INSTITUTION OF ELECTRONICS EXHIBITION IN MANCHESTER

THE ninth Annual Exhibition of Electronic Devices, organized by the North-West Branch of the Institution of Electronics, was held in the Manchester College of Technology during July 14–20. The Exhibition was as large and efficiently organized as any of its predecessors, and was as deservedly popular. It included, in addition to exhibits in the commercial and research sections, a programme of general and specialized lectures, and a number of illustrative film shows. For an affair of this size—some forty exhibitors were represented—a detailed review cannot be given; the writer must restrict his attention to a few of the features which he found most interesting.

The commercial section was impressive chiefly for its evidence of steady progress in the development of known techniques. Applications of television were prominent, and there were on view no fewer than three industrial closed-circuit television channels (by Pye, Philips Electrical, and J. Langham Thompson). Low-inertia integrating motors were shown by Electro Methods, Ltd.; these motors have practically straight voltage-speed characteristics, and are used for time integration of minute voltages. The Saunders–Roe exhibit included some interesting and, incidentally, very handsome strain gauges. These are made of metal foil etched into suitable strain-sensitive patterns, and mounted on an epoxy resin lacquer backing. They are more robust than conventional wire gauges, and permit a higher input current without compromising stability. Part of the large Mullard exhibit consisted of a formidable array of ultrasonic devices. Among them was an ultrasonic drill press, designed for the drilling or machining, by the action of an abrasive slurry between the vibrating tool and the work, of such intractable materials as glass. Equipment for the ultrasonic cleaning of fragile or inaccessible objects, and an ultrasonic soldering-iron capable of dealing with aluminium, were also demonstrated.

Prominent in the research section were the stands of the British Rayon Research Association. Among the recently developed instruments on display was an ingeniously simple autocorrelogram computer, used for the separation of periodic from random irregularities in yarns. The same exhibit included a demonstration of equipment used in flash photolysis. In this technique an intensely bright flash of short duration is used for irradiating a specimen, and after a selected interval of 20 μsec. or more, a second, less bright, but shorter, flash is used to record the absorption spectrum of the specimen. In this way the presence and decay of short-lived products of irradiation can be studied.

The Institute of Cancer Research exhibited ultrasonic echo-locating equipment, used for the examination of brain structure. When the equipment is in use, a quartz transducer in acoustic contact with the head emits a narrow, pulsed beam of ultrasound. Any echoes incident on the transducer are transmitted as pulses through amplifier and display circuits, and appear on an oscillograph screen. The position of the pulse on the screen gives a measure of the distance of the source of the echo from the transducer. At present, observations are being compared with what is known of the 'normal' brain, with the view of the possible identification of abnormal structures. In view of the drastic effects of ultrasonic vibrations, as demonstrated in the Mullard exhibit, it should be mentioned that the power output of the transducer is only 30 μW. Since the vibrations suffer considerable attenuation on entering and leaving the skull, it is clear that high sensitivity is required of the amplifiers.

A portable twelve-channel toposcope, designed as an aid to the increasingly important subject of electroencephalography, was exhibited by the Burden Neurological Institute. The complete study of the simultaneous electrical activity associated with a number of points on the head, for a significant period, is bound to be almost prohibitively time-consuming. The purpose of the toposcope is to restrict severely the type of information to be studied, and to present it in a rational manner. The equipment can be set for a desired frequency, or alternatively it can be made to set itself servo-mechanically for the predominant signal frequency of any selected channel, and in this condition it is sensitive only to that frequency or its harmonics. The display panel consists of a number of cathode-ray tubes, and each of these indicates for one of the channels (that is, for one of the selected points on the head) which, if any, of the harmonics of the driving signal is present, and what its relative phase is. A larger version of the equipment has been in use at the Burden Institute for the past two years, and has proved to be of particular value in research on the functional anatomy of the brain.

The Exhibition as a whole has proved to be of the highest interest to very many visitors, and due credit must be paid to the exhibitors and organizers alike.

A. W. HANSON

BRITISH CAST IRON RESEARCH ASSOCIATION

OPEN DAY

THE British Cast Iron Research Association, Birmingham, held an open day on July 7 for representatives of member-firms, some three hundred of whom attended, being welcomed by the president, Sir Frederick Scopes. The next day some hundred and fifty attended from other research associations, government laboratories, trade associations, technical institutions, universities, technical colleges and schools.

The extensions last reported (*Nature*, **170**, 153; 1952) have been fully brought into use, except for the new melting shop, which has yet to be equipped, but which in the meantime is being used for work on foundry atmospheres. The Association has been negotiating with the Department of Scientific and Industrial Research with respect to arrangements for its new grant period, during which it is hoped a further stage of expansion will be reached.

A feature which attracted considerable interest was a display of art castings in moulded iron, in-

volving very advanced skills in pattern-making and moulding. The importance of maintaining these skills is indicated by the adoption in recent years of such medieval methods as the lost wax process for producing jet engine parts which have to be cast to very accurate tolerances, and to their final dimensions, since they are frequently too hard to machine.

