remain as long as possible in employment, the best interests of the nation and the aged coincide.

In the discussion that followed, it was clear that some lay members of the public, at least, are more interested in the causes of ageing and in the search for some partial elixir of life than in the more serious problems raised for society by a rapidly ageing population. W. A. SANDERSON

NEW BUILDING MATERIALS

THE widespread incidence of the shortage of houses justifies even a belated account of a discussion on "Building Materials with Special Reference to New Materials", held in Section B (Chemistry) of the British Association on September 14. The full text of the four main papers read at the discussion has already been published*.

Speaking on "Some Modern Trends in Building Materials", Dr. F. M. Lea, director of building research, Department of Scientific and Industrial Research, described the factors which influence both the development of new materials and new methods and their assimilation into the traditional structure of the building industry—developments which have made it essential to study building scientifically with the object of reshaping its traditions to modern needs. The potential demand for building materials is so large that the industry offers an attractive field for exploitation of newly discovered materials and a prospective outlet for industrial by-products. To be successful, a new material must be suitable in all needful respects for the purpose for which it is intended, and must be capable of being used without major change in existing craft processes. Large manufacturing resources and ample supplies of raw materials are essential if a new product is to become generally used. The industry can readily absorb new materials introduced on a relatively small scale, and these, if they prove to meet a real need, can be commercially successful and lead to the establishment of major industries, as has happened, for example, with asbestos-cement products, concrete roofing-tiles and fibre boards. Increased stress on functional requirements—thermal insulation, sound insulation and so on—leads to consideration of how the technical needs can be met by materials singly or in combination with others. This stimulates the development of new materials or new ways of using them. Changes must of necessity be slow because new materials and new techniques have to be grafted on to an established body of practice by a widely scattered labour force.

Dealing with "The Use of Aluminium Alloys in Building", Mr. E. I. Brimelow, of the Chief Scientific Adviser's Division, Ministry of Works, described the rapid growth of the aluminium industry which has brought aluminium and its alloys to the status of engineering materials in little more than a century. The strength of aluminium alloys compares favourably with that of mild steel; the lower modulus of elasticity can be allowed for by appropriate increase in the dimensions of structural members without undue increase in weight. The relatively low melting point need cause no anxiety about the fire-resistance of loaded members; it is necessary only to provide a thicker covering for insulation and fire protection to obtain a performance comparable with that of steel. The low density of aluminium and its versatility of form fit it for use as a decorative material, as window-frames and rain-water goods, and, with due discrimination, for plumbing. It is used for spray coatings and as scaffolding. The low emissivity of clean, bright aluminium foil allows it to be used in cavity types of construction as an insulating material. Though generally resistant to corrosion, some precautions are necessary in the use and maintenance of aluminium and its alloys. Anodizing affords useful protection and gives a good surface for painting, which is recommended for rain-water goods in industrial and coastal districts. The good appearance of aluminium window-frames can be maintained by regular washing with water or by polishing with wax. In plumbing applications, electrolytic corrosion can be avoided by appropriate choice of the associated materials and by use of insulating washers. Use of aluminium for hot- and cold-water supply installations will not be advisable until the cause of a pitting type of corrosion which occurs in some districts has been further studied. The aluminium bungalow, using aluminium in combination with foamed-concrete insulation, has made a substantial contribution to the temporary-housing programme. With some improvements, the method of construction is being extended to provide permanent houses, schools and factories. Shortage of building materials has given opportunity for trial of those new uses for aluminium which could be technically justified, and the experience so gained will be a valuable guide for the future. The advent of cheaper methods of production would increase its potentialities.

Dr. T. W. Parker, of the Building Research Station, dealt with "Light-weight Building Materials", development of which has been fostered by present demands for thermal efficiency arising from the desire to achieve economy in fuel consumption and to provide increased comfort for the occupants. Low-density blocks can be used as load-bearing materials; sheet materials form linings or cladding; fibrous or granular materials are used as 'loose fill' or as blankets or 'bats'. Light-weight blocks, besides having a substantial insulating value, have the merit of high thermal capacity, the importance of which is often overlooked. Its influence in smoothing out variations in temperature is particularly valuable where intermittent methods of heating are installed. The greatest advance among low-density materials has been in the development of cellular concrete, which can be made in a number of different ways with a density of 20 lb. per cu. ft. upwards. Except in the aluminium bungalow, this material has not yet been used to any great extent in Great Britain, but experience in Sweden has demonstrated its potentialities. Light-weight sheets used as wall linings provide thermal insulation and offer a surface that can be quickly warmed to a comfortable temperature. Such materials must be robust enough to withstand accidental damage. They must not introduce an additional fire hazard. When circumstances preclude the use of low-density boards, the desired thermal resistance can be attained by using stronger boards fixed with an air space behind them. 'Loose fills', blankets and 'bats' form a convenient form of insulation for hollow walls and for roofs and ceilings. They must be chemically and physically stable, and should not give off noxious or combustible gases in the event of fire. They are mostly made from glass-wool, slag-wool or mineral-wool. Production of vermiculite in South Africa has stimulated interest in expanded vermiculite

* *The Builder*, 175, 335, 365, 393, 454 (1948).

for use as 'loose fill', as concrete aggregate, and as a constituent of insulating plaster applied by spraying. Its cost is at present higher than that of other forms of insulation.

