

RUTHERFORD LABORATORY Dr David Davies, Editor of LECTURE Nature since 1973 is the next speaker in the

Rutherford Laboratory Lecture to be held on Thursday 19 May at 1515 hours in the Lecture Theatre.

David Davies was educated at Nottingham High School and Peterhouse Cambridge where he obtained his MA and PhD. He has held a number of appointments including Assistant Director of Research, Dept of Geodesy and Geophysics Cambridge 1963-69; Fellow of Peterhouse, Cambridge 1964-69; Rapporteur, Seismic Study Group of Stockholm, International Peace Research Institute, 1968-73 and Group Leader, Seismic Discrimination Group, M.I.T. Lincoln Laboratory, 1970-73.

As regards publications, amongst those listed are - 'Seismic Methods of Monitoring Underground Explosions: A Laser Seismometer' and, 'Geophysical Studies of the Seychelles Bank'.

Dr Davies lists as recreation, orchestral and choral conducting but readers are assured that he is coming to lecture on "The Scientist - Rights and Responsibilities".

Dr Davies has kindly supplied the following summary:- Ten years ago we all got on with our work. We did not question where the money came from, or whether our labours benefited or harmed the economy or the environment, and we were almost ignorant of the sort of unsavoury political pressures that scientists can be subjected to. Now we have an establishment organisation for Social Responsibility in Science, an anti-establishment counterpart, we find lawyers asking persistent questions about our activities and we periodically turtut about the Soviet Union, Argentina, Chile and so on. Why the change? And where will it all lead?

#### OVERSEAS VISITS

The Director, to CERN, 6-7 May, to attend Inauguration of CERN SPS. Dr J T Hyman, to CERN, 6-11 May, to attend SPS Inauguration and for technical discussions on SPS controls.

Mr R H C Morgan, to CERN, 8-11 May for technical discussions on SPS controls.

Mr P Haskell and Dr J Hutton, to CERN, 8-18 & 15-25 May respectively, for software installation on W47 NORD computer.

Mr H Wroe and Mr P L Davidson, to ILL, 8-14 May, tests of Position Sensitive Neutron Detector for D4 Instrument.

Dr P Litchfield and Mr I Corbett, to CERN, 9-10 May, proposal talk for RMS.

Mr L Phillips, to CERN, 9-13 May, for assembly of Muon experiment calorimeters.

Mr R Matson, to CERN, 9-27 May, repairs to Modular Control Room.

Mr R Blatchford, to CERN, 9-13 May, repairs to Proportional Chamber.

Dr W G Williams and Mr F F Freeman, to ILL, 9-20 May to carry out approved experiments.

Mr G M McPherson, to CERN, 10-20 May, installation work W47 and discussions.

Dr L C W Hobbs, to ILL, 12-13 May, to attend Steering Committee meeting.

Dr S F J Cox, to the USA and Canada, 12-28 May, to give invited talk at 6th International Symposium on Magnetic Resonances and to visit various Labs for discussions.

Dr L C W Hobbs, to the USA, 15 May-4 June, for discussions on LAMPF at Los Alamos and on the Argonne Pulsed Neutron Source Project at ANL.

Dr C J S Damerell, to CERN, 16-27 May, to work on W43.

Mr R A Lawes, to the USA, 16-30 May, to visit companies specialising in deutron beam lithography etc and to attend 14th Symposium on Electron, Ion and Photon Beam Technology.

Dr D Giddings, to Greece, 22 May-5 June to attend CERN Summer School at Nafplion.

#### SITE EMERGENCY EXERCISE

30 MARCH 1977

Over many years AERE, Harwell has developed a comprehensive system to deal with Site Emergencies so that foreseeable forms of incident, involving a release of radioactive or other noxious substances can be dealt with quickly. The Rutherford Laboratory must maintain, for obvious reasons very close contact with the Harwell Site Emergency Organisation.

From time to time exercises such as occurred on 30 March are held to test the organisation. They aim at simulating a realistic situation and the whole site has to behave during the exercise as if there were a real incident. Everyone has to take cover and obey the instructions which come from the Site Incident Control Centre. The Police, Fire, Health Physics, Medical and Ambulance services are all involved.

