THE LEVERHULME TRUST

THE fifth report of the Leverhulme Trustees* covers the years 1962–64, in which commitments totalled £1,230,950, of which £591,650 was to the universities and centres of higher education, £130,950 to learned societies and research institutions, and £193,700 to medical research; these figures compared with £885,350, £371,150, £46,550 and £184,900, respectively, in the triennium 1959–61. Among the grants to universities may be noted £3,750 to the Department of Zoology, University of Cambridge, for taxonomic work; £11,000 to the Department of Sociology, University of Essex, for a survey of journalism; £1,300 to the University of Keele for research into municipal government; and £18,500 to the University of Lancaster for research into higher education. A further £3,000 went to the University of Leeds for research posts in the history and philosophy of science, and £24,000 for the proposed diploma course in development administration for overseas students. The University of Liverpool received £34,000 for fellowships in general research; the Institute of Education, London, £18,000; the London School of Economics, £12,950 for scholarship and research awards and £2,400 towards a conference on the philosophy of science. The University of Manchester received £2,700 for a research fellowship in the Department of Chemistry on the metabolism and biosynthesis of unsaturated fatty acids, £4,000 for an investigation of income distribution in the United Kingdom before and after tax, and a final grant of £6,000 for the Jodrell Bank Experimental Station. The Department of Chemistry, University of Newcastle upon Tyne, received £3,600 for an investigation of the enzyme, catalase, in the decomposition of hydrogen peroxide, and the University of Nottingham £8,900 for a project in adult education through the medium of television. A grant of £35,000 to Queen's University, Belfast, was for staff for the School of Librarianship, while £11,550 goes to the University of St. Andrews for industrial health courses at Queen's College, Dundee, and £22,500 to the University of Southampton for the Department of Econometrics. Overseas grants included £18,000 for tutorial staff for University College, Dar-es-Salaam; £28,000 for Royal Society Leverhulme visiting professorships for India; £24,500 for the Inter-University Conference, Hong Kong; £15,000 to University College, Nairobi, for adult education; and £18,000 for tutorial staff at University College, Makerere.

The Association of Commonwealth Universities received £6,600 for travel grants for the ninth quinquennial conference, the British Association £3,500 for analysis of mathematics teaching projects, the British Museum £3,500 for a research fellowship on mammals, the Institute for Strategic Studies a further £4,500 for a research assistant, the Joint Mathematical Council for the United Kingdom £6,000 for research into teaching mathematics, and the Institute of Mathematics and its Application another £8,000 for the same purpose. £70,000 went to the Royal Society for Leverhulme Scholarships for young scientists, and £3,000 to the Scott Polar Research Institute for a research assistant.

Awards to schools, chiefly for scholarships, totalled £36,400; to architecture, £48,600, including £9,000 to the Royal Institute of British Architects for an industrialized building study; and miscellaneous grants included £15,000 to the Administrative Staff College, £20,000 to the Centre for Educational Television Overseas for English Language Teaching, £15,000 to Voluntary Service Overseas, and £5,000 to the Overseas Development Institute for an economic survey of Uganda. Among those for medical research may be mentioned £22,500 to the Department of Electrical Engineering, Imperial College of Science and Technology, for a one-year course for post-graduate medical students; £20,000 to the Liverpool School of Tropical Medicine for a visiting lectureship, £25,000 to the Middlesex Hospital Medical School for scholarships at the Institute of Clinical Research; £32,400 to the Eastman Dental Hospital for visiting Indian and Pakistani studentships; £13,500 to the Royal College of Surgeons for research assistantships at the Institute of Basic Medical Sciences; £8,300 to the Institute of Orthopaedics for a research fellowship in the Department of Biomechanics; and £6,600 to the Department of Mental Health, University of Aberdeen.

* The Fifth Report of the Leverhulme Trustees, 1962–1964. Pp. 93. (London: The Leverhulme Trust, 1965.)

