

Science in the Universities

THE report "Science in the Universities" submitted by the Association of Scientific Workers to the University Grants Committee, March 1944, which has now been published, covers very little ground that has not already been dealt with by the reports from the Parliamentary and Scientific Committee, the Association of University Teachers, or the Nuffield College statements. It is limited to consideration of the physical and biological sciences and the applied sciences immediately related to them such as are normally taught in universities, with some attention to the social sciences; within these limits, it is one of the best guides that has appeared to the ways in which the rapid expansion of scientific knowledge and its application are affecting the universities, and to the measures required to deal with the immediate problems. Among the recommendations may be mentioned those stressing practical work in the vacations as part of the training of all scientific workers, not merely those training for industry; the emphasis on the education and training of laboratory technicians, and also on the technique of teaching.

The report supports the proposal for a universities academic council to co-ordinate the development of research, and also advocates research committees in each university to watch over the development of research, and administer the Government grant for research. Stress is also laid on the extension of maintenance grants, especially in post-graduate work, and the improvement of salaries and conditions of service. The report visualizes a doubling of the 1939 undergraduate population within four years after the War. The capital cost of the accommodation required, including a possible trebling of science departments, is estimated at not less than £30 millions over ten to twenty years, with an increase in annual expenditure to £15 millions within five years and to £20 millions after ten years. Doubling the Government grant in the first full academic post-war year, with an increase to £9 millions in the fifth year, is recommended.

Standard Frequency Broadcasts

SOME slight modifications have recently been made in the radio transmissions of standard frequencies broadcast by the U.S. National Bureau of Standards from station WWV. A new radio frequency at 2.5 Mc./sec. now operates from 23.00 until 13.00 U.T.; and the time signals have been modified by the omission of the pulse on the 59th second of every minute. The service now comprises standard radio frequencies of 2.5, 5, 10 and 15 Mc./sec., at least three of which are available at any time; standard audio frequencies of 440 and 4,000 c./sec. broadcast on these carriers; and interruptions of these broadcasts which constitute accurate time signals synchronized with the basic time service of the U.S. Naval Observatory. The time signals, which are available throughout the 24 hours, consist of pulses of 0.005 sec. duration at intervals of 1 sec. on all the carrier frequencies, and of 1-min. interruptions of the modulating frequencies every 5 min. The seconds pulses are heard as faint ticks which provide useful standards of short time intervals for physical measurements as well as serving their main function as accurate time signals. On the 59th second of every minute the pulse is omitted.

The 1-min. interval in the audio-frequency transmission is used to give the station announcement,

either in Morse or (at the hour and half-hour) orally, and it also permits use of the radio frequencies uncomplicated by the presence of the low frequencies. The accuracy of all the frequencies, radio and audio, as transmitted, is higher than 1 part in 10^7 . The intervals given by the seconds pulses are correct to 10^{-6} sec. The 1-min., 4-min. and 5-min. intervals marked by the interruption and resumption of the modulating frequencies are accurate to 1 part in 10^7 . The Astronomer Royal's annual report remarks of these broadcasts: "A remarkable degree of agreement has been noted in comparisons of both frequency and time; as a time signal, this form of transmission appears to be capable of a very high standard of precision and to be well adapted for accurate comparisons".

International Trade

A BROADSHEET, "Facts about International Trade" (No. 219), issued by PEP (Political and Economic Planning), describes developments since the PEP report on international trade was published in 1937, and is intended to form the starting point for a later examination of some of the main problems of post-war international trade. The main conclusions emerging from the report itself and the present broadsheet are, first, that exports are essentially a means of obtaining necessary or desirable imports: neither Britain, the United States nor any other country should export primarily to create home employment; export and import policy should be deliberately related to a nation's balance of payments and to its long-term foreign lending and borrowing. Secondly, trade restrictions and bilateralism were a symptom more than a cause of the decline in world trade after 1929; post-war policy should aim at a continuing expansion of effective world demand, making full use of the world's man-power and resources. Multilateral trade, while creating the necessary conditions for obtaining the greatest possible advantages from international trade, also heightens the economic interdependence of nations. A restoration of multilateral trade requires: (a) an efficient international monetary exchange clearing system in which all nations have complete confidence; (b) the maintenance of full employment within national economies; (c) the maximum attainable measure of political security. These three requirements are essential to a universal 'economy of peace'. Failing the establishment of a universal multilateral system of trade, the 'low-tariff club' represents a means by which nations most dependent on international trade can secure the benefits of multilateralism on a limited scale. 'Lend-lease' is essentially a war-time method of international exchange and is unlikely to continue after the immediate post-war period of securities; but world prosperity, like peace, is indivisible. Finally, Great Britain's major problem in foreign trade after the War is to increase her visible exports very considerably, to repair the inroads of war here and in overseas investment income, and to maintain the volume of imports vital to her standard of living.

Soviet Academy of Sciences in Western Siberia

IT is announced in the *Soviet War News* that a new branch of the Soviet Academy of Sciences has been opened in western Siberia to direct scientific activities in the territory stretching from the Ural Mountains to the banks of the Yenisei, and from the Arctic coast to China and Central Asia. It is believed that

a promising future exists there for agriculture, forestry, fishing and coal mining; and there are large deposits of metals and raw materials for the chemical industry. Long before the outbreak of war, the Soviet Government had made detailed plans for the development of Western Siberia; the War has given a great impetus to the process of industrialization. Many of the factories, colleges and scientific research institutions evacuated to the territory from the danger zones have already returned to their homes, but not without leaving behind important traces of their activities, as well as a proportion of their staffs to continue the work begun in Siberia.