The recent exercise was centred on a supposed incident in Hangar 9. The postulated meteorological conditions on that occasion left us at Rutherford well clear of the normally expected area of possible contamination. After assessment of the situation it was decided that Rutherford could be allowed to carry on working as normal before the actual all clear was given by the klaxons.

One of the main purposes on any such exercise is to test communications, in particular by passing messages through the 'cascade' system of telephones. Exercises such as this discover the short comings of the system and point to remedies. The lessons learnt on this occasion were that messages must be extremely brief and clear, and each branch of the cascade should be short. Action is being taken.

The system whereby Building Wardens look after the control of access to and from buildings worked extremely well. All staff (with only a very few exceptions) were very co-operative - they immediately got indoors and stayed indoors. It seemed that most aspects of the organisation at Rutherford worked as well as could be expected. There will be a general get together of building wardens soon to discuss their responsibilities. The Site Emergency Committee wishes to thank you all for your co-operation during the exercise.

## AGM

Rutherford Recreational Society

Wednesday 18 May at 1240, Lecture Theatre

Please make every effort to attend

#### FILM SHOW

Jonathan Webb, well known local angling writer and film maker goes angling for shark at Looe, barbel near Reading and pike near Oxford. An entertaining and sometimes amusing film which runs for about 30 minutes, 12.40 Wednesday 11 May in the Lecture Theatre.

#### SAD NEWS

Friends of Tommy Wright whose flair with his hands solved many mechanical problems around the site will be saddened to hear of his death at Battle Hospital Reading on 21 April. Tommy, an employee of Geo E Taylor & Co Ltd worked at the Lab from 1964 to 1976. Four members of the RL staff were among the packed congregation who attended a moving service at Echinswell Parish Church on 26 April.

#### DEPARTURES

A number of 'farewells' are being held over until the next issue.

## RUTHERFORD LABORATORY BULLETIN

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RUTHERFORD

Bulletin

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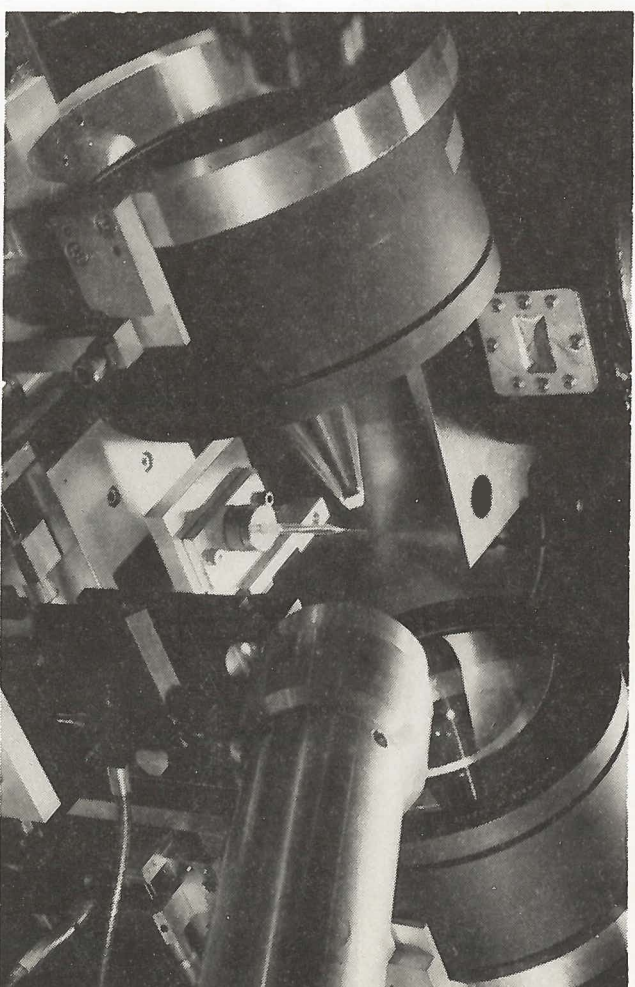
9 - 23 May 1977

## Laser Inauguration

The Secretary of State for Education and Science, the Right Honourable Mrs Shirley Williams, MP, has consented to inaugurate the Science Research Council's Central Laser Facility here at the Rutherford Laboratory on Monday, 20 June 1977. Mrs Williams will arrive at the Laboratory at about 10.45 and leave at 2.45 pm. The inauguration will take place in the Restaurant after lunch via a link with the Laser Laboratory. More details will be published in a later issue of the Bulletin.