Speaking on "The Use of Plastics in Building", Mr. R. J. Schaffer, of the Building Research Station, stressed the importance of selecting the building (and all other) applications of plastics with due regard to their suitability for the purpose intended. The idea of using plastics, other than resin-bonded wood, as load-bearing members is no longer of practical interest. Thermoplastics are obviously unsuitable for such use; the low modulus of elasticity, lack of ductility and high cost make it impracticable to use thermo-setting plastics. The advent of synthetic, waterproof glues has increased the potentialities of plywood and of glued construction in timber, and has led to the development of new kinds of building-board made from wood-waste or other by-products. Plastics enter into the composition of a variety of flooring materials. Polyethylene, already used for piping beer, etc., promises to be useful for domestic cold-water supply and sanitary installations. Foamed or 'expanded' plastics may be used for thermal insulation. There is a wide scope for the use of moulded plastics as building fittings; adoption of the British Standards Institution certification mark will ensure that high standards of design and workmanship are maintained. R. J. SCHAFFER

THE NUFFIELD FOUNDATION

THE third report of the trustees of the Nuffield Foundation*, which includes a list of 'fellows' appointed during the year, the balance sheet and a schedule of grants, records an allocation of grants during the year ended March 31, 1948, amounting to £495,350, the largest of any year up to date. The grants allocated since 1943 now total £2,135,980; this includes £605,850 to medical sciences; £242,000 to natural sciences; £142,000 to social sciences; £509,900 (including £225,000 over fifteen years to the Dominion Students' Hall Trust for the development of London House) for fellowships and scholarships; and £589,700 (of which £500,000 is to the National Corporation for the Care of Old People) for the care and comfort of the aged poor. During 1947, the resources of the Trust have been enriched by a gift of £450,000 from Capt. Oliver Bird. This benefaction, to be known as the Oliver Bird Fund, is to be held on trust for promoting research into the prevention and cure of rheumatism or, failing that, for the advancement of health and relief of other sickness. The trustees are now turning their attention to the planning of the programme for the next quinquennium, and they point out that the welcome increase of State support for learning and research does not lessen the need for voluntary enterprise or decrease the importance of alternative sources of support if the principle—fundamental to a free and democratic society—is to be upheld that "there should be room for more than one opinion and for more than one means of putting that opinion to the test".

A new grant in the medical sciences of £50,000, payable as required over ten years, goes towards the capital and maintenance costs of a hæmatological research unit to be set up by the Medical School of the University of Oxford, in conjunction with the Nuffield Department of Clinical Medicine under Prof. L. J. Witts, and the Radcliffe Infirmary Department of Pathology under Dr. A. H. Robb-Smith. A second new grant of £4,000 has been made towards the expenses of a new inquiry into the relation of infant mortality and morbidity to environment for the whole of Great Britain. This inquiry is to be undertaken by the joint committee of the Royal College of Obstetricians and Gynæcologists and the Population Investigation Committee, with help from the Institute of Child Health of the University of London. Like the inquiry into the maternity services, begun in 1945, it will also require the help of the medical officers of health and health visitors. Progress has also been made during the year in building up a comprehensive rheumatism service under the Medical School, University of Manchester; in addition to clinical work in Manchester and Preston, an experimental clinic is being established at Walkden for the diagnosis and treatment of rheumatism in coal-miners, and an investigation commenced into the role of the oral septic focus in chronic rheumatism. The five-year study of student health at the Institute of Social Medicine, Oxford, commenced in January 1947, and as a result of a conference on student health at the Institute in July 1947, student-health services which are starting at other universities will be co-ordinated with the Oxford service to achieve comparable records and statistics. The first year's work under Prof. J. Z. Young in the Department of Anatomy, University College, London, on the mechanism of learning in various animals has confirmed the hope that study of the structure of the brain and the learning powers of cephalopods (and especially the octopus) will throw light on the nature of the learning process.

New grants in the natural sciences during the year have been for a scientific study of the principles that should guide agricultural policy in Britain, and £18,000 over five years to the University of Bristol for research under Dr. C. R. Burch on the improvement of the reflecting microscope and for an attempt to solve the problems involved in the manufacture of the microscope by machinery. The agricultural study is being conducted by Mr. T. E. Eastwood, under the guidance of a committee of which Sir William Goodenough is chairman. At the University of Birmingham progress is reported in work under Prof. M. L. Oliphant upon the design and creation of new equipment for further fundamental studies in nuclear physics. An additional research fellow has been appointed to the staff working under Prof. P. I. Dee at Glasgow, and in addition to successful work with the million-volt generator and thirty-million-volt synchotron, results of fundamental interest have been obtained in the development of 'detection' techniques for use with these machines. In the biomolecular research laboratory at Birkbeck College, London, under Prof. J. D. Bernal, the X-ray analysis group is studying crystalline proteins and viruses, as well as simpler and related organic compounds which might provide clues to the structure of the proteins themselves. Dr. S. Levine's extensive theoretical work has shown that long-range forces between colloidal particles can originate in the electrical double layers at the surfaces of the particles. Results obtained in cosmic-ray research under Prof. P. M. S. Blackett at the University of Manchester have already been described in *Nature* (**160**, 855; 1947), and a cloud chamber is now operating at the Jung-

* Nuffield Foundation. Report of the Trustees for the Year ending 31 March, 1948. Pp. 92. (12–13 Mecklenburgh Square, London, W.C.1.)