Rutherford Laboratory

17 December 1973 - 7 January 1974

bulletin 37

DIRECTOR'S CHRISTMAS MESSAGE

My wife and I would like to wish all who work in the Rutherford Laboratory and their families a festive Christmas and a very happy New Year.

May I take this opportunity of thanking you for your efforts in making 1973 scientifically another very successful year.

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FUEL EMERGENCY

Message from Mr R M Jenkins, Personnel Group: The following statements are true as at 3 pm 12 December 1973.

1. AERE is not going over to a 4 day working week.
2. AERE is not closing down for 10 days at Christmas time.

BULLETIN NOTICE

This Bulletin covers a period of three weeks from 13 December 1973 to 7 January 1974.

FILM BADGE NOTICE

It is now Period 13. Colour Strip RED for βγ films. Please make sure that old neutron packs are returned.

OVERSEAS VISITS

Dr L C W Hobbis 13-14 December to ILL, Grenoble, to attend the 15th Meeting of the ILL Steering Committee.

Messrs P A Pitts and A L Lintern 16-21 December to CERN, to work on the ISR experiment.

RL CENTRAL COMPUTER FACILITIES

Christmas arrangements. There will be an extended shutdown as follows:

From Saturday 22 December 1973 - am
To Friday 28 December 1973 - 16.00 hours

It is the intention to complete all work outstanding before switch-off. No jobs should be submitted after 16.00 hours on Friday 21 December at which time electric facilities will be curtailed.

Output to remote printers will continue as long as the workstation is active. Advantage will be taken during this break to do required modifications to the air-conditioning plant and to complete the half yearly maintenance.

RUTHERFORD LABORATORY LECTURE

For your diary. The next lecture will be on 10 January 1974 when Mr A J Hastings will talk about the work of the Select Committee on Science and Technology.

EQUIPMENT TO CERN

Due to the Xmas break at CERN (22 December 1973 to 5 January 1974) the last date for despatch of equipment to CERN via the weekly road service was 13 December 1973. This service will recommence on the 5 January 1974.

Urgent air freight consignments can be despatched up to the 18 December 1973.

MISSING ITEMS

Paint Spray, Serial No RF 26381, taken from R25 Heavy Laboratory. Anyone having this item please return it to Mr R G Fowler, R50.

¼" Electric Portable Drill, Serial No 517406, last seen in R18 on 16.11.73. Anyone knowing the whereabouts of this item please inform R9 Tool Stores.

¼" Drill, Serial No 846, and Scintilla handsaw, AERE No 8307. Anyone knowing the whereabouts of these tools please inform M A Hynes, R20, Ext 435.

FOUND

A sum of money has been found on Road 8. Enquiries should be made to Mrs S A Fones, Personnel Group, Ext 495.

STORES NOTICE

Due to staff shortage difficulties may arise in obtaining a reply from Stores, Tel Ext 6141. As an alternative users may phone their requirements of liquid nitrogen and other gas to Stores Tel Ext 6136.

SEMINARS IN COMPUTING - A POSTPONEMENT

We regret to announce that the seminar "A Brief Introduction to the Use of Computers in Air Traffic Control" scheduled for Friday 14 December has had to be postponed until some time in the New Year, an exact date will be announced later. There will now be no seminar on Friday 14 December, please amend your original notice (dated 27 November) as required.

NIMROD LECTURE SERIES
Monday 7 January
11.30
Lecture Theatre

"Inelastic Proton Scattering at the I.S.R"

Dr M Albrow/CERN

DARESBURY LECTURE SERIES
7-11 January (daily)
11.00
Daresbury Laboratory

"Polarisation in Real and Virtual Photon-Proton Scattering"

A J G Hey/CERN

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NIMBUS 'E' BIRTHDAY

The satellite carrying Oxford University's Selective Chopper Radiometer has completed its first year in orbit. This radiometer designed, developed and its prototype made at the Rutherford Laboratory is still working correctly on its 16 channels having completed 5000 orbits, 15000 calibration cycles, 126 million filter wheel changes and 630 million chopper revolutions. This was in fact its designed lifetime. It is hoped it will now work at least until the summer when its successor on Nimbus 'F' will be launched. The SCR measures temperatures of the atmosphere up to 45 kilometres in height on a global basis and provides other experimental data on the upper atmosphere (see R.L Bulletin No. 43.1972).