## First Shot Success For Laser Compression

Photo: Microballoon on glass stem (centre) with F1 lenses either side surrounded by various diagnostic devices, in particular the X-ray pin-hole camera (tapered nose in background) from which the reported information was obtained.



A milestone in the progress of the laser division was passed on Friday, 29 April when laser compression was recorded with the first shot of the new two beam laser at a glass microballoon target.

Rutherford Laboratory thus becomes the first Western European Laboratory and one of only a handful of centres worldwide where such observations have been made.

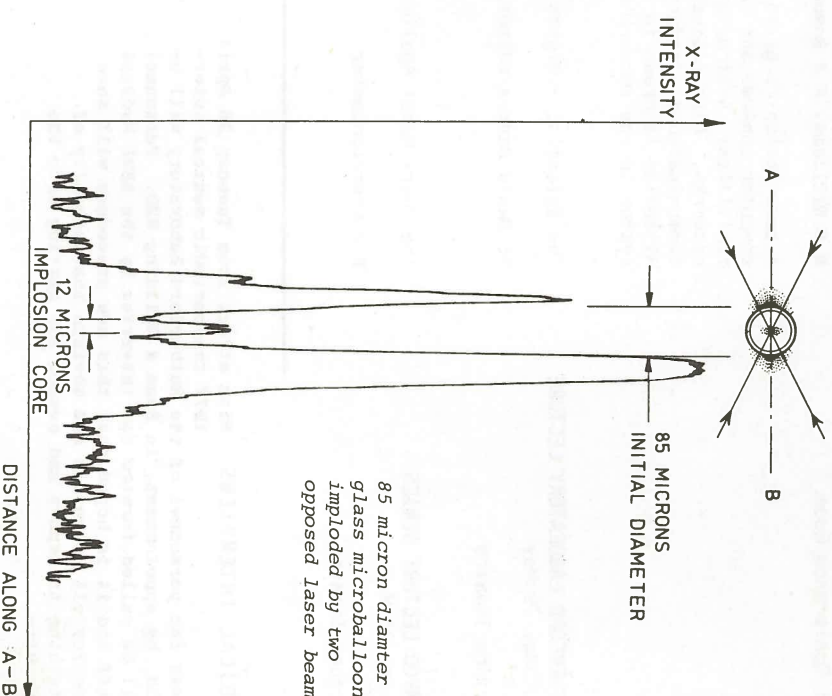
The technically difficult experiment involved focussing the twin laser beams from opposite directions onto a tiny glass balloon of 85 microns diameter and 0.5 microns wall thickness. The laser pulses 100 picoseconds (or 3 cms) long were timed to arrive coincidentally at the target within 20 picoseconds. The target was positioned at the centre of a spherical vacuum chamber and viewed by an array of measuring instruments that have been developed during single beam plane target experiments earlier this year.

One such instrument is an X-ray pinhole microscope which produced a picture of the high temperature target in thermally generated 1 kilovolt X-rays.

The image showed strong emission at the two irradiated poles of the sphere and also very localised emission from the centre where the laser driven implosion compressed and heated gas in the glass balloon.

The diagram shows a tracing taken of the X-ray image showing the polar and central X-ray emission features. This first shot was at only 10% of the 750 gigawatt full rated laser power and it augers well for experiments in the next weeks during which the laser will be brought up to full power operation.

The need for a laser facility suitable for study of laser compression was a major factor in the decision to establish the laser division. Understanding of the physics of the laser compression process is essential for current schemes for controlled thermonuclear fusion in laser driven implosions.