The experimental work on view included the study of the mechanism of blister formation on porcelain-enamelled cast iron, the gas originating the blister defect being removed during heating in a stream of argon and measured by an infra-red gas analyser. The application of strain gauge techniques to measure stresses set up in actual castings in service was illustrated. An important section related to work on white and chilled cast irons as used in the roll-making industry and referred to the effect of various conditions, composition and temperature, affecting the depth of chill.

Considerable advance was shown in the section on moulding and core sands tested at the elevated temperatures to which they are subjected in practice by induction heating, and the mechanism of the formation of defects due to sand failure was shown by a working model. A train for the production and casting of shell moulds of resin-bonded silica sand, about 5 mm. thick, was demonstrated, together with a newly devised arrangement for testing the material itself. Other work on moulding sands related to their effect on the shrinkage characteristics of the cast metal and on surface finish. The pore size of sand aggregates has been shown to affect heat transfer, mould permeability, gas flow during pouring and metal penetration.

The vacuum fusion method has been developed to yield quantitative information on the gases present in cast iron, especially oxygen and nitrogen, and the vacuum heating principle is used for the determination of hydrogen. Gamma-radiography was demonstrated for determining unsoundness in castings. The use of cathodic protection for cast iron pipe lines in aggressive soils and for propellers in sea-water was shown. In the analytical block a variety of demonstrations was in progress on chemical methods of examination and on spectrographic analysis, the latter including foundry slags.

Although no formal programme on the problem of brittle fracture has existed, since this problem mainly concerns the steels, a useful result has emerged from parallel studies of two aspects of the properties of ferritic nodular iron castings—properties at low temperatures and properties under impact. It appears that the ferritic nodular irons are better suited to resist the phenomenon of brittle fracture than many steels. Transition temperatures for ordinary ferritic nodular iron may be as low as −50° C., and with specially chosen raw materials this could be reduced to −100° C.

The work of the Foundry Atmospheres Team has made considerable progress. The control of dust on practically every type of rotating wheel used for cleaning and grinding castings, many of which are common to a wide range of other industries, has been established, and some devices are in commercial production. A systematic study of the behaviour of dust-laden air streams at the knock-out, where castings are normally separated from their sand envelopes, has been begun. A satisfactory design of wet spark arrester for cupola furnaces has been evolved and will assist in dealing with external atmospheric pollution.

J. G. Pearce

BRITISH COLONIAL TERRITORIES

REPORT FOR 1953–54

If the proposals of the White Paper entitled "Reorganization of the Colonial Service" (Colonial No. 306. London: H.M.S.O., 1954; 4*d*. net) are implemented, the recently published report on "The Colonial Territories 1953–54"* may be the last survey to appear under that title. It is proposed to constitute from October 1, 1954, an Oversea Civil Service which will include all those officers now in the Colonial Service who have been selected for their present posts by the Secretary of State for the Colonies whether or not the territory in which they are serving attains self-government. Should the territory attain self-government, their conditions of service and pension rights will be safeguarded by formal agreement between the Government in the United Kingdom and the Government of the territory. When the new Service is in being, any offer of appointment will include a clear statement whether it carries membership of the Oversea Civil Service or whether the officer's contractual relationship will be solely with the territorial Government. Officers in either category will be expected to regard themselves as being in all respects responsible to the territorial governments under which they are serving.

The new form of Service is intended to safeguard the interests of existing officers as well as to overcome political difficulties or prejudices which are more fully indicated in the review of constitutional and administrative developments in "The Colonial Territories 1953–54" report than in introductory paragraphs of the White Paper. It is also intended to encourage qualified men and women to continue to come forward in a spirit of confidence, enthusiasm and partnership and to assist the social, economic and political progress of the overseas governments and peoples. The present decisions are not intended to exclude the constitution of a Commonwealth service or an overseas service directly employed by the British Government, but the Government has not yet reached any conclusions on the complicated administrative and constitutional, as well as financial, problems involved in such proposals.

Apart from providing a very convenient conspectus of the political, economic and financial, and social developments in the Colonial territories for prospective candidates for appointments in the Colonial Service, whether scientific or not, "The Colonial Territories 1953–54" is also of interest to the man of science as providing the background against which progress in Colonial research, for developments in education, in health and welfare, and in communications and industry in these territories are appropriately considered. In particular, the surveys of constitutional and of economic and financial developments should facilitate both responsible criticism of particular developments and a general understanding of the extent to which economic and social developments, as well as the application of the results of the research at present in progress, depend on education.

In all branches of education the expansion of facilities continued during 1953–54, and special stress is laid on the increased provision for training teachers, alike in Malaya, Singapore, and Hong Kong, in the larger West African territories (where in view of

* Colonial Office. The Colonial Territories 1953–54. (Cmd. 9169.) Pp. xii+196. (London: H.M. Stationery Office, 1954.) 6*s*. net.