

## INDUSTRIAL RESEARCH IN BRITAIN

**R**ESearch for Industry, 1963\* reports briefly on the progress made by nine research associations the grants of which were reviewed during the year. The British Coke Research Association's investigations of the conditions necessary for improving the quality of coke from a medium-quality coking coal, such as will be carbonized in increasing quantities, have already led to improvements in the consistency and quality of the coke by controlling the bulk density of the charge, adjusting the size and water content of the coal, and admixing small amounts of oil. By adding three different materials to poor coking coal, the physical properties of the coke have been improved sufficiently for it to be suitable for use in blast furnaces. Investigations on foundry coke, in collaboration with the British Cast Iron Research Association, have indicated procedures extending the range of coke suitable for foundry use, and a major achievement in the domestic field has been the demonstration that certain additives give a coke of improved reactivity. Fundamental investigations of the thermal behaviour of coal and the fissuring of coke promise to illuminate the process of fissure formation during carbonization of coal in coke ovens.

Fundamental work by the Research Association of British Flourmillers has included investigations of the amino-acid composition of the total protein of different types of flour, comparison of the individual fractions of the protein and an examination of the interrelation of the disulphide and thiol groups. A new family of at least six anti-oxidants has been isolated from oats and wheat, and development of the air classification of flour continued. Replacement of at least 25 per cent of the malted barley by a low-protein English flour has given beer with a better head and keeping properties. The Fruit and Vegetable Canning and Quick Freezing Research Association has continued its investigations of the heat-resistance of micro-organisms which might be present in the canned products before heat processing. Its work on the chemistry of processed peas in relation to texture is nearing completion, and a survey is being made of the extent of contamination of quick frozen foods by various types of bacteria.

The Gelatin and Glue Research Association has initiated an investigation of the fine structure of collagen and has prepared many derivatives of gelatin and animal glue by substitution of the amino-groups present. Methods have been evolved for determining the degree of substitution, and also for increasing the cross-linkability of certain bone glues. Extra-mural support is being given to an investigation at Cambridge on the ultra-centrifugation of gelatin gels, and there has been further

\* Department of Scientific and Industrial Research. *Research for Industry, 1963*; a Report on work done by Industrial Research Associations in the Government Scheme. Pp. v+54+19 plates. (London: H.M. Stationery Office, 1964.) 5s. 6d. net. (See also p. 307 of this issue of *Nature*.)

investigation of the effect of maturing conditions on their melting-point and rigidity. As a result of work by the Heating and Ventilating Research Association, together with that of other organizations, the factors conducive to large fuel savings in modern light-weight structures are now known at least qualitatively, and a simple approximate means of sizing the plant is being developed. A simple method of noise-rating has been specified which will enable manufacturers of ventilating and air-conditioning equipment to give the fan-noise output in identical form. The Association is also examining the ventilating and air conditioning of operating theatres.

Research by the British Hydromechanics Research Association on fluid sealing is concentrated on the mechanical or face seal, on moulded seals for reciprocating shafts, and on soft packings for stuffing box glands. Work on centrifugal pumps has involved use of a mathematical model in clarifying the nature of the fluctuating forces and of electrolytic tank methods for determining perfect fluid flow patterns in pumps, while a digital computing method has been used as an alternative to a graphical one for the analysis of complicated pumping systems. The basic engineering principles in the use of oil hydraulic machinery for transmitting mechanical power are being investigated and further model tests have been made on hydraulic problems in the pipe-work systems of the cooling-water circuits of large power stations. In a different field of industry, the 'Lacra' brass bobbin winder developed by the Lace Research Association is being satisfactorily used in Leavers lace factories, and a method has been devised to speed up that part of the process of removing floats or 'clips' from lace which is still carried out by hand, and to mechanize the final removal of the floats.

The Rubber and Plastics Research Association has made fundamental contributions to the theory of polymer molecule distribution and network formation and is able to record noteworthy progress in its investigations of the effect of water on unstrained glass-reinforced plastics. The British Ship Research Association, which for five years from April 1, 1963, was awarded a minimum grant of £300,000, subject to a maximum of £500,000 with a further £200,000 on the basis of £1 per £1 on special contributions from ship owners and managers, continued full-scale trials of turbine machinery and investigated in several ships the cause of the deterioration in performance with time in service. Investigation of the increased wear of cylinder components associated with burning heavy residual oils indicates that an increase in cylinder liner temperature is most beneficial if the temperature is increased at the coolest portion of the liner. Problems of nuclear ship design, construction and operation are being investigated by a special team.

## THE ROCKEFELLER FOUNDATION

**T**HE statement on future programme and policy issued last autumn by the Rockefeller Foundation described five principal interrelated areas in which the Foundation expects to concentrate its efforts during the immediate future. It is with these five areas that the first part of the president's review for 1963 "Promise and Progress" is mainly concerned, and, dealing first with the conquest of hunger, Dr. J. C. Harrar, recognizing that private

philanthropy can only play a modest part, points out that the Foundation has chosen to assist this effort through co-operative efforts in the interrelated fields of education and the medical, agricultural and social sciences\*. Moreover, it not only seeks to strengthen education in

\* The Rockefeller Foundation Annual Report for 1963. Pp. 319 + xviii. (The Rockefeller Foundation, 111 West Fiftieth Street, New York, N.Y., 1964.)

all these sciences but also participates in rural health programmes, so that advanced agricultural technologies will accompany better health protection. The Foundation has its own programme in the agricultural and health sciences, within which it has attempted to encourage the development of extension methods and organization, but Dr. Harrar stresses the need for closer union between the social, agricultural and health sciences if the problems of backward areas are to be attacked successfully.

