

dence unit; and linear amplifiers and scintillation counters for the Health Physics Section.

One of the aims of the fuel element research conducted at the Establishment is to develop a 'self-breeding' fuel in which thorium is present in such quantities that fissioned uranium is continuously replaced by uranium-235. Beryllium and beryllium oxide are also being studied as moderator materials and fuel carriers. Another problem under study is the production of graphite which is impermeable to fission product gases and several methods of sealing inherent porosity are being investigated. Research on a sodium-based liquid metal fuel reactor was begun at Harwell and is being continued at Lucas Heights. The experimental assemblies built by the Australian staff while at Harwell have been purchased and shipped to Australia. The sodium plant built by the Australian Atomic Energy Commission at the Research Establishment is a research tool designed to pump molten sodium at 500°C. at 10 gall. per min. and it will provide facilities for carrying out research on compatibility problems, sodium component testing, heat-transfer investigations and the training of staff in the handling of liquid metals.

In the sections of the report dealing with the search for, and mining of, uranium details are given of the airborne radiometric and geological surveys carried out by the Bureau of Mineral Resources. There was a marked decline in interest in the search for uranium both by companies and individual prospectors. This is attributed to the uncertainty regarding the future of the world uranium market. The picture presented in the report is that of a rather difficult period in the years immediately ahead, but that the present rate of production could well

prove insufficient within the next decade. The production of uranium oxide at Rum Jungle was lower than in the preceding year. Full-scale open-cut mining has been in progress at Mary Kathleen during the year and a large stock-pile of ore for treatment has been built up. A recalculation of the ore reserves of the Mary Kathleen deposit has shown that the total reserves of recoverable uranium oxide are greater than was originally thought and more than enough to complete the contract with the United Kingdom Atomic Energy Authority.

A symposium on the 'Peaceful Uses of Atomic Energy in Australia' was held in Sydney during June at which 114 papers were presented. Brief details of the proceedings are given in the annual report, and a record of the papers and discussions is to be published. The publication of a new quarterly, *Atomic Energy*, giving information on developments in and applications of nuclear science and technology was commenced during the year, and the booklet entitled 'Prospecting and Mining for Uranium in Australia' was reprinted. Six atomic energy exhibitions in various towns in the Commonwealth were presented by the Commission in addition to several television programmes at national and commercial stations in Sydney. The annual report concludes with a statement of the net expenditure of the Commission for the year ended June 30, 1958; details of the extra-mural research projects at various Australian universities; the names of the senior research staff and holders of the postgraduate research studentships and undergraduate scholarships; and a bibliography of the principal publications of members of the Commission, its staff and advisory committees.

CONSERVATION OF ENGLISH WALLPAINTINGS

IN recent years those interested in early wall-paintings have been greatly perturbed by their condition and the rather haphazard methods sometimes employed for their preservation. It was therefore more than timely in 1953 for the Central Council for the Care of Churches and the Society for the Protection of Ancient Buildings to appoint a committee to report on the nature and causes of the troubles which have been observed in such paintings, the remedies which could be applied and the methods which would give the best hope of successful preservative treatment in the future. The report* was compiled under the able chairmanship of Mr. W. I. Croome. The committee included well-known archaeologists and scientists who had made a special study of this problem.

At the outset the committee was seriously perturbed by the use of varnish and wax as a preservative, for these act as relatively impervious skins and impede the rate of evaporation of moisture and cause disintegration of the surface. As a preliminary measure it advised that these two methods should cease immediately.

The report continues with an instructive and necessary explanation of the technical terms and

materials used in wallpainting. Then follows a useful summary of English and foreign practice in relation to wallpaintings with some pregnant notes on the effect of time. These clearly show that the conservation methods used were not satisfactory.

It was therefore abundantly clear that much fundamental work was necessary and the constructive recommendations of the committee are based on the practical applications of its conclusions.

The main recommendations deprecate the use of wax varnish, sodium silicate, or ethyl silicate for any preservative treatment. The use of caesin in a maximum 2 per cent solution in appropriate cases should be confined to the binding of loose pigment. Lime water should be used for the consolidation of the plaster foundation, and in the case of disintegration of the paint it may be mixed with skim milk. The committee stresses that since wallpaintings are liable to deteriorate under conditions of damp every care should be taken to make the church structurally sound and thus exclude any excessive moisture.

The committee feels that much further research should be undertaken on this problem and suggests a course of training which will eventually provide a succession of practitioners for this important work.

The report concludes with some practical notes for the removal of wax preparations, retouching and overpainting, recording and some excellent illustrations of work that has already been undertaken.

* The Conservation of English Wallpaintings: being a Report of a Committee set up by the Central Council for the Care of Churches and the Society for the Protection of Ancient Buildings. Pp. 30+13 plates. (London: Central Council for the Care of Churches, Fulham Palace, 1959.) 7s. 6d.