

which the Association received from the directors and staff of member firms on advisory and other committees. He stressed the need for qualified staff in the industry to apply the results of the Association's work and hoped that the Association would be able to play some part in providing facilities for education and training for nominees of members. Finally, he welcomed the representatives of the City and University of Sheffield.

After the official opening, the Association held a series of open days for the benefit of staff from member firms and others closely associated with the industry. In all, approximately 450 visitors have inspected the Research Station during the first and subsequent open days.

A. H. SULLY

## BRITISH CAST IRON RESEARCH ASSOCIATION

### OPEN DAYS

**T**HE British Cast Iron Research Association, Alvechurch, Birmingham, held two open days on July 3 and 4, the first day being set aside for representatives of member firms, and the second day for visitors from other research associations, Government laboratories, trade associations, universities, technical colleges and institutions.

The new experimental melting station was opened by the president of the Association, Mr. J. J. Sheehan, on July 3. It covers an area of 5,000 sq. ft. and is fully equipped with oil-fired crucible furnaces, a 5-ton S. W. L. electric travelling crane, sand preparation and moulding equipment. In addition, it is furnished with four 'Efeo' electric high-frequency melting furnaces of 10, 5, 2 and 1 cwt. capacity. Cupola furnaces, including facilities for both hot-blast and cold-blast melting, will be provided eventually, and will permit melting under both acid and basic conditions in a water-cooled melting zone. The annexe to the station is equipped for rough grinding, shot-blasting, heat-treatment, coremaking, and for carrying out small experimental melts. The equipment here includes a 30-kW. high-frequency vacuum melting furnace made by the National Research Corporation of Cambridge, Massachusetts, with a melting capacity of 30 lb.

Experimental investigations on view included the majority of the work in progress under the current research programme. Several investigations on the soundness of iron castings were illustrated and included the effect of physical variables and composition on the soundness of grey cast iron; solidification sequences in iron castings, and the soundness of nodular iron castings.

Aspects illustrative of the work on malleable cast iron included investigations on 'inverse' greyness in unannealed malleable castings, the influence of graphitization on decarburization, and a study of the nucleation of the melt by counting the eutectic cell size. Factors influencing the chilling tendency of cast iron and work on the solidification mechanism of white cast irons were also exhibited.

An effort is being made to provide data to enable cast iron to be used for steam engineering applications at temperatures above 450° F., the current temperature limit. Growth tests are being carried out up to 600° C. and the battery of creep testing machines

recently installed will permit creep tests to be made on materials evaluated on the basis of these growth tests. Further work on mechanical properties refers to the correlation of composition and structure of high-phosphorus materials, based on the eutectic cell size concept. Other investigations under this heading include a scrutiny of the form of the stress/strain curve for grey cast irons; the influence of testing conditions and composition on the properties of pearlitic nodular cast irons; the influence of arsenic and phosphorus on the high-temperature tensile properties of these materials, and the influence of understressing on their properties in the normalized state.

A display was shown to illustrate the corrosion-resistance of ordinary and high-alloy cast irons in various media. Other work in this field covers the application of cathodic protection to prevent severe pitting attack in cast iron propellers, and the mechanism of the corrosion attack on cast iron diesel engine waterways in the presence of antifreeze solutions.

A recent project undertaken by the Association concerns an attempt to utilize low-phosphorus native ores by providing means of dephosphorization, and work shown included experiments with the oxygen top-blowing process. Equipment is available for the determination of gaseous elements in cast iron, using vacuum fusion and vacuum heating techniques. Certain of these elements are of significance in the study of pin-holing of iron castings, in the origination of enamelling defects, and in the graphitization of malleable cast iron. An investigation is in progress on the causes of the premature failure of ingot moulds, in association with the manufacturers of ingot moulds and bottom plates.

Current research on foundry moulding and core sands includes high-temperature testing, using a high-frequency oscillator to determine load/deformation characteristics at high temperatures; the testing and properties of CO<sub>2</sub> process sand moulds and the properties of bonded sand in the green state.

Routine methods of examination and analysis were demonstrated in the chemical and spectrographic laboratories, and in the sands, metallographic and mechanical testing laboratories. Work was also exhibited to illustrate some of the investigations undertaken by the Development Department which, of course, is chiefly concerned with giving advice to member firms on the numerous technical problems that arise in the course of production.

Experimental work on the occurrence of sub-surface blow-holes in association with manganese sulphide segregations was shown, and work on dry sliding and lubricated wear at high and low local pressures. A further exhibit gave the results of an investigation into the failure of certain heavy section castings due to abnormal forms of graphite, associated with the presence of traces of such elements as lead, tellurium, selenium and bismuth.

The work of the Foundry Atmospheres Section was illustrated by a display showing the pattern of formation, dispersal and control of dust in the foundry, together with dust sampling equipment. Some of the equipment developed for local dust control was also shown and included external dust control arrangements for pedestal grinders, a wet spray collar for bars used in de-coring difficult castings, a ventilated wire handbrush and wet spray type of grit and dust arrester for cupola furnaces.