The Foundation's work in the agricultural sciences, which began as a single centre in Mexico directed toward improving the amount and quality of that country's basic foods, has now been extended to include similar centres in Colombia, Chile and India. In addition, two international centres have been established at strategic locations, designed for basic and applied research on food problems of major importance over a wide region. The International Rice Research Institute is a co-operative venture of the Government of the Philippines and the Ford and Rockefeller Foundations, while the International Centre for Corn and Wheat Improvement at the National School of Agriculture, Chapingo, Mexico, is operated by the Government of Mexico and the Rockefeller Foundation.

In the second field, the population problem, the Foundation will assist research in fields relating to human fertility, such as the physiology of reproduction, endocrinology, human genetics, the biochemical effects of diet, etc., as well as in demography and cultural attitudes. It will also support pilot operations in areas where population density is an especially difficult problem and where there is a desire for help. In 1963 the Foundation contributed substantially to the establishment of a Centre for Population Studies at Harvard University, and its interest in rural health centres includes investigation of family planning.

In the third area, that of strengthening emerging centres of learning, Dr. Harrar exemplifies the Foundation's policy by the support given to the University of Valle, which is already internationally important in several areas of medicine, and which in 1963 the Foundation assisted with investigations of the business and financial aspects of the University's administration, the provision of basic teaching materials, and the construction of a new building for the humanities and linguistics departments. The University of East Africa received grants for research and training in economic development, and for the Faculty of Agriculture: the University of Ibadan was helped in the creation of a Department of Psychiatry, Neurosurgery and Neurology, and also in establishing a virology research unit to study the tropical fevers of West Africa which had not been diagnosed, while the University of the Philippines received substantial grants for faculty research in the Department of English and Comparative Literature, History, Political Science and Sociology and for training and research in economics and agriculture.

In the fourth area, the Foundation is making Negro education a main programme, with considerable emphasis on higher education. A substantial contribution to the United Negro College Fund will help to strengthen the faculty and improve the equipment of 32 predominantly Negro colleges, while besides appropriating funds to assist qualified undergraduates at Duke, Emory, Tulane and Vanderbilt Universities, the Foundation has made a grant to the Woodrow Wilson National Foundation to enable Fellows to teach for a year at some 40 southern colleges, mostly predominantly Negro. In the fifth area, aiding the cultural development of the United States, Dr. Harrar cites two grants made during the year to help raise standards of excellence in the theatre.

In the second part of his review "People for Progress", Dr. Harrar describes the way in which the Foundation uses its fellowship programme as part of a training programme, linked with the establishment or reinforcement

of local institutions of education and research, and the strengthening of national agencies responsible for putting new methods and materials to use. The 276 new awards in 1963 brought the total of current fellowships and scholarships to 709, of which 218 were in agricultural sciences, 191 in humanities and social sciences, and 200 in medical and natural sciences. The Fellows and Scholars came from 52 countries and an additional 93 fellowships from Foundation funds were administered by other organizations, including 12 by the Medical Research Council, 22 by the Population Council and 59 by the Social Science Research Council. Appropriations for these activities totalled 3.525 million dollars, and 3.625 million dollars has been appropriated for fellowship awards in 1964.

Considering first the provision of trained man-power for health services, Dr. Harrar notes that in Latin America the supply of physicians is reasonably adequate and the output sufficient to establish a reasonable cadre of doctors for medical care and health services. Nurses, sanitary workers and technicians are scarce and are likely to remain so. Accordingly, at the University of Valle a programme for training auxiliary community nurses is under way and in the Candelaria pilot centre comparative studies are being made to determine how much care and preventive service one resident can provide when supported by a first-class medical centre within reasonable distance. In Africa, however, the number of indigenous physicians and auxiliaries is very small and the task is to maintain the high-level clinical training while inserting into a crowded curriculum sound field training in running a dispersed health service largely staffed by sub-professionals. The Foundation is attempting to help by providing staff and economic assistance to centres based on the medical faculties of the University of Ibadan and the University of East Africa, while in India the Foundation is supporting the All India Institute of Medical Science at New Delhi, with both funds and staff in a key scheme to prepare academic personnel for the burgeoning network of medical schools. The Foundation believes that it should undertake to study the problems of the proper utilization of sub-professional staff and to provide guidance for the advanced nations in their efforts to assist the development of health services in countries which need them.

Similarly, Dr. Harrar shows how the 50 per cent increase in 1963 in the funds for supporting scholarships and fellowships in agriculture to a total of 1.5 million dollars—supporting 318 students from 27 countries at 46 institutions—is directed to the conquest of hunger. Another 1 million dollars over four years has been appropriated for the International Centre for Corn and Wheat Improvement; the International Rice Research Institute, now fully staffed, expects to have 60 graduate-trainees by the end of 1964 and already has a comprehensive and integrated programme of basic and applied research on all aspects for rice production. The Foundation has also assisted the establishment of the graduate school of the National School of Agriculture, Chapingo, Mexico, and the postgraduate school of the Indian Agricultural Research Institute, New Delhi, and already the increased resources of trained man-power have permitted progress in the structure and functioning of agencies concerned with agricultural advance. Dr. Harrar also reviews briefly the way in which the support of the Foundation is enabling the University of East Africa and its constituent units to respond to the call for development of leadership in Africa.

Besides the president's review, the annual report includes notes on the regional programmes, and lists the grants and study awards made during the year, together with the financial statement showing appropriations during the year totalling 37 million dollars, of which 7.3 million dollars was for the agricultural sciences, 10.3 million for humanities and the social sciences, and 6.3 million dollars for medical and natural sciences.