Industrial Research and Taxation

THE long memorandum on "Post-war Industrial Reconstruction" issued by the Internal Combustion Engine Manufacturers' Association covers a wide field and quotes extensively from the League of Nations report on "The Transition from War to Peace Economy". While some of its proposals regarding the disposal of Government stocks of internal combustion engines after the War may be open to objection—the suggestion that the balance, after meeting the needs of devastated countries, providing a war reserve, and improving training equipment at engineering schools and technical institutions, should be disposed of by an organization, representing the industry and the Government, in the way best calculated to promote the national development and least likely to affect adversely employment in the industry, is somewhat naïve—the report is yet another document emphasizing the importance of research. Dispersal of the industry's skill would undoubtedly be against the national interest, but the interests of producers can scarcely be allowed to dictate the disposal of surpluses, and the memorandum itself recognizes the necessity of continuing some national and international controls after the War, and on the whole shows a wide outlook and a readiness for more fundamental changes than mere attempts to mend the rents in the old pre-1939 patterns.

In regard to research, the memorandum urges that the position in regard to finance and especially the high level of taxation is a main reason for the inadequate prosecution of research in Great Britain. It suggests that all research expenditure should be allowed for taxation purposes, either when incurred or over a period of years, depending on the nature of the expenditure. Capital expenditure, such as that on laboratories and plant, and on patents, new designs and development to the commercial stage, should be granted relief on the basis of an allowance over a reasonable period of years. Research expenditure which is a normal incident of an efficient and progressive business should be allowed as and when made. Contributions to research organizations should be allowed similarly or, in special circumstances, spread over a reasonable period of years. Appropriate wear and tear allowances should be granted on plant and machinery acquired for the purposes of research, and if such plant and machinery is scrapped, any loss thereon, less any prior wear and tear allowance, should be allowed. The memorandum stresses the importance of clarifying the position as soon as possible, so that manufacturers can embark on an adequate programme of research and development with the knowledge that all such expenditure will rank for taxation relief.

"Political and Economic Planning"

THE Broadsheet "P E P Work, 1940–43", recently issued by Political and Economic Planning (No. 215, December 14, 1943), includes a summary of the present programme, as well as a note on some recent publications on "Research and Industry", and a complete list of P E P broadsheets and reports during 1933–43. Nine groups are in more or less regular session, and at least five full-scale reports are planned for 1944. One of these is a comprehensive report from the Fuel Group on the co-ordination of the fuel industries considered as a whole. The Population Policies Group, which is run jointly by P E P and the Eugenics Society, has begun to meet again, and it is hoped to publish a full-scale report as well as a number of broadsheets during 1944. A new edition of the P E P Report on the British Health Services is in prospect and a fully-fledged Health Group has again begun to meet regularly. The Physical Planning Group has concentrated attention in the past year on the complex social and economic factors influencing the pattern of physical planning and on the human needs to be satisfied, and in addition to further broadsheets a report will be published in 1944.

The Economic Outlook Group of P E P is conducting an investigation into the structure and functions of trade associations, and a broadsheet will be published early in the year. The International Group, from the publication of a forthcoming broadsheet on world political structure, will be replaced by an International Trade Group, the aim of which will be to present the facts about Britain's post-war export problem in its world setting. The Machinery of Government Group has completed two stages of its examination of the need for adjustment so as to make government the nation's common effective instrument for expanding its social and economic welfare, and when reconstructed this Group will tackle the problem of associating the ordinary citizen more closely with the process of local government. A special-purpose group to consider the future of Government information and publicity will follow the broadsheet on "The Future of Foreign Publicity" with one on home publicity. The work which formerly fell to the Partners in Industry Enquiry has again been taken up and several chapters drafted of a report on industrial relations, while further investigations are being made into the structure of industrial relations at the national, district and works levels.

Progress in Bacteriological Technique

PROF. J. CRUICKSHANK has prepared for the British Council an account of recent advances in bacteriological methods (*Brit. Med. Bull.*, **1**, No. 8; 1943). The principal advances in the last ten years have, in his opinion, been made in the discovery of more efficient selective culture media for the isolation of bacteria, in the determination of the stable subgroups or types of bacteria and in the development of typing methods which make it possible to trace the probable source of an infection or an epidemic. Antigenic analysis has resulted in such valuable discoveries as the Vi or virulence antigen of the typhoid bacillus. Antityphoid serum made for therapeutic use should contain Vi antibodies. The blood of typhoid carriers almost always contains these, so that the Vi agglutination test has become a valuable means of helping to trace the sources of the infection. The discovery of a Vi bacteriophage, which has a specific action on Vi strains of typhoid bacilli, can be used for the identification of particular strains of these bacilli. Epidemiologists have used this means of tracing the source of isolated infections or epidemics. The typing of diphtheria bacilli has also produced valuable results.

Work on the hæmolytic streptococci has revealed, by the extraction from these streptococci of a carbohydrate substance which gives a precipitation reaction in the presence of the appropriate anti-serum, thirteen groups of these streptococci. The streptococci of major importance in human infections belong to Group *A*, and at least twenty-three types of these have been identified. It has been found that the

same hæmolytic streptococci can give rise to various manifestations in a single community. At Queen Charlotte's Hospital in London, this typing method has provided the valuable information that, in puerperal fever, infection of the placenta by organisms in the genital passages at the beginning of labour is almost a negligible cause of puerperal fever; the important sources of infection are the attendants or other contacts, or even the upper respiratory passages of the mother herself. Similar work on the staphylococci has not yet given such striking results, but it is proceeding. The War has, of course, greatly stimulated work on organisms of the gas-gangrene group. Methods of growing anaerobic bacteria in the presence of air have been devised, and they have been grown on ordinary broth or peptone water containing a small strip of sheet iron.

