HARWELL bulletin

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Log-Boat dated – Iron Age

Carbon dating work carried out at HARWELL's Isotope Measurements Laboratory has revealed that a unique log boat, found by archaeologists at Hasholme, Humberside, is over 2300 years old, (approximately 400 BC); the early iron age period. The boat, made from a single oak tree, is over 10 metres long and weighs more than 5 tonnes. It was probably manned by as many as 25 paddlers and it is the largest log-boat discovered in Britain and still in existence.

Archaeologists at the National Maritime Museum, Greenwich, where the boat is currently housed, believed that it was of the Iron Age period but that it could have been built at anytime between 500 BC and 300 AD. To obtain a more accurate date, small samples of wood were taken from the boat and sent to HARWELL for radiocarbon dating.

The boat was discovered by local archaeologists who were checking whether anything of interest had been unearthed in drain laying operations on agricultural land. During the excavation a special cradle was constructed underneath the boat, and it was eventually hoisted by crane onto a low-loader, for the journey to the National Maritime Museum. The photograph, taken recently at the Museum, shows the boat resting in its cradle. In the picture are Jill Walker (left) of HARWELL's Isotope Measurements Laboratory and Veryan Heal Deputy Head of the Archaeological Research Centre at the National Maritime Museum.

The boat is kept in a special polythene tent and a sprinkler system operates day and night to keep the boat moist and prevent the wood from drying out and crumbling away. When recording is complete, the boat is likely to return to Humberside and be put on permanent display in Hull.

Radiocarbon techniques are an invaluable aid to archaeologists in dating objects or materials made from organic matter. Radioactive Carbon-14, naturally present in the atmosphere, is absorbed (as carbon dioxide) by living organisms, and forms a constant proportion of the carbon in all living bodies. Carbon-14 gradually decays with a half life of 5730 years, and by measuring the proportion of ^{14}C remaining in organic matter it is possible to determine how long since the organism was alive. In this way archaeological specimens, works of art and other treasures can be dated.

HARWELL's Isotope Measurements Laboratory is one of the world's leading radiocarbon dating laboratories and has special facilities for radiocarbon measurements on small samples weighing as little as 10 milligrams.

For further information on the Iron Age Boat contact Mrs. Kingsley Curry, Public Relations Department, National Maritime Museum, Greenwich, London SE10. Telephone 01 858 4422 Ext. 222.

For further information on Carbon-14 dating at Harwell contact Jill Walker, Isotope Measurements Laboratory, Harwell, Didcot, Oxon OX11 0RA. Telephone 0235 24141 Ext. 2336.

Director's Senior Staff Meeting – 3 July 1985

In his address to senior staff, Dr. Roberts reviewed the latest developments at HARWELL and in the nuclear industry. Both he and Dr. Stuart Nelson (Director of Nuclear Research), concentrated on the prospects for the AEA as a trading fund.

Opening the talk Dr. Roberts paid tribute to Dr. Hans-Otto Wüster the Director of JET whose sudden death, on 30 June, was a source of great sadness.

In the Queen's Birthday Honours, Harry Izzard of Contracts and Stores Branch had been awarded the BEM and Derek Pullen of MP and MD had become an MBE.

Past members of HARWELL had also been honoured; Pat Byrne former Chief Engineer had become an MBE and former Director Sir Walter Marshall, now Chairman of the CEGB, had been enobled. In the House of Lords Sir Walter would join another former Head of HARWELL's Theoretical Physics Division, Lord Flowers.

There had been several other distinctions for HARWELL staff; Bob Paris of MDD had been awarded the prize for the best paper at the 1984 technical meeting of the International Metallographic Society – a particularly great personal achievement.

Ron Bullough, Head of MDD had been elected a Fellow of the Royal Society, and John Collier, former Head of HARWELL's Chemical Engineering Division, now Director General, CEGB Barnwood, had recently been elected a Fellow of Engineering.

Geoff Hewitt, Head of THD, had been appointed as a Professor in the Department of Chemical Engineering and Chemical Technology at Imperial College, London.

