

HARWELL

bulletin

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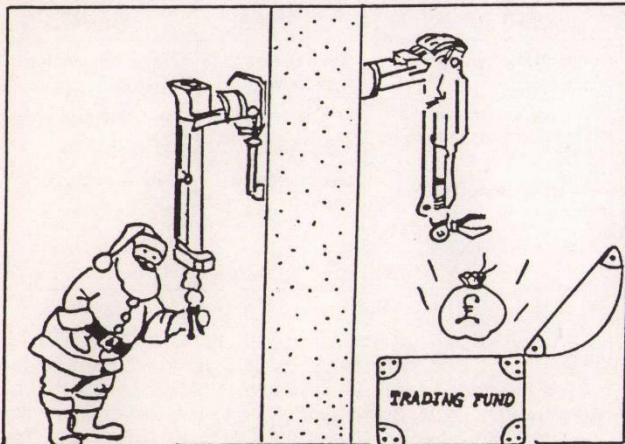


Plowden Prizes '85

Helen Atkinson (above) of Materials Development Division, has won this year's British Nuclear Energy Society's Plowden Prize. The award was made on the basis of an article Helen wrote entitled 'Rate controlling factors in the oxidation of 20Cr/25Ni/Nb-stabilised CAGR stainless steel fuel cladding', which appeared in *ATOM* (May '85).

Runner-up was Mr. Graham Raw of Actinide Chemistry and Analysis Group, Chemistry Division.

Best Wishes for Christmas and the New Year
to all Bulletin readers – and grateful thanks to all contributors.



What HARWELL is hoping for this Christmas?

Ceramics Feel the Heat

Dr. Bill Reynolds (left) of HARWELL's NDT Centre demonstrates the use of transient thermography inspection techniques for flaw detection in ceramics.

Video compatible transient thermography was developed at HARWELL originally for the inspection of composite materials. It is now also being used for the inspection of ceramics and sprayed surface coatings.

Watching the demonstration are two visitors, Dr. G.A. Weeks, Director, RTZ Borax Ltd. (right) and Dr. R. Thompson, Managing Director, Borax Research Ltd. (third left) who were at HARWELL to learn about our work in materials and materials technology. Also in the picture is Dr. Tony Childs (second left) of HARWELL's Marketing and Sales Department who arranged the visit.



New Technology Requirements Board

The Department of Trade and Industry has announced the establishment of a new Technology Requirements Board (TRB), and a number of subsidiary Advisory Committees, to advise it on the development and implementation of policy in support of industrial research and development.

The new Board and its committees replace the various Research Requirements Boards which have operated since 1972. The new structure has been set up following a Departmental review.

The new TRB will be chaired by John Collyear the chairman of AE plc. The board will provide a general overview of broad policy for research and development. The advisory committees will deal more closely with particular sectors and technologies. They will cover such topics as advanced manufacturing technology, biotechnology, computing and communications, electrical engineering, engines and vehicles, maritime technology, mechanical engineering, metrology and standards, metals, minerals and materials, process plant, textiles and other industries.

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Director's Talk to Junior Staff

In his talk to staff on 6 December (repeated on 13 December), the Director reviewed achievements at HARWELL and in the nuclear industry and reported on progress towards the setting up of the UKAEA as a Trading Fund.

Dr. Roberts said that during 1985 there had been three personal achievements by staff from Materials Development Division. Dr. Ron Bullough (Division Head) had been elected to a Fellowship of the Royal Society. Mr. Bob Paris had received the International Metallographic Society's Best Paper Award. Mrs. Helen Atkinson had been awarded the Plowden Prize (see previous page); as President of the British Nuclear Energy Society he had been pleased to make this presentation at the annual dinner of the Society on 5 December.

The Nuclear Industry

Between January and September 1985, Britain generated approximately 21% of its total electricity from our 16 nuclear power stations (43.14 TWG out of a total of 205.09 TWG). A record demand for electricity (44,748 MW) had been recorded on 8 January 1985 and the nuclear component of this had been nearly 20%. The present construction programme of graphite-moderated, gas-cooled AGRs was going well with Heysham-2 and Torness both around 80% complete and expected to be supplying power to the national grid in 1987/88.

The Public Inquiry into the building of a PWR at Sizewell, which started in January 1983, ended in March 1985. It had been Britain's longest Public Inquiry, sitting for 340 days, involving 55,000 documents weighing 55 tons, 200 witnesses and 16 million words. (The whole proceedings can be scanned by the STATUS information retrieval system developed at HARWELL.) The publication of the Inspector's Report was not now expected until the Spring of 1986, but whatever the result, no PWR would be generating electricity in the UK until the mid 90s; the backbone of our nuclear generating capacity up to the year 2000 will be the AGRs. HARWELL's contribution to these thermal reactor programmes continues, with particular reference to lifetime of components - particularly of fuel.

