

has evolved from the use, by primitive man, of caves as shelters, while the other has evolved from tree shelters. Other papers read before the general meeting were "Inheritance by Labile Genes", by A. Ernst; "The Sting of the Bee", by M. Roch; "Ontogenesis of the Bird as a Problem in Evolution", by A. Portmann. These papers are all printed in full. In addition, abstracts are given of some 150 more specialized papers, dealing with nearly all branches of science, which were presented to the sectional meetings of the Society.

Royal Cornwall Polytechnic Society

THE one hundred and third annual report of the Royal Cornwall Polytechnic Society, besides containing the usual list of members, financial statements and an account of the work of the Falmouth Observatory, has several contributions of general interest. One of these is by Miss R. Beckett, who, in a paper on "Public Library Service", traces the growth of public libraries due to the Library Acts of 1850, 1855 and 1919. The Act of 1850 limited the rate to be levied to $\frac{3}{4}d.$ in the £ and that of 1855 to $1d.$ These sums proved quite inadequate, but it was not until 1919 that the penny rate limitation was abolished. In practice to-day, the average expenditure is $1s. 4d.$ per head of population, though some authorities expend as much as $2s. 6d.$ In another contribution, Mr. S. Furze deals at length with the operations involved and the machinery used in tin dressing, while in a third, Mr. J. H. Rowe gives the early history of Hayle Foundry, which was founded by John Harvey (1730-1803) and developed by his son Henry Harvey (1775-1850). This foundry was the earliest in Cornwall, and became ultimately the most important engineering works in the west of England. The well-known engineer Arthur Woolf (1766-1837), the pioneer of the compound steam engine, was at one time superintendent of this works, and it was there that he built some of the finest Cornish pumping engines of the time. The history of the Royal Cornwall Polytechnic Society inevitably recalls the Fox family, and the report has a tribute to Mr. Wilson Lloyd Fox, who died on February 10, 1936. He gained one of the Society's prizes in 1860, became a member in 1865, served as president in 1922-24, and was secretary of the Committee of the Falmouth Observatory from 1877 until 1931.

Intelligence, Character-training and Civilization

A LUDWIG MOND LECTURE entitled "Intelligence and Civilization", delivered at the University of Manchester last October by Prof. G. H. Thomson, of the University of Edinburgh, has been published in the first issue of the new *Journal of the University of Manchester*. After a preliminary discussion of some aspects of recent researches in the field of intelligence measurements, Prof. Thomson proclaims his belief (which was also H. T. Buckle's) that the history of the advance of civilization has been the history of the conquest of the world by intelligence. He preaches the salvaging of civilization "through the cultivation by an education proper to each of

the intelligence of all". Of character-training he is profoundly distrustful. A clear vision of truth is, he assumes, to be attained solely through cultivation of the intelligence and "the schoolmaster's sole business is to lead his pupils to see truth clearly . . . and . . . that is the only character-training the school may lend itself to, if it is to refrain from serving party or class . . . but is to serve civilization". He does not think much of civilization's debt to the poets ("far more dangerous than scientists"), notwithstanding that he holds intelligence to be based on imagination, and he makes a point of registering disagreement with Earl Baldwin's hope, confided to the Congress of Universities of the Empire, that from those universities may presently come forth "poets who will inspire Europe and the world once more with a sense of unity and a sense of freedom".

The Utilization of Wood as Fuel for Motive Power

IN the *Bulletin* of the 'Société d'encouragement pour l'Industrie Nationale' of January is printed an abstract of a paper by R. Vaultrin on the utilization of wood as fuel for motive power. Towards the end of the Great War, the French Ministry of Inventions made experiments on carrying heavy loads between Paris and Rouen by motor-lorries provided with suitable gas generators using wood for fuel, but the results obtained were not good. In 1928, after a further rally with 'camions à gazogène', the problem was completely solved; but at that time the price of the wood fuel was too high to make it profitable. A notable rally was made in 1930 between Paris and Rome, crossing the Alps and the Apennines, and another was made through the Landes where resinous fuel was used and found suitable. Recent results for tourist vehicles gave 50 miles per hour consuming about 70 lb. of firewood, costing six francs for a sixty miles run. Heavy motor-lorries can run at 30 miles per hour, the cost for sixty miles being fifteen francs. In France, there is an annual over-production of thirteen million cubic yards of firewood. This would be sufficient for 60,000 motor-vehicles using gas generators. At the moment, the difficulty is to obtain, on the road, supplies of suitable wood with constant humidity. This double problem has been solved between Frankfurt and Cologne. In France there are already large stores on a 'national' road, and all the main routes on the east are being supplied with stores. The control of the humidity of the wood distributed is being studied.