This year saw the retirement of Colin Amphlett, Head of Chemistry Division and Ken Henry, Head of Research Reactors Division, two men who had made a major contribution to HARWELL and its programmes.

The UK Nuclear Scene

The UKAEA and BNFL had submitted a formal application for 'enabling' planning permission to build a fast reactor fuel reprocessing pilot plant at Dounreay. The plant if built, would be owned by BNFL or by the European Fast Reactor Consortium and would be operated and managed by the AEA. There had been a welcome of expression of support for the proposal from the Secretary of State for Energy. The Secretary of State for Scotland had 'called in' the application and there would be a public inquiry at the end of the year. Everyone hoped that this inquiry would not become another Sizewell.

The CEGB Chairman had recently reaffirmed the Board's commitment to nuclear power. It planned 3 large new nuclear plants by the end of the century to replace the ageing Magnox stations. Towards the end of the Sizewell Inquiry there had been controversy between the CEGB and the SSEB over the relative merits of the AGR and PWR. The AEA remained entirely neutral in these arguments. It could not 'second guess' the Boards on matters of economics; on purely technical questions, the SSEB's assessment of the AGR was in line with that of the AEA.

There had been no major public developments in the field of radioactive waste management, but later in the year NIREX would be nominating potential shallow repository sites, additional to Elstow, which it hoped to investigate.

The Trading Fund

The AEA had made considerable progress in developing the financial and organisational framework for their operation as a trading fund, and in developing the mechanisms for agreeing the forward nuclear programme with their customers.

Under the new regime the Treasury would set a value on our assets for payment of interest. The Authority's internal exercise to revalue their assets was now complete and discussions were in hand with the Treasury on the final valuation and the rate of return on the implied loan. Other major negotiations on financial targets and the profit levels to be paid by Government customers, were also underway.

Changes would also be required in the AEA's internal financial control and information systems. A new simplified system was to be established across the AEA which would provide cost-centre managers with a better data base for management decisions. Training programmes to introduce managers to the new arrangements were due to begin later this year.

Discussions with the DEn on the Vote successor contracts, and with major customers, were proceeding well. The AEA's nuclear programmes for 1986/87 were expected to be about the same size as those in the current year.

In its review of the AEA the DEn had recognised the importance of the AEA's underlying programme and this had been reaffirmed in Ministerial statements. The mechanism for raising funds for underlying work would be a levy on charges, and this was being discussed with our major customers.

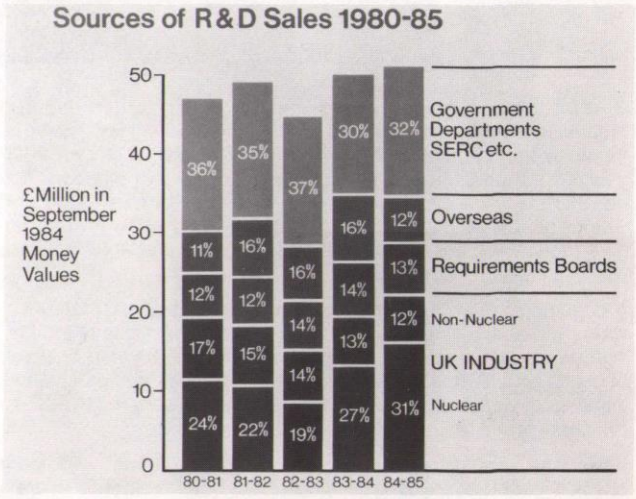
Corporate Review

The importance of expanding our industrial contract research programmes and the need for sound income targets had been major themes of this year's Divisional Corporate Plan meetings. Contract R and D sales in 1984/5 totalled over £50M and were slightly up (in real terms) over the previous year.

In recent years we had been considering how to secure a better financial return on our work. This might involve interaction with venture capital companies: HARWELL has had discussions with a number of these, and one programme supported by such a company is now underway.

Staffing, pay and recruitment had also been recurrent themes in Corporate Plan discussions. A number of measures were already being taken to help in attracting good recruits and had met with some success. It looked as though recruitment would be a major activity at HARWELL for some time. A number of Division Heads were closely involved in the development of new graduate recruitment literature, and successful recruitment campaigns would require the close involvement of Divisional line-managers with the Personnel Department.