Design work is in hand at the Laboratory for a more complex radiometer also for Oxford University to be launched in 1978 on Nimbus 'G' (funding permitting).

CHRISTMAS HOLIDAY LAST MAIL COLLECTION

The last delivery of Atlas and Rutherford Laboratory mail to the Post Office will leave the Post Room, Atlas Laboratory at 11.00 hours on Friday 21 December 1973. Mail reaching the Post Room after this time will not be taken to the Post Office until Thursday 27 December 1973

RUTHERFORD LABORATORY BULLETIN *Published by the Scientific Administration Group* *Acting Editor:* F HARDEN

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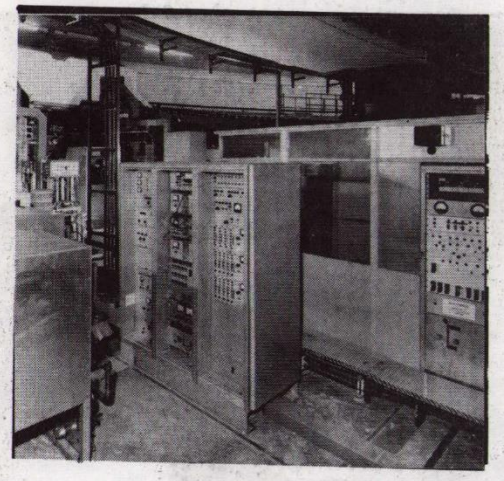
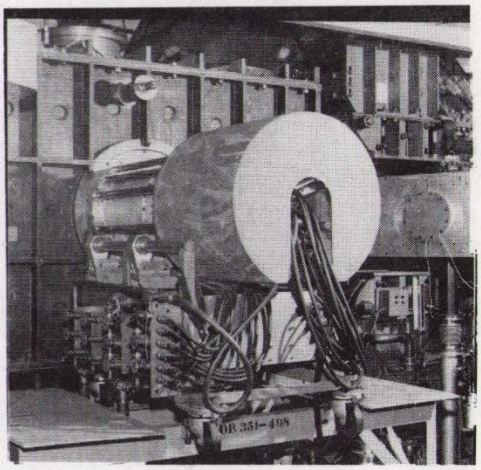
Deadline for Insertions	GENERAL & SOCIAL NEWS	INTERNAL & EXTERNAL EVENTS
	Tuesday 1600	Wednesday 1200

NIMROD 2ND RF SYSTEM



General view of 2nd RF System in Nimrod Magnet Hall



A close up of a resonator

The results of 3 years work on the second Harmonic RF System were brought to fruition at the end of cycle 13, a few hours before Nimrod was switched off for its annual shut down. On 1st December a maximum accelerated beam intensity of 4.2 10^{12} protons/pulse at 7 GeV was recorded with average beams of 4.0 10^{12}. This is an increase of 40% above the usual operating levels, which was the improvement forecast in the original design study.

The project began early in 1971 with model studies of a tuned drift tube structure capable of increasing the normal accelerating field by 60% at the 2nd harmonic frequency of the field in the straight 8 cavity. The limited time available to develop the system, the exacting specification for the large volume of ferrite needed to tune the drift tube, the wide frequency range covered and the control problems associated with phase locking and 2nd harmonic field to the main RF field and to the beam bunches in Nimrod were factors making the project particularly interesting and challenging.