A Film of Hospital Treatment

A REMARKABLE film, made by Gaumont Instructional Films, which is being shown under the auspices of the British Council, shows the successful operation by a British surgeon for the removal of the whole lung. The pictures are so taken that the spectator sees at least as much as, if not more than, most of the surgeon's assistants. At the beginning of the film the patient is shown, with his fellow workers in a factory, undergoing routine examination of the chest by X-ray. A cancer of the root of the lung is suspected in him, and the diagnosis is discussed by several experts in the light of subsequent examinations. Operation is decided upon and the patient sees the hospital almoner, who relieves his anxiety about the welfare of his wife and family while he is away from work. The special methods of anæsthetizing the patient are then shown and the operation itself follows, the spectator seeing the beating heart, the ligature and division of the pulmonary veins and the bronchus and other details. The rest of the film shows the after-care of the patient and his rehabilitation in a convalescent home until he returns to work. The British Council's chief function is, of course, to make British institutions and methods known abroad. This film, however, might well be shown widely in Great Britain.

Women's Health in War-time

IN a note entitled "Healthier Women—a War-time Asset", the *Statistical Bulletin* states that comparison of the mortality of women in the United States for the two years prior to the entry of that country into the War of 1914–18 with that for the two years (1940–41) before Pearl Harbour shows that women were benefited by the increasing control over disease. During this 25-year period, the death-rate among women insured in the Industrial Department of the Metropolitan Life Insurance Company, New York, has been reduced by about half. There were thirteen deaths in every 1,000 women aged from 15 to 74 in 1915–16 as compared with only seven in 1940–41. The decline in mortality from tuberculosis has contributed more than any other factor to this remarkable record. The control of pneumonia has also contributed much to the improvement in the total mortality among women. Diseases associated with pregnancy and childbirth have been sharply reduced since 1918. Diabetes alone has increased in the past twenty-five years among women. As regards suicide, the death-rate among insured women in 1940–41 was about two thirds the rate in 1915–16, and for accidents the proportion was three fourths.

An Ultra-High-Speed Motion-Picture Camera

ACCORDING to an article by H. J. Smith (*Bell Lab. Rec.*, **22**, No. 1; October 1943) a new high-speed camera, known as the Western Electric Fastax High-Speed Motion-Picture Camera, is capable of taking pictures at the rate of 8,000 per second. Fastax cameras are made in both 8 mm. and 16 mm. models. The 8 mm. model will take from 300 to 8,000 pictures per second, depending on the voltage applied to the motors, while the 16 mm. model will take from 150 to 4,000 pictures per second. Approximately full speed is obtained at nominal line voltages from 110 to 125 volts. To secure lower speeds a rheostat may be placed in series with the motor to reduce the applied voltage.

These new cameras are of the continuous-motion type employing an optical compensator, or rotating prism, between the lens and the sprocket. The 8 mm. camera has an eight-sided prism permitting eight pictures per prism revolution, and the 16 mm. camera has a four-sided prism permitting four pictures per prism revolution; each revolves in synchronism with the film. The prism creates successive and properly spaced images travelling with the film. The image gathered by the lens is refracted by the prism upward to meet the incoming frame, and as the frame advances downward, the image follows, thereby permitting continued exposure throughout the period that the film travels past the aperture. The duration of the exposure is controlled by the speed of rotation of the prism. Both these cameras are arranged to use either 100-ft. or 50-ft. spools of film. At top speed the film travels through the camera at about 70 miles per hour, the exposure time per frame being about 1/30,000 sec. for the 8 mm. camera and 1/12,000 sec. for the 16 mm. camera. At full voltage one hundred feet of film runs through the camera in approximately 1·25 sec. The motor driving mechanism is described in the article.

Physical Significance of Maxwell's Theory

IN a lecture delivered by Mario Bunge on June 21, 1943, before the Faculty of Industrial and Agricultural Chemistry of the National University of Litoral, under the title "Significado Fisico e Historico De La Teoria. De Maxwell", the work of Maxwell is considered, and its influence in his own day and also on posterity is dealt with (Buenos Aires: Universidad Obrera Argentina. Pp. 16). Among the important effects of Maxwell's theory may be noted the downfall of mechanism for the second time in history. The first non-mechanical theory was the undulatory theory of light under Huygens, Fresnel, MacCullagh, Green, Cauchy, etc., and now for the second time physics seemed to be released from the thraldom of mechanism. The opinion of Gustavo Avé Lallemant, one of the few authorities on physical science in the days of Maxwell, is worth recording. He said that the English, so practical, had created a new science, "la Electrometria", which teaches us how to calculate all the effects of electrical phenomena, though adding nothing to the manner of explaining the nature of electricity (*Anales de la Sociedad Cientifica Argentina*, **13**, 193; 1882). For Maxwell a model was simply a method for teaching but not a real need, and he was convinced that electromagnetism was not reducible to mechanism. In conclusion, it is pointed out that Maxwell's theory has developed in its form and consequences in such a manner, that in the mechanics of de Broglie, Schrödinger, Heisenberg, Born and