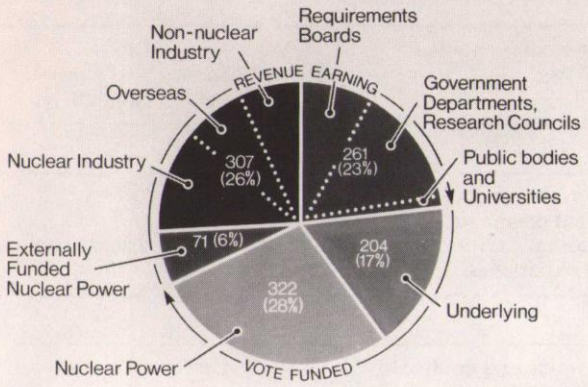
The approach of the Trading Fund had raised in some people's minds the question of whether the AEA should seek to break the Civil Service non-industrial pay link. However, the severance of this long established link on non-industrial pay would be an extremely long and complicated exercise involving negotiations with the DEn, the Treasury and the Staff Associations. It was not an issue it would be sensible to decide whether to pursue until the financial frame work and prospects under the Trading Fund were clearer.



Capital Planning

Capital schemes not provided for under major contracts would have to be paid for from profits or by borrowing before resources could be committed. Therefore, all schemes would be subject to careful investment appraisal. Exercises were already in hand to assess the long-term value to our programmes and thus the business prospects of all our major capital facilities.

Approximate deployment of professional staff for 1984-85



The Nuclear Programme under the Trading Fund

In his talk on the prospects for the commercial exploitation of HARWELL's major nuclear facilities, Dr. Nelson described the new situation as an exciting challenge. New financial constraints would combine with scientific and technical objectives, to producing new sets of priorities and change the balance of programmes.

The key to a strong nuclear programme lay in diversity both of work and of customers. Only about one-third of HARWELL's income will be derived from the Department of Energy's contributions to programme letters and to the underlying programmes. Therefore, it will be essential for HARWELL to expand its research income both from nuclear and non-nuclear industry, at home and overseas.

The main objectives of the Laboratory were to secure customer funded work at a profit and ensure that all our major nuclear facilities paid. The problems and constraints included: conflicting programme requirements, the costs of capital refurbishment and the balance of staff skills. Funds for the capital refurbishment of major facilities would have to be generated over fixed periods. These new conditions would require changes in our pricing structures and new market initiatives. M & SD were now actively involved in developing new priorities for the sale of our nuclear capabilities.

Many programmes centred on individual capital facilities often used others as well. The Active Handling, MTRs and PIE facilities were, to a large degree, interdependent. This interlinkage would be a key element in the development of new marketing strategies and would form the basis of the largest business opportunities.

There were, of course, many other major facilities which were not characterised by such interdependency. These would be maintained as long as they were self supporting but it would be difficult to subsidise them from profits from other areas.

Considerable effort was now being devoted to identifying the opportunities which would utilize our business strengths, facilities and staff in the best possible way. Individual programme justifications were no longer sufficient and it was now important to oversee activities in terms of their contribution to the viability of the Laboratory as a whole.

Points from Question Time

There would be a continuing strong need for the HARWELL workshops; the practice of sub-contracting routine work to other firms would continue. There had to be a correct balance between using in-house capabilities and subcontracting. An Efficiency Unit study of engineering workshop operations was in progress.

The continuation of the Underlying Programme was strongly supported by Ministers and it would remain as a balanced programme with AEA wide scrutiny. It would be treated in the same way as other AEA programmes but with a longer timescale and different orientation.

In selling our nuclear services we were often in competition with highly subsidised services overseas.

In counteracting the continuing shortage of R and D funds in UK industry HARWELL was developing collaborative research programmes in Europe, seeking venture capital and maintain[redacted] our work for the DTI.

It looked as though unified grading at Principal level would soon be introduced in the Civil Service. This was a change the Authority had been advocating strongly.

Recruitment and promotion procedures would be included in an Authority wide Efficiency Unit Review of personnel procedures due to begin shortly.