85 micron diameter glass microballoon imploded by two opposed laser beams



## INTERNAL EVENTS

NIMROD LECTURE SERIES  
Monday 9 May  
11.30  
Lecture Theatre

Charm and Apres Charm

J Ellis/CERN

PROPOSAL TALKS  
Tuesday 10 May  
11.00 and 11.45  
Lecture Theatre

Proposal 173 - Addendum and Progress Report "A Proposal to Measure Neutrino-electron Scattering at MLL". VPI and State Univ/Univ of Maryland/Oxford U

Talk by Dr N E Booth/Oxford  
Proposal 198 - "A Proposal to Continue the Study of D<sup>+</sup>-muon Production by  $\pi^+$ ,  $K^+$ , p and p at 40 GeV/c". Birmingham Univ/CERN/Neuchatel Univ/Ecole Polytechnique, Paris/Rutherford.  
Talk by Dr J D Dowell/Birmingham U.

HEP SEMINAR  
Wednesday 11 May  
11.00  
R61 Conference Room

Differential Cross-sections and Polarization for the Reaction  $\pi^- p \rightarrow n n$   
R T Ott/RL

HEP DATA HANDLING GROUP SEMINAR  
Wednesday 11 May  
13.30  
R61 Conference Room

Report on International Computing Symposium Held in Liege  
Brian Bracker/RL

SPECIAL NIMROD LECTURE  
Friday 13 May  
11.30  
Lecture Theatre

Experimental Comparison of  $J/\psi$  Production by  $\pi^+$ ,  $K^+$ , p,  $\bar{p}$  at 39.5 GeV/c  
Dr I Kenyon/Birmingham

NIMROD LECTURE SERIES  
Monday 16 May  
11.30  
Lecture Theatre

The Mechanism of Hadron-hadron Reactions, Evidence for Dominance of Resonance Production and the Quark Model  
D R O Morrison/CERN

HEP SEMINAR  
Wednesday 18 May  
R61 Conference Room

Future Projects at CERN: the Hunt for the W  
Professor S Fubini/CERN

HEP DATA HANDLING GROUP SEMINAR  
Wednesday 18 May  
13.30  
R61 Conference Room

Structure, Standards and Management for Networking. - A Report by the Network Unit of the Computer Board and Research Councils  
M B Williams, R A Rosner and C Morris

A description is given of the rationale for networks to interconnect university computer centres and to offer increased access to the large national computing facilities. A structural approach is suggested for the evolution of such networks. Also discussed are recent and relevant developments in this field of communications standards and their impact on computer hardware and software. Attention is drawn to the frequently neglected problem of managing and computing system in the network environment.

RUTHERFORD LABORATORY LECTURE  
Thursday 19 May  
15.15  
Lecture Theatre

The Scientist - Rights and Responsibilities  
Dr David Davies/Editor, Nature (see 'News' for details)

NIMROD LECTURE SERIES  
Monday 23 May  
11.30  
Lecture Theatre

The Quark Model Applied to Resonance Photo and Electroproduction  
F Foster/Lancaster

MEDICAL INTERVIEWS

With effect from Tuesday 26 April 1977 the periodic medical interviews for personnel of the Rutherford Laboratory will be held, by appointment, in Room 8 Building R20. Personnel will be called forward for interview by the AERE Medical Staff and it is hoped that this new procedure will save time for all concerned and obviate the necessity of obtaining transport and passes for getting onto the Main Site.

MISSING EQUIPMENT

The following items of equipment have been reported missing from the HPD area (Rm G 31-34):-  
Electric Drill, 5/16" capacity chuck, AERE No 16178  
Ammeter Model 8, Ser No S1148-C-956  
Will anyone with information on the present whereabouts of these items please contact F R Jacobs, Bldg R1, Ext 6255.

## EXTERNAL EVENTS

ELEMENTARY PARTICLE PHYSICS SEMINAR/MP LAB, OXF - 1430 hrs  
12 May: Dr R Cashmore - The proposal LEP accelerator and its physics

ELEMENTARY PARTICLE THEORY SEMINARS/MP DEPT, OXF 1430 hrs  
13 May: Dr T Weiler/Liverpool - Extensions of the Weinberg-Salam model

20 May: Dr P Thomas/DAMTP Camb - Parity Violation in atoms.

THEORETICAL PHYSICS SEMINAR/CLARENDON LAB, OXF - 1615 hrs  
12 May: Prof K P Jain/ITT Delhi & Paris - Theory of scattering line-shapes in systems with overlapping discrete & continuum states.

