The plans of this latter differ little from similar types in Great Britain; but the use of compressed wood panels in the various parts of the house is a new development. It would be of interest to compare this latter house with the new types being developed in America, as discussed at the Third World Forestry Congress. For those interested, this report merits a careful study.

* B.I.O.S. Overall Report No. 3: The Timber Industry in Germany during the Period 1939–1945. Pp. 16. (London: H.M. Stationery Office, 1948.) 6*d*. net.