As uranium supplies get scarcer and more expensive, the Fast Reactor will dominate the nuclear power generating programme. The problem of heat-exchangers leaks in the AEA's own Prototype Fast Reactor at Dounreay has been solved and during 1985 the reactor had been running at full power (245 MWe); the fuel elements had already passed their target lifetime and improved designs which would lead to even longer lifetime and reduced costs were being loaded. The Reprocessing Plant for Fast Reactor fuel at Dounreay had also been doing well. The AEA and BNFL were proposing a European Demonstration Reprocessing Plant (EDRP) at Dounreay to deal with fuel from three European Fast Reactors. An application for planning permission had been submitted and a Public Inquiry would be held (although it was hoped that the scope of this would be limited). A Solvent Extraction Pilot Plant (SEPP) had been built in Chemical Engineering Division, Bldg. 351. Operating on uranium only, this was testing the pulsed column design to be used in EDRP. A very comprehensive report on the environmental impact of EDRP had been published recently.

The Future of the UKAEA

The outcome of the Department of Energy Review of the Atomic Energy Authority had been announced in Parliament in February 1985. The broad conclusions were that the AEA should continue as a unit and should not be privatised, in whole or in part, and from **1 April 1986** should operate on a 'Trading Fund' basis. Department of Energy funding would continue but there would be no annual cash accounting and the AEA would be permitted to borrow money from the National Loans Fund. The necessary changes are incorporated in The Atomic Energy Authority Bill which is before Parliament at present.

Outlining the new system, the Director said that for all its work the AEA would be dependent on contracts from customers (including DEN). HARWELL has considerable experience of contract research for customers and at present over half our work is funded this way. In future, this will be extended to all work; capital

expenditure will be funded from profits on contracts and depreciation charged to customers. The AEA's statutory position will remain but some quite fundamental changes are being made to accounting and reporting systems.

Looking to 1986/87, the first year of the Trading Fund, the Director said that about 50% of HARWELL's income will come from contracts with customers (Class M), as at present; about 20% will come from DEN to cover our main nuclear programmes (Class E contracts) and some other activities such as public information (Class O). The CEGB and DoE would fund rather less than 10% of our programme (Class C) covering thermal reactor and waste management. The remainder (around 20%) was the Underlying Programme, mainly based at HARWELL, which would be funded by a levy on all AEA Programmes and charged, at various rates, to customers.

It was envisaged that HARWELL staff numbers would increase slightly in 1986/87 and then remain constant but there would need to be a formidable recruiting programme to replace the increasing number of staff approaching retirement age.

(An AEA video programme on the Trading Fund would be shown to staff in their Divisions and Departments early in 1986.)

Capital Investment

Dr. Roberts stressed the need for continuing capital investment at HARWELL. We had been involved in a deliberate policy of renewal and renovation of our most expensive buildings and plant over the past six or seven years. A significant stage had been reached with the recent completion of the Radiochemical Remote Handling Wing of Bldg. 220. This represented a major advance in the engineering of high-activity radiochemistry laboratories. All the actual work will be carried out in stainless steel boxes which can be removed by remote handling for decontamination; this improves efficiency and reduces radiation levels to operators.

The Director showed a short film of the opening ceremony of the Radiochemistry Remote Handling Wing, by Sir Frederick Dainton, on 31 October 1985.

A very different type of major facility was the supercomputer. The AEA had approved the case for a CRAY2 at HARWELL (to replace the existing CRAY1). Treasury approval was awaited.

Nun-nuclear Energy and Conservation

In 1985, the Advisory Council on Research and Development (ACORD) had reviewed the Department of Energy's renewable energy programme, co-ordinated by the Energy Technology Support Unit at HARWELL. As shown in the table, the renewable energy technologies had been divided into three categories with different objectives appropriate to each. (For further details see RE News Issue 13.)

Classification of Renewable Energy Technologies for use within the UK

Economically Attractive	Promising but Uncertain	Long Shots and Rejects
Conventional hydropower	Small scale hydropower	Active solar water heating
Combustion of dry municipal, commercial, industrial and agricultural wastes	Offshore wind	Geothermal aquifers
Conversion of wet wastes to fuel gas	Tidal power	Offshore wind
Passive solar building design	Geothermal hot dry rocks	Wave power
		Photovoltaics
		Active solar space heating

The Energy Efficiency Demonstration Scheme (EEDS), also co-ordinated by ETSU, was likely to achieve the Department of Energy's target of savings equivalent to 1.5M tonnes of coal per annum (worth £120M) by the end of 1985. The Select Committee on Energy had recently singled out EEDS as "the single most successful element of the UK conservation effort".