The straight box containing the drift tube was manufactured of copper clad steel in a welded construction with a reinforcing outer skin. Manufacturing difficulties with welds left vacuum leaks in the delivered box which were rectified at the Laboratory after meticulous leak hunting. All the internal joints were rewelded and a very satisfactory vacuum achieved. The ferrite supplied by Messrs Phillips of Eindhoven was similar in grade to that supplied to CERN for the new PS RF system. It was moulded in rings and mounted in two large cylindrical resonators mounted as tuning stubs on either side of the box (see photo). The bias conductors pass through the central stems and the drift tube, and return along the inside walls of the box under RF screens. The 50 kW RF power valve (4CX 35000) is mounted in the box lid above the drift tube and driven remotely from a 1kW drive chain, supplied by Marconi Limited. The frequency range is 2.8 to 16 MHz. The system was completed and tested by February 1973 and installed in Nimrod (Straight 6) during the shutdown in March and April.

First results were promising with increased beams surviving for several milliseconds before oscillations in phase and width of the proton bunches caused severe losses. During machine development periods there followed many exacting measurements to determine the nature of the loss process and to find ways of suppressing the oscillations. Finally it was shown that oscillations in bunch width could exist independently of the phase motion and that they could be damped out by feeding back a signal derived from a bunch width monitor into the phase control system for the RF fields. Suppression of the beam oscillations enabled acceleration through to full energy. Extraction of proton beam at the enhanced intensity was not possible in the time available before the shutdown, but with partial operation of the second harmonic system extraction efficiency was normal.

It should be mentioned here that although first described by N M Blackman in 1949 higher harmonic fields have been used only on two other accelerators and those only over short periods after injection i.e. in the Princeton 3 GeV and Moscow (ITEP) 7 GeV proton synchrotrons. Nimrod is the first accelerator to have a high power system operating throughout acceleration.

ANOTHER FAMOUS CHARACTER RETIRES

Bozi Todorovic from the Stores Section, a young 65, retired on the 7 December after 12 years service at the Laboratory.

On behalf of his many friends and colleagues Mr J Marshall presented Bozi with a portable radio and in doing so reflected on a small item of the Bozi history. How as a young man he had escaped the tyranny in his native country and after having lived in refugee establishments on the continent had arrived in this country to again experience refugee camps.

He took up employment with C.O.D. Didcot from 1950-61 in stores duties and from there to Rutherford Laboratory where again he entered the Stores organisation. To all sections he has given exemplary service and his reflections will be missed.

We all join in saying "farewell Bozi", all good wishes for a long and happy retirement.

CHRISTIAN FELLOWSHIP

Tuesday 18 December Rutherford Laboratory Carol Service led by the Reverend David Price of Christchurch, Abingdon in the Lecture Theatre at 12.40 pm.

Friday 21 December - No meeting.

Friday 28 December - Ray Powell of Building R20 will be leading a Bible Study entitled "Christ in the Book of Isaiah". All are welcome to come along and the meeting commences at 12.30 pm in the R12 Conference Room.

SOCCER

Quarter Finals of the Rutherford Challenge Trophy - the matches have been played and the draw for the next round will be made shortly.

Results:-

C.A. Division	-	4	vs	Admin - 2 (Harwell)
Present Holders - Bldg 351 (Harwell)		4	vs	G.O. - 1 (Harwell)
Casuals		2	vs	Atlas - 3

The semi-finals and final will be played and the Trophy presented to the winning finalists the week beginning 17 December 1973. Kick-off 12.45. Spectators welcome.

END OF THE YEAR MESSAGE FROM THE EDITORS

This is the last Bulletin of the year 1973. It is our privilege and pleasure at this time of the year to thank all those who have assisted in the production of the Bulletin. In particular thanks are due to the Typists, the Office Services team, the Photographers and the Post Ladies and Messengers who deliver the copies to your 'In' trays.

A Merry Christmas and Happy New Year to all our readers.