SELECTION OF CLAY BUILDING BRICKS

DEFECTS in brickwork, when these occur, are not necessarily due to faulty design or construction, but often probably because the properties of the bricks used in a particular building or other project are not given enough serious consideration in the first place, relative to the proposed conditions which they are destined to withstand. For example, constructional brickwork should not, be or remain, excessively wet, since clay building bricks differ in their tolerance of exposure to wet conditions; wet brickwork lends itself to risk of sulphate attack on the mortar, to efflorescence, and to frost damage; sulphate expansion of mortar rarely occurs except in parapet and retaining walls subject to continual water infiltration; where sulphate expansion of brickwork in normal external walls does occur, this is often due to the bricks themselves containing excessive soluble sulphates, for example, potassium sulphate. This advice is among the many practical hints given in *The Selection of Clay Building Bricks*—1*.

Criticisms are often voiced on the admittedly ugly, white, powdery growth or encrustations revealed on brickwork, especially on new buildings, to the effect that this is due to use of newly manufactured bricks, not properly kilned, or possibly not long enough 'seasoned', or to use of inferior raw materials, and so on; actually, as this pamphlet is at pains to emphasize, efflorescence is normally a temporary springtime occurrence on new brickwork and is generally harmless; it happens because very small amounts of alkali salts, usually derived from cement in the mortar, are latent to produce this blemish, given the right conditions. "Examples of destructive efflorescence, where crystallization of soluble salts causes crumbling of brick surfaces or displacement of plaster, are rare—probably rarer than they were a generation ago, to judge from enquiries received at the Building Research Station." Efflorescence can recur every spring for many years, so long as water can find ways of percolating through the brickwork; in parapet walls this often implies faulty damp-proof courses; none the less, it is on all occasions unsightly, but difficult to eradicate completely; beyond remarking that the precautions on site necessary to reduce

* Building Research Station Digest (Second Series), No. 65 (December 1965): *The Selection of Clay Building Bricks*—1. Pp. 4. (London: H.M.S.O., 1965.) 4*d*.

or avoid efflorescence are tedious and seldom observed in practice, no suggestions are forthcoming on how best to eradicate this trouble; superficially this may be done by various expedients, but the result is seldom permanent, if conditions inside the brickwork are unfavourable or if there is recurrent reaction between water and vulnerable constituents in the cement.

On the question of frost damage to bricks, this appears to be rare in normal external walls between damp-proof course and eaves, although not uncommon in parapets, free-standing walls, and retaining walls, especially where insufficient care has been exercised in selection of special quality bricks. Thermal, and particularly moisture, expansion of bricks are important factors; the former happens with all building materials, its effects are well known and usually allowed for at the design stage; the latter form of expansion is not so generally recognized, this property only receiving scientific attention in recent years. The practical implications of moisture expansion, as set forth in this publication, may be summarized thus: bricks should not be used straight from kiln, or on site unless stacked for at least one week; special attention must be paid to storage before use if bricks are to be laid in high-strength mortar, which will become rigid very quickly; short returns in brickwork, specially vulnerable to cracking by expansion, are to be avoided; in long walls, expansion joints should be provided capable of accommodating an expansion of $\frac{3}{8}$ in. in 40 ft. Quality control testing of bricks, envisaged in the new British Standard 3921 : 1965, is here strongly and rightly urged; acceptance of 20-year-old test reports, still occasionally proffered by manufacturers of bricks, should be refused.