1986 would be Energy Efficiency year and this was being given a 'breakfast-time' launch on 23 January at Grosvenor House, London, with a panel including Peter Walker (Secretary of State), Dr. Ken Currie (Head of Energy Efficiency Branch, ETD) and Angela Rippon (TV presenter). However, there was no HARWELL responsibility for the advertising slogan "Get more for your Monergy!".

HARWELL's Industrial Programme

HARWELL's income from contract Research and Development was now running at **£1 million each week** and to sustain this business we need to continuously publicise our activities.

Three photographs by Eric Jenkins, Photographic Group, were on show at the 'Public Eye' exhibition at the Science Museum, London, and one of these (preheating of crucible by gas-flame) was used as the poster advertising the exhibition.

Another facet of publicity is participating in commercial exhibitions and there were some impressive HARWELL displays at 16 different venues during the year. The number of genuine enquiries is a measure of success on these occasions.

The Director showed a four-minute extract from a TV programme entitled 'Feat of Clay' shown on the ITV series 'The Real World' on 24 June. This showed work on filament winding from the Polymers and Composite Programmes Materials Group (MDD), Bldg. 401.

Several HARWELL programmes were now achieving incomes exceeding £1M/year and one of these was the irradiation of silicon in the DIDO reactor. Another was HTFS which now has 175 members; this club activity is run jointly with the National Engineering Laboratory and Chalk River Laboratory, Canada, and half the members are from outside the UK.

HTFS is the oldest of HARWELL's club activities, where large and small firms jointly subscribe to a programme of mutual interest. Amongst the newest clubs is that for Biosensors.

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Members of the Board are:

Professor Sir Geoffrey Allan, Director of Research and Engineering, Unilever plc.

Anthony Gill, Group Managing Director, Lucas Industries plc.

Michael Hoffmann, Managing Director, Babcock International plc.

Geoffrey Lomer, Technical Director, Racal Electronics plc.

Peter Michael, Deputy Chairman, UEI plc.

Professor Sir David Phillips, Chairman of the Advisory Board of the Research Councils.

Derek Roberts, Deputy Managing Director, General Electric Company plc.

Ralph Robins, Managing Director, Rolls-Royce Ltd.

Ivan Yates, Deputy Managing Director, British Aerospace.

Members from the DTI are the following deputy secretaries:

Alastair MacDonald; Robin Mountfield; Brian Oakley; Oscar Roith.

The terms of reference of the new board are:

- To identify and continuously update the R&D requirements of the areas of industry or technology with which the Department deals.
- To advise the Department on the broad objectives, balance and strategy for Departmental expenditure of R&D.
- To advise the Department on the allocation of funds necessary to secure those objectives; in exceptional cases to consider particular proposals referred by the Department to the Board for advice and to make particular recommendations for longer term or more speculative programmes to be considered by the Department.
- To review the programmes and activities of the Department's research establishments.
- To propose other measures which will further the applications of science and technology within the Board's area of responsibility.
- To advise the Department on any other matters within the Board's competence.

For 1985/86 the Department's expenditure on scientific and technological assistance and support for investment in innovation is expected to reach £420 million.

HARWELL's 40th Anniversary

1 January 1986 is the 40th Anniversary of the setting up of AERE Harwell and various activities are being planned to mark this event.

1986 was also Industry Year, sponsored by the Royal Society of Arts.

To publicise these two events a special franking stamp (shown below) would be used on all outgoing mail from HARWELL after 2 January 1986.



The Director concluded his talk with a 10-minute video, prepared by Photographic Group, showing personalities and scenes from HARWELL over the past 40 years.

Dr. Roberts ended this, his tenth and last series of December talks, with thanks to all staff for their co-operation and wished them success in the future.

Discussion

In answer to questions, the Director made the following points:

- Payments made by CEGB in support of AEA programmes would have to be passed on to electricity consumers but the amount when spread over all consumers would be very small.
- The levy to fund the underlying research would inflate some of the contract R&D charges but not those on contracts where we already charged what the market will bear.
- There would be no immediate break in the links with the Civil Service salary scales. Any such changes would need to be analysed in depth before a final decision was taken.
- We were using existing salary scales as advantageously as possible to recruit the best staff to HARWELL.