The Civil Service had recently introduced a selective bonus payment scheme (for grades down to Principal level). The possibility of introducing a similar but not necessarily identical scheme was being examined in the Authority.

Main Active Drain

Work is starting on the laying of a new Main Active Drain across the HARWELL site which will, over the months, involve a number of road crossings.

The first of these will be across Rutherford Avenue on the east/west stretch of the avenue a little to the west of the Fermi Gate during the period, 22 July to 2 August. The road will be limited to half width and no traffic congestion is expected. **Please drive extra carefully**.

Acid Rain in Helsinki

The British Government has decided against joining the so-called '30% Club' which aims to tackle Europe's acid rain problem. Mr. William Waldegrave,. Parliamentary Secretary of State at the Department of the Environment, announced this decision at a meeting of environment ministers held in Helsinki on 9 July.

Mr. Waldegrave said that Britain could not accept the Club's terms of a 30% reduction of sulphur dioxide between **1980** and **1993**. Britain believes that the 1980 starting date for the convention, signed by 18 other countries, put it at a disadvantage since its sulphur emissions fell sharply in the 70s.

To meet the terms of the convention, Britain would have to fit gas scrubbers to fossil-fuelled electricity generating stations at a cost of around £150M per station. These scrubbers would also reduce operating efficiency.

The '30% Club' is sponsored by the UN Economic Commission for Europe. The Helsinki Meeting was the third session of the commission's convention on long-range trans-boundary air pollution.

New EEC Exhaust Rules

The price of medium-sized cars sold throughout the European Community will increase following the decision of environment ministers to introduce stricter exhaust emission standards, the motor industry warned on 9 July.

The standards can be met only by the use of three-way catalytic converters or the development of new technology in the form of the lean-burn engine.

From 1991, cars between 1,400 and 2,000 cc will be permitted to emit 30 grammes per test of carbon monoxide and 8 grammes per test of hydrocarbons and nitrogen oxide together.

Film Badge Notice

2 Weekly Films: Period 29F (Colour Stripe Black)

4 Weekly Films: Period 08M (Colour Stripe Yellow) commencing Monday, 15 July.

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

Harwell

Nuclear Physics Division Colloquium	Professor Sir E. Titterton (*Australian National University, Canberra*)	**'Antipodean matters nuclear'**	Wednesday 24 July at 3.30 p.m. Conf. Room, Hangar 8

Culham

– Colloquium	Dr. E. Bertolini (*JET*)	**'The JET toroidal and poloidal magnetic field power supplies: basic concepts, commissioning and operational experience'**	Friday 19 July at 11.00 a.m. John Adams Lecture Theatre

Outside

BNES 3rd International Conference	**'Boiler dynamics and control in nuclear power stations'**	21-25 October Harrogate Details: Tel. 01-222-7722
The Institution of Mechanical Engineers – International Conference	**'Fatigue of engineering materials and structures'**	15-19 September University of Sheffield
The Institute of Physics – (*Solid State Physics Subcommittee*) – Conferences	**Solid State Physics**	18-20 December University of Reading. Details from Conference Secretary: Dr. J.A. Blackman, Dept. of Physics, Univ. of Reading, Whiteknights, Reading. RG6 2AF.
	Polymer Physics	11-13 September Reading. Details from: The Meetings Officer. The Inst. of Physics, 47 Belgrave Square, London SW1X 8QX. Tel: 01-235-6111.
	'Microstructure of cement and concrete'	24-25 September University of Leeds Details: See above
	'Sensors and their applications'	10-12 September Southampton Details: See above

British Social Attitudes

The result of a survey, conducted by an independent research organisation in 1984, indicated that some two thirds of respondents still consider that nuclear power stations create serious risks for the future. A table of comparative responses to the question 'What affect on the environment?' is given below.

	Very Serious	Quite Serious	Not Very Serious	Not At All Serious
Nuclear power waste	69	18	9	2
Industrial effluents	67	25	6	1
Industrial air pollution	46	40	11	2
Lead from petrol	45	39	11	2
Traffic noise/dirt	20	45	29	4
Aircraft noise	7	24	50	17

(All figures in %; Don't Knows omitted.)

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