MINERALS OF THE SEA

A SURVEY and understanding of the geology of the sea-floor, implying the four oceans and the shallower seas that feed them, equally a knowledge of the organic and inorganic constitution of sea-water itself, are not new concepts in the realms of exploration or exploitation of the resources of the Earth, but much more is to-day being heard and learnt of this fascinating subject because of the universally intensified research efforts being made in its contemporary study. From the original *Challenger* expedition to the present *Mohole* project, the story of the oceans and that greater part of the Earth's crust which they conceal, has been slowly but very surely growing. Scientific interest, in stature, far outweighs that of economic, commercial investigations into the problems of the oceans, but that state of things is probably destined to be upset, if not reversed, in the not-too-distant future. All over the world the energy, food and mineral resources of the oceans are being re-appraised, explored and, where feasible, exploited in the interests of mankind. Britain is by no means behind in the quest, and this does not mean simply 'North Sea oil and gas prospects'.

In September 1965 there began a relatively little publicized investigation into the possibilities of long-term exploitation of the oceans and their resources, sponsored by the Commercial Oceanology Study Group, a consortium of six British companies: British Petroleum, Richard Costain, Hawker Siddeley Group, Imperial Chemical Industries, Rio-Tinto Zinc Corporation, and Unilever. This joint project is expected to last at least a year. According to an article entitled "Minerals of the Sea" (*BP Magazine*, No. 17; Autumn 1965. The British Petroleum Co., London), each company is already working in different but related fields of oceanology; each will ultimately contribute its own particular knowledge and experience to the study. The article itself is an extract from the book, *World Beneath the Oceans*, by Dr. T. F. Gaskell (courtesy of Aldous Books, London, 1965); Dr. Gaskell, with Mr. D. C. Ion, both of British Petroleum, are members of this Study Group.

This particular article is devoted specifically to the minerals of the sea, the salts it carries and deposits, and the natural cycle of meteorological and geological events which, through millions of years of time, have given rise to them. Salinity measurements through the entire width and depth of the oceans have been going on during the past eighty years or so, and the chemical composition of sea-water is well established; the problem is, how are we going to extract or mine some of the more valuable products it contains on an economic scale? As Dr. Gaskell rightly points out, shortage of terrestrial fresh-water, as world population increases, must inevitably be made good by water processed from the sea; in fact, water will become one of the most important products of the sea. Other examples are magnesium (there are 4 million tons of magnesium dissolved in every cubic mile of sea-water), for which the process is already perfected; bromine, for the photographic industry and for producing anti-knock compounds for petrol; gold, the pipe-dream of men for years past: ". . . there is more gold in the sea than there is in use now", but commercially this problem has not yet been solved. Iodine is obtained from plants and animals of the sea; lobsters collect cobalt; the oyster gathers stray atoms of copper; and so on. The origin of petroleum, actually still an unsolved mystery, is in modern theories intimately bound up with the sea; sooner or later this secret will be unfolded, perhaps when we know more about the ocean floor itself.

THE MOLE: ITS ADAPTATION TO LIFE UNDERGROUND

THE increased economic importance of the mole (*Talpa europaea*) as a farm pest has engendered renewed research into its behaviour and structure. The Ciba Foundation guest meeting on "The Mole: its Adaptation to an Underground Environment", held on January 5 and 6, was attended by approximately thirty persons and eleven papers were contributed covering a wide variety of topics. There were also several films, tape recordings and demonstrations, providing a very varied programme.

The first day of the meeting was mainly concerned with behaviour. At the beginning of the symposium the mole was considered to be almost exclusively subterranean, continually burrowing in search of food. By the end of the meeting this picture had changed greatly. Dr. K. Mellanby showed that different moles used established burrows over and over again. Natural flooding proved that they could migrate over considerable distances and return after flood waters had receded. Mr. A. T. B. Rudge had succeeded in developing a trap for catching live moles. He had constructed monitored artificial burrows of wire mesh and shown that moles had periods of activity lasting 2–3 h, followed by rest periods of 3–4 h. This rhythm continued day and night. These findings were confirmed in the field by tagging moles with radioactive silver or cobalt sources attached to their tails. In their active periods they were continually running along their burrows (maximum speed up to 2·5 m.p.h.), only stopping for food that had fallen by chance into their runs. Moles did not often tunnel except while making