The West Siberian branch of the Academy incorporates the Mining, Engineering and Geology Institute, the Chemicometallurgical Institute, the Power and Transport Institute and the Medical and Biological Institute; Novosibirsk has been chosen as its seat; and it will also have offices in Tomsk and Omsk, as well as in the new industrial towns which have sprung up during the last twenty-five years. Typical of these are Kemerovo (chemical and coal industry), Prokopyevsk (coal), Stalinsk (metallurgical industry and mining) and Barnaul (centre of the Altai region). Prof. A. Skochinsky, a specialist in mining engineering, is head of the newly formed branch.

British Film Institute Summer School

A COURSE on visual education was organized by the British Film Institute at Bangor during August 19-26. Among a wide range of topics discussed, very useful contributions were made by Mr. Geoffrey Bell of the Shell Film Unit who discussed "The Scientific Film" and Mr. Neilson Baxter, of the same Unit, who dealt with "The Documentary Film". Both argued that the scientific, realist approach to a subject so characteristic of the documentary group of film-makers is in essence also the proper characteristic of an educational classroom film, as well as being useful for enlarging the child's general knowledge of his environment. Other speakers were Mr. G. P. Meredith, lecturer in visual education at the University College of the South-West, Dr. Winifred Cullis, who made a plea for an increase in the number of films for teaching physiology, and Lieut. M. G. Bowden of the U.S. Army, who gave the conference an account of the extent to which visual aids were used in America. The conference was attended by Polish, Dutch and Canadian representatives, as well as by English teachers and film-makers.

Crop-cutting Survey of Wheat in the Punjab

PRELIMINARY results have just reached Great Britain of an interesting example of random stratified sampling on the grand scale, devised by Dr. P. V. Sukhatme, statistician to the Imperial Council of Agricultural Research, New Delhi, and carried out by the Department of Agriculture of the Punjab. By sampling a hundred out of the total of nine million acres under wheat, the net out-turn of that crop for twenty-seven of the twenty-nine districts of the Province is estimated at 3,448,700 tons, with a standard error only just over 1 per cent. The cost of the survey scarcely exceeded Rs. 1,000 per district.

Uniformity of practice was obtained by central training of the senior staff concerned in all the details of the experiment, and also by central selection of the 748 villages (about 2 per cent of the total number

available) used for the scheme. These were, for each district of the Province, proportionate in number to the area under wheat, but equally distributed among the tehsils of the district, and randomly within each tehsil. Within each village three fields were selected (since previous experimentation had shown little difference between the variation between villages and that between the fields of a village, and practical considerations of time, labour and cost counselled concentration of fields within a village), and within each field one plot of 1/20 acre (the variation between plots in a field being less than that attributable to either source just mentioned). Selection of the fields in villages and of the plot in each field was by use of random numbers supplied by the centre, which was able to check the process. Harvesting, threshing, winnowing and weighing were normally completed in one day. The final estimate includes adjustments for 'driage' owing to the divergence of this procedure, necessary for accuracy and speed, from the general practice (which allows a week or two for drying between harvest and threshing), and also for the different yields of wheat sown pure or mixed with other crops.

Improved Use of Daylight

Two useful recent publications deal with the more effective use of natural daylight. "The Natural Lighting of Houses and Flats with Graded Daylight Factor Tables", by T. Smith and Miss E. D. Brown of the National Physical Laboratory (London: H.M. Stationery Office, 4d. net), gives guidance in the choice of window dimensions for houses and flats. The penetration of daylight through a window is discussed, and tables are given from which the penetration of daylight for different window dimensions may be assessed. These tables are for daylight factors of 2, 1 and 0.5 per cent respectively. "Natural Lighting", Lighting Reconstruction Pamphlet No. 4 issued by the Illuminating Engineering Society (1s.), deals with the subject in a descriptive manner, and shows particularly the benefit derived from high windows and the suitable planning of buildings. In the most favourable circumstances, a daylight factor of 5 per cent may be attained at the working table, and in no case should the daylight factor be less than 0.2 per cent.

Announcements

MR. R. H. HILL, secretary of the Bodleian Library, has been appointed librarian and secretary to the Trustees of the National Central Library, in succession to Dr. Luxmoore Newcombe, who retires at the end of the year.

BOOKS and prints relating to various States of Central and South America, the West Indies and the Antarctic, as well as some rare old maps are the subject of Catalogue 671, issued by Messrs. Francis Edwards, Ltd., Marylebone High Street, London, W.1. The catalogue includes several rare items: a complete set of the *Challenger* results in forty-one volumes; J. Colnett's "Voyage of Whaling and Discovery" (1793-94), with his manuscript journal of the same date; the manuscripts of several of Cunninghamham Graham's books; Grynaeus' "Novus Orbis", with the rare map of 1532; the first Latin edition of Munster, "Cosmographiae Universalis" (1550); "Purchas his Pilgrimes" (1624-26); Apian's map of America (1520); and Arrowsmith's chart of the Pacific (1798).