Publication Note

The next issue of the Bulletin will be dated Friday, 10 January 1986.

Site Waste and Decommissioning - New Centre

Dr. Stuart Nelson, Director of Nuclear Research, has announced the setting up of a new Business Centre - the **Radioactive Waste and Decommissioning Operations Centre**. This Business Centre will take responsibility for the handling of site wastes, for generating and updating a site plan for all waste management and decommissioning operations, and eventually for managing programmes on decommissioning. Dr. Ken Carley-Macaulay has been named as the Manager of the new Business Centre.

National Blood Transfusion Service

Due to building works in Icknield Way House, Bldg. 173, it has been necessary to cancel the Autumn visit of the Blood Transfusion Service to HARWELL. The Service will next visit the Laboratory between the 21 and 25 April 1986, and the clinic will be held in the Functions Room of the west wing of the HARWELL Restaurant, Bldg. 532. (Enquiries to Mr. Andrew Knight, Bldg. 6, Ext. 2514.)

Film Badge Notice

2 weekly films: Period 51F (colour stripe NONE).
Commencing Monday, 16 December.

2 weekly films: Period 01F (colour stripe BLACK)
4 weekly films: Period 01M (colour stripe PURPLE)
Commencing Wednesday, 1 January.

Please change your film(s) promptly and return old ones for processing.

Diary of Events

Harwell

Chemical Engineering Division Colloquium	Dr. A.R. Thomson	'An overview of the biochemistry group R&D programme'	Tuesday 17 December at 11.00 a.m. Large Conf. Room, Bldg. 551
Environmental and Medical Sciences Division	Dr. J.A.B. Gibson	'Fusion – the next one hundred years'	Thursday 16 January at 3.30 p.m. Large Conf. Room, Bldg. 551
Materials Development Division Colloquium	Dr. A. Marples (<i>Chemistry Division</i>)	'The properties of solidified high level Rad-Waste'	Wednesday 22 January at 2.00 p.m. Conf. Room, Bldg. 551
Nuclear Physics and Materials Development Division Colloquium	Mr. G. Gabriel (<i>Corrosion and Protection Centre at UMIST</i>)	'The effect of silicon additions and ion implantation on the high temperature oxidation behaviour of iron-nickel base alloys'	Monday 6 January at 2.00 p.m. Conf. Room, H.8

Rutherford Appleton Laboratory

Astrophysics – Seminar	Dr. I.S. Maclean (<i>ROE</i>)	'An infra-red camera for UKIRT'	Wednesday 15 January at 2.00 p.m. Conf. Room 3, R61
Technology Lecture	Mr. N.J. Phillips (<i>Dept. of Physics, Loughborough University of Technology</i>)	'Holography – where is it going'	Thursday 19 December at 3.15 p.m. Conf. Room 12, Bldg. R68

Outside

The British Computer Society	Mr. E. Thomas (<i>RAL</i>) and Mr. T. Couper (<i>Logical Choice Ltd., Oxford</i>)	'UNIX and PICK'	Wednesday 15 January at 5.15 p.m. Lloyd Building, Oxford Polytechnic
The Institution of Electrical Engineers – 21st Appleton Lecture	Professor M.S. Longair (<i>Director, The Royal Observatory, Edinburgh</i>)	'The electrical engineer and the universe'	Thursday 9 January at 5.30 p.m. (tea at 5.00 p.m.) IEE, Savoy Place, London WC2R 0BL Details: Tel: 01-240-1871
The Institution of Mechanical Engineers – Conference	(<i>Engineering Manufacturing Industries Division</i>)	'Fibre Reinforced Composites 1986 – Design Manufacture and Materials'	8–10 April Liverpool Details from: I.Mech.E., 1 Birdcage Walk, London SW1H 9JJ
Institute of Physics – Conference	(<i>Electronics Group</i>)	'Solid State Physics Conference 1985' 'Advanced lithographic techniques'	Wed. – Fri. 18–20 December University of Reading Details from: Dr. J.A. Blackman, Dept. of Physics, University of Reading, Whiteknights, Reading RG6 2AF Tuesday 28 January Details from: The Meetings Officer, The Institute of Physics, 47 Belgrave Square, London SW1X 8QX
– One day meeting	(<i>Industry Committee</i>)	'Intellectual property and patents'	Tuesday 18 February The Royal Society, 6 Carlton House Terrace, London SW1 Details from: Institute of Physics (address above) or Tel: 01-235-6111
– Conference (sponsored by the British Vacuum Council)	(<i>Vacuum Group</i>)	'Vacuum '86'	25–27 March University of Strathclyde Registration forms available from address above