Electric Furnaces

DURING last year the use of electricity for the melting and heat treatment of iron and steel in Great Britain considerably increased. There has been a revival in the demand for arc furnaces, a number of which, varying in capacity from 500 to 6,000 kilowatts, are being installed. In the *Electrical Review* of April, Mr. D. Campbell states that the furnaces ordered from a single manufacturing company during last year would consume about a 100 million electric units a year. The cost of the annual power bill for these furnaces alone would be about £200,000. A

furnace of 6,000 kilowatt capacity, probably the largest electric melting unit in Europe, has just begun operation in Sheffield. Within its small area of furnace hearth (13 ft. diameter), as much energy is consumed per day as the aggregate loads of Cambridge, Salisbury and Tonbridge. Unfortunately, the requirements of larger and interconnected power stations make it essential to install higher rupturing capacity switch-gear, and this constitutes a heavy charge on small firms which may want to use electric furnaces. Seeing that the cost of the energy consumed by the furnace during its average life (ten years) is about thirty times the original cost of the complete installation, the companies should offer attractive conditions to steel manufacturers. The extreme purity of arc furnace steel owing to the absence of slag inclusions is now generally recognized, and for many types of forging this steel is specified. The choice between high-frequency furnaces and arc furnaces is difficult to make. Although the capital expenditure for high-frequency furnaces is much higher, yet when melting operations only are required they are cheaper to work.

Astronomy in Japan

THE Kyoto Imperial University has accepted a donation equivalent to about £10,000 from the Osaka Electric Railway Co. towards the building of an observatory on the southern peak of Ikomasan at a height of 640 metres. The observatory will include a main building with a 9-metre dome, a solar laboratory, housing for a reflector and a dormitory. The equipment of the solar department of the Kwasan Observatory is to be transferred to this new site, in addition to other instruments including the 80-cm. Tomkins reflector. Later a large museum devoted to astronomical exhibits and those of allied sciences will be built near the Ikomasan Observatory. Prof. Yamamoto will be the director of the group. The Kwasan Observatory will then become a purely academic institution. The Osaka Municipal Electric Museum, which has recently been completed, includes a Zeiss planetarium, which is installed under an 18-metre dome on the sixth floor of the Museum. *Bulletin* No. 326 of the Kwasan Observatory directs attention to a daily series of sun-spot observations made for fourteen years by Mr. Katue Misawa, whose failing eyesight now prevents the series from being carried on. The observations, which have been made regularly under excellent weather conditions, have been of great use in supplying data with the minimum delay to Japanese investigators. Observations of the zodiacal light are receiving special attention in Japan, and it is planned to establish a special observatory at Onomiti, Hiroshima-Ken, at a height of 150 metres. The observed longitude of the Kwasan Observatory, deduced from 74 observations made with the 90 mm. Bamberg transit in conjunction with the reception of Greenwich wireless time signals, is $-9^{\text{h}} 3^{\text{m}} 10.315^{\text{s}} \pm 0.002^{\text{s}}$ or E. $135^{\circ} 47' 34.72'' \pm 0.03''$. The elements of latitude variation for the epoch 1934.0-1935.9 computed by Dr. Kimura from data provided by five northern stations are given in *Bulletin* No. 322.

Hygiene in the Bacon Factory

WITH this title, *Bull.* No. 1, published by the Bacon Development Board, Thames House, London, S.W.1 (1s.), lays down certain standards of sanitation as a condition of every licence to produce bacon, and describes in some detail a system of sanitation which, if adhered to, will assist curers to comply with the conditions of their licence, and help them, in their own interests, to reduce the risk of spoilage of their products. The construction, maintenance and equipment of the factory are first discussed, after which the daily and the periodical cleaning of the premises are described. Next, the keeping of the meat and bacon clean and wholesome, and the personal hygiene of the employees are dealt with. Data are given in an appendix upon sources and reduction of contamination and the use of sodium hypochlorite as a disinfecting agent.

Brown-Firth Research Laboratories

A BROCHURE of some seventy pages deals with the equipment and work of the Brown-Firth Research Laboratories in Sheffield. The various types of research undertaken are described briefly, and the apparatus used is illustrated. A long list of original papers which have been published is appended, together with a catalogue of books, manuscripts and reports available in the library. To all who are concerned in any way with the development of modern steels, this publication cannot fail to be of interest.

1851 Exhibition Studentships and Scholarships

THE science scholarship committee of the Royal Commission for the Exhibition of 1851 has recently awarded the following senior studentships and overseas scholarships, upon the recommendations of the universities and other institutions named: SENIOR STUDENTS. Dr. H. J. Bhabha (University of Cambridge), for research in theoretical physics at Cambridge; Dr. H. N. Rydon (Imperial College of Science and Technology), for research in organic chemistry at Oxford; Dr. J. L. Harley (University of Oxford), for research in mycology at Oxford; Dr. A. H. S. Holbourn (University of Oxford), for research in experimental physics at Oxford. A fifth Studentship was given to Dr. T. S. Westoll, who was a palaeontologist recommended by University College, London, but he has been appointed to a lectureship at Aberdeen and therefore will not take up the award. OVERSEAS SCHOLARSHIPS. *Canada*: Mr. A. J. C. Wilson (Dalhousie University, Halifax), for research in physics at the Massachusetts Institute of Technology and the University of Cambridge; Mr. D. M. Ross (Dalhousie University, Halifax), for research in experimental zoology at the University of Cambridge; Dr. H. Rudoff (McGill University, Montreal), for research in organic chemistry at the University of Oxford; Dr. J. L. Morrison (McGill University, Montreal), for research in physical chemistry at the University of Cambridge; Mr. A. G. Ward (Queen's University, Kingston), for research in physics at the University of Cambridge. *Australia*: Mr. R. D. Hill (University of Melbourne), for research in physics at