from the generation of electric power and of both from the full utilization of coal is as artificial, irrational and wasteful as is the treatment of the coal industry as something apart from the chemical industry, of which coal is the very foundation.

Discussion on the coal industry was the most important single development of the mechanization theme, and it led to the conclusion, not from any devotion to nationalization as a good-in-itself, but from lessons in the long unhappy history of that industry in particular, that mechanization in coal-getting would not be attained without governmental control so firm and detailed as to mean nationalization. The inapplicability of any such simple prescription as 'American machinery everywhere' was recognized; but there was a clear conviction that a plan of mechanization measured to the geology and the degree of past working is of extreme importance.

The discussions, which brought in variations on the theme of mechanization, interwove it so intimately with the theme of standardization that an answer to criticisms of 'dullness through standardization' was specially important. It was pointed out that general availability of the products of industry depends on the wide extension of mechanization, that mechanization can only be reasonably effective if the production runs are long runs giving large numbers of one pattern, and that consequently the total number of patterns available to the total field of consumption would be reduced. This does not, however, mean that the average consumer, with limited purchasing power, has a reduced range of available patterns. He would, in fact, have access to a wider range of better models, brought within his reach by the economies in cost attained through mechanization.

The Conference was made notable by the resumption of personal international contacts on a scale only now becoming possible as the war situation improves. The Sunday morning session was marked by the enthusiastic reception of addresses by Dr. Marcel Matthieu, a member of the executive committee of the French Association of Scientific Workers, and by Prof. A. Danilov, chairman of the U.S.S.R. trade union covering scientific and ancillary workers in the laboratories of the universities, the academies of science and the research institutes. Prof. Danilov was accompanied by four other Soviet colleagues; it was noteworthy that the Soviet delegation to the World Trade Union Congress meeting in London included three scientific workers.

The Conference adopted at its closing session a resolution in the following terms:

"This public conference which has met to consider the tasks of science after the war, records its wholehearted admiration of the fighting forces of the United Nations whose great achievements are bringing peace nearer at hand. Their deeds are providing the foundations for a better world while the advance of science and technique are the tools with which it can be built. This conference declares its conviction that:

(1) The achievement of a progressive rise in the standard of living of mankind needs the fullest use of science and technique within the frame-work of a world expansionist economy.

(2) An expansionist economy policy at home implies assistance to the backward and undeveloped countries to raise their productive level by the establishment of modern industry and scientific agriculture.

(3) In this country the advanced and efficient application of science requires democratic planning largely by scientists themselves. For this we propose a central research and development council under the authority of the Lord President of the Council.

(4) The problems facing the manual workers in the future, arising from the effect on their working conditions, of scientific and technical advances, demand close collaboration between the organized scientists and the rest of the Trade Union movement.

(5) The closest collaboration must be achieved between the people of all nations, including the fullest interchange of scientific and technical knowledge based on the contacts now being built between the scientists in Great Britain and the Dominions, the U.S.S.R., France and the U.S.A."

NEWS and VIEWS

Chemical Engineering at Cambridge

THE period extending between the two World Wars has been remarkable for the advances made in what is usually termed 'technology', and it is especially in chemical technology that this development has been most rapid and spectacular. A scientific discovery in a chemical research laboratory may be the progenitor of a finished manufactured article, but the aims and objects of the discoverer and those of the manufacturer are quite different. Since the manufacturer is interested in producing an effect, and since also economics plays an important part in his considerations, it is clear that many steps alien to a pure research laboratory have to be taken after a discovery has been made before a plant is in actual operation. We are confronted with the problem as to the most suitable training for such workers in chemical technology. Prof. Haber, who was at Cambridge at the end of the War of 1914–18, when asked what English chemical industry needed, replied that our weakness lay in not applying the methods of physical chemistry to industry. There is more than a germ of truth in this. Chemical engineering may be regarded by some as a misnomer for chemical technology; and it is within the orbit of physics and chemistry rather than engineering that the new development should take place.

The larger industries in Britain can train their own men, but this is impossible in smaller units. The training given in the Technische Hochschulen on the Continent, or the Massachusetts Institute of Technology in the United States, has proved eminently successful in the respective countries. In Great Britain it appears that such further development as is required will take place in the universities. Hence the munificent gift of about half a million pounds by the Shell Group of oil companies to the University of Cambridge for the endowment of chemical engineering comes at an appropriate time. The University, in accepting this, has likewise incurred a great responsibility. It is generally recognized that we have much leeway to make up to survive in the post-war world as an industrial nation. The chemical industries of Britain are by no means

the least important contributors to the country's wealth and may well become a dominant factor. Increased burdens will be placed on the nation's chemists and chemical engineers, and their training must be such that they can achieve the tasks that lie ahead. Care must be taken that the new Department is continually nourished by its roots—the subjects of chemistry, physics, mathematics and engineering; and those who pass through it should then build on sure foundations.