Finally, some of the work based on the experience of the operational research team, which visits foundries by invitation and provides advice on problems of production and layout, was shown, and included recommended suitable foundry layouts, improvements in production flow lines, the correct use of patterns and moulding equipment, and data on output and costs.

J. G. PEARCE

## ORGANIZATION OF THE METEOROLOGICAL OFFICE

IN a written answer in the House of Commons on June 28, the Secretary of State for Air, Mr. G. Ward, said that the Committee appointed in 1955 under Lord Brabazon to review the organization of the Meteorological Office in relation to current and future requirements saw no reason to question the wisdom of the decision to entrust responsibility for the State meteorological service to the Air Ministry, and was satisfied that the close association of the Meteorological Office with aviation since 1919 had been mutually advantageous. The Committee considered that the present standing of the Meteorological Office as a scientific institution was high, and that users had great confidence in the services provided. The Committee welcomed the work being done by the research staff in the development of numerical methods of forecasting, and the decision to install an electronic computer at the Central Forecasting Office. It considered that greater precision in local forecasting might be achieved by more detailed study of local weather characteristics, coupled with the use of radar scanners. The development of a combined headquarters at Bracknell should eliminate the present loss of effort due to dispersal of the Office.

As a result of the Committee's recommendations, the Meteorological Office had been reorganized under a director-general with two sections, concerned with forecasting and services and with research, each under a chief scientific officer, and a third section, under an assistant secretary, with administration and general duties. Measures approved as a result of the report, including an increased number of higher level posts, and an increase in the number of senior appointments open to the experimental officer class, would improve the prospects available to both the experimental and the scientific officer classes. The Committee expressed the hope that it would be possible to bring home to the universities the challenge which meteorology presented to the imagination of the first-class physicist or mathematician.

The Committee suggested no changes in the constitution or terms of reference of the Meteorological Research Committee or in the division of the research programme between the Meteorological Office and the universities, but recommended that the arrangement under which a separate grant is made to the Royal Society for fundamental research should be reviewed at the end of the current five-year period and that grants for research emanating from the Air Ministry should thereafter normally be channelled through the Meteorological Research Committee. This recommendation was still under discussion. The Committee also recommended a system of research grants for postgraduate study in meteorology, and the Department of Scientific and Industrial Research was willing to consider awards under the scheme it administers.

The Committee also recommended a review of the man-power requirements for aviation services. The requirements of civil aviation were being reviewed in conjunction with the Ministry of Transport and Civil Aviation. Local forecasting units were desirable for other purposes, particularly in agricultural and horticultural districts, but a more detailed examination was required before any pattern of development could be approved. The Minister said that he had accepted the Committee's recommendation that the existing Meteorological Committee should be replaced by an advisory committee of not more than five members, all of whom would be outside the Government service. The new Committee would consist of an independent chairman, and four members, including the chairman of the Meteorological Research Committee *ex-officio* and another scientist, appointed after consultation with the president of the Royal Society, and normally two laymen. Lord Hurcombe had accepted the invitation to become chairman of the new Committee, which would be required to keep under review the progress and efficiency of the Meteorological Office and the broad lines of its current and future policy, the general scale of effort and expenditure devoted to the Meteorological Office, and the contacts between the Office and those using its services.

## WATER RESOURCES OF GREAT BRITAIN

THE publication of the Surface Water Year Book 1954-55\* is a further welcome addition to the growing body of hydrological knowledge for Great Britain. The first four Surface Water volumes dealt with the periods 1935-36, 1936-37, 1937-45 and 1945-53: since that date the volume has been appearing annually and the time-lag in publication has been steadily reduced.

There has been an increase from 102 gauging stations in 1953-54 to 116 gauging stations in this latest volume; but some changes have been made in the presentation of the statistics for 1954-55 in order to reduce both the size and the cost of the volume. The daily mean discharge tables have been omitted, while hydrometric records of 'reservoired areas' have been summarized on a single page. The station descriptions have been rearranged and condensed, and the surface geology particulars omitted. Complete records and details are, however, available for consultation at the Surface Water Survey Centre.

While progress is thus being made in the collection and dissemination of these basic hydrological data concern is still being expressed at the lack of a much-needed water policy for Great Britain. A notable debate in the House of Lords on May 29 surveyed the steadily increasing consumption of water per day, and also the rising consumption of water per head per day throughout the country. Emphasis was laid upon the very great and continuing increase in the industrial use of water over the past two decades, to which must be added the demand likely to arise in agriculture with the application of summer irrigation methods. Some areas now face the prospect of permanent water shortages even under normal

\* Ministry of Housing and Local Government, and Scottish Office. The Surface Water Year-Book of Great Britain 1954-55. (Hydro-metric statistics for British Rivers, together with related rainfalls, for the year-ended 30th September, 1955.) Pp. xi+54. (London: H.M.S.O., 1957.) 15s. net.