U.S. Research Board for National Security

ESTABLISHMENT of the Research Board for National Security by the U.S. National Academy of Sciences was announced on February 11 by Mr. Henry L. Stimson, U.S. Secretary of War, Mr. James Forrestal, U.S. Secretary of the Navy, and Dr. Frank B. Jewett, president of the National Academy of Sciences. The Executive Committee of the new Board will be headed by Dr. Karl T. Compton, president of the Massachusetts Institute of Technology, and the Board will consist of seventeen civilian men of science and nine representatives each from the army and navy, including Major-General Norman T. Kirk, Army Surgeon-General, and Vice-Admiral Ross T. McIntire, chief of the U.S. Navy Bureau of Medicine and Surgery. Civilian members include Mr. Herbert S. Gasser, director of the Rockefeller Institute for Medical Research, Prof. E. O. Lawrence, professor of physics at the University of California in Berkeley, and Prof. Isador I. Rabi, professor of physics at Columbia University. The Secretaries of War and Navy requested the president of the National Academy of Sciences under its congressional charter to establish the Board "to assist in providing for continued civilian participation in the longer-term scientific problems of national security when the Office of Scientific Research and Development proceeds to liquidate its activities as a temporary war-time agency. . . . The objective of the Board will be to continue, pending final consideration by Congress on creation of an independent agency, the close co-operation between civilian scientists and the armed services which has proven to be such a vital element in the prosecution of the war. Composed of high-ranking officers responsible for the needs and plans of the Army and Navy with an equal number of distinguished representatives of science, engineering, medicine and industry, this Board includes many of the features of the Office of Scientific Research and Development which has proven so successful as a war-time agency in mobilising civilian scientists and coordinating their work with the requirements and operations of the armed services. . . ." The announcement pointed out that "science is here broadly interpreted to include the employment of scientific method of analysis, experiments and tests in any branch of science or technology including engineering, medicine, psychology and biology."

Science and Planning

IN a memorandum "Science and the Real Freedoms" issued by the Association of Scientific Workers (price 3*d*.), Sir Robert Watson-Watt gives a very fair appraisal, under the title "Freedoms of Science", of the issue between planning and freedom, successfully avoiding the political prejudices with which the discussion is apt to become entangled. Sir Robert's article is based on a speech delivered in Manchester last October. He insists first on the necessity for clearly defining our terms. Science he regards as organized knowledge; but he considers that those constructive pursuits requiring for their prosecution, expansion and usefulness the application of a like process of thought are also properly covered by the term 'scientific'. The pure and applied sciences are in fact planned sciences. There is no human activity which is not a planned activity, and Sir Robert urged that we should consider whether organization in hope is not a nobler and more fruitful aspect of human endeavour than the organization of and through fear which has inspired our planning for war and even extended to the medical sciences. Asserting that the freedom to learn, to choose, to think, to work and to speak are the fundamental freedoms of the individual and the pillars of any tolerable society, Sir Robert urged that the real question is whether planning—which is inevitable—is to be open and public, or sectional, secret or selfish. He visualizes a structure in which the user who wants a definite result asks the research worker, the developer and the producer how best, by what particular kind of planning, he can attain his result; the research worker, the developer and the producer co-operate with the user, indicating to him the full possibilities. The greatest danger is over-simplification; but the planning of science in the application to national life is possible with no substantial risk to the freedom of fundamental science.

Education and Training for Engineers

IN a second report now issued by the Institution of Electrical Engineers, it is suggested that provision should be made for the education of craftsmen, technicians and professional engineers. There should be a three-year course for a craftsman certificate, followed by a more general course, lasting two years, in workshop administration. For the technicians group, the existing course for the ordinary national certificate in electrical and mechanical engineering should be co-ordinated as a basic course, and this should be followed, where necessary, by a course in advanced technology. Students who do well in the first two years of the ordinary certificate course should be combined with those who have reached the standard of a good school certificate in mathematics and physics, and these students should enter a two-year course leading to an intermediate national certificate designed to meet the requirements of the Section A examinations of the Institutions of Civil, Mechanical and Electrical Engineers. These courses would lead to the higher national certificates in electrical engineering and kindred subjects. Another section of the report contains proposals for the further education and training of electrical engineers returning from the Services.

University of Birmingham

THE Court of Governors of the University of Birmingham has nominated Mr. Anthony Eden for appointment as Chancellor of the University in succession to Lord Robert Cecil. The Pro-Chancellor (Mr. E. P. Beale) has announced that a public appeal for £1,000,000 will shortly be made to enable the University to proceed with urgently needed developments, especially the bringing together on one site of all the departments (some of which still remain in the centre of the city) and the building of additional halls of residence. Many of the donors to the appeal for £250,000 for rebuilding and re-equipping the Departments of Mechanical and Electrical Engineering have expressed the opinion that a great need of