NUCLEAR STRUCTURE SEMINARS/MP DEPT, OXF - 1430 hrs  
9 May: Dr D Kelvin/Glasgow - Shell model calculations for mass 24 nuclei.

16 May: Dr B Cooke/MP Dept - Radiative proton capture in the f-p shell.

23 May: Prof J King/Toronto - Nuclear astrophysics - title to be announced.

COMPUTING APPLICATIONS SEMINARS/MP LECT. TH., OXF 1630 hrs  
12 May: C Tapper/Faculty of Law, Oxf - Computer and the law.

19 May: Mrs S Hookey/Oxf - Computers in literary and linguistic research.  
(NB) Abstracts are available from the Editor, R20).

HEP SEMINARS/CAMB U., CAVENDISH LAB, RM B - 1500 hrs  
11 May: F Halzen/Madison, RL - Studying weak interactions with high energy storage rings.

19 May: (at 1130) S Fubini - Future projects at CERN: The hunt for the W  
20 May: (at 1400) S Fubini - Conformal invariance.

## Minis Show Their Paces

Two years ago the SRCs Engineering board set up a Technical Group under the Chairmanship of Professor H H Rosenbrock of UMIST to look into the provision of interactive computing services. The Group's report, 'Engineering Computing Requirements' (generally referred to as the Rosenbrock report) made a number of recommendations, one of those being that the SRC should purchase two mini-computers for software development and evaluation purposes.

After an intensive study of the mini-computer market, two machines were chosen, a PRIME 400 and a GEC 4070 and installed at the Rutherford Lab in Building R27. In selecting the two machines, Rutherford Laboratory produced an interactive acceptance test (with 6 users typing furiously) designed to run for 30 minutes. Initially this took 17 minutes on the PRIME and 30 minutes on the GEC; the tests now run in 13 minutes on PRIME and 14 minutes on the GEC.

The very fast times are due to the machines being rather more powerful than originally envisaged and to the software having developed far better than anticipated. Recent press releases announced the successful completion of these acceptance tests

The PRIME 400 has 2 kilobytes of 80-nanosecond cache store, 192 K of main memory and two 80 megabyte disk

HEP SEMINARS/CAMB U., DAMTP, ROOM A - 1500 hrs  
12 May: C H Llewellyn Smith/Oxf - CHEEP: ep Colliding beams at CERN.

13 May: P K Kabir/Virginia, CERN - CP(T) and Charm.  
19 May: M F Atiyah/Oxf - Solitons

HEP SEMINARS/MANCHESTER U. - 1415 hrs  
11 May: Prof P G de Gennes/Paris - Physics of entangled chains.

12 May: D Stark/Manch. - Measurements on coherent elastic and inelastic pd scattering at the ISR.  
THEORETICAL PHYSICS SEMINAR/MANCHESTER U. - 1430 hrs  
18 May: Prof K H Stevens/Nottingham - Intermediate valencies in rare earth compounds.

PHYSICS & GEOPHYSICS COLLOQUIA AT BRISTOL U. - 1700 hrs  
9 May: Prof H F Moffat - Helicity and the geodynamo.

16 May: Dr M V Berry - Focusing and twinkling.  
22 May: Prof J B Hasted/Birbeck - Spectroscopy without photons.

THEORETICAL & HEP SEMINARS AT SOUTHAMPTON - 1430 hrs  
13 May: F Halzen/Wisconsin, RL - Hadroproduction of charm - a review.

19 May: Dr A C Davis/Durham - Bags. (postponed from 5 May).  
20 May: Dr D Broadhurst/Open U. - Currents in bags.

THEOR PHYS SEMINAR/AERE, CONF RM, BLDG 8.9 - 1415 hrs  
13 May: Dr P Knight/Holloway - Optical Resonance & the Rabi frequency.

NUCL PHYS DIV COLLOQUIUM/AERE, CONF RM, H8 - 1530 hrs  
12 May: Dr G M McCracken/Culham - "First-wall" problems in fusion reactors.

drives; the machine provides a virtual memory of 512 megabytes. It is the faster of the two new minis with a power of about twice that of the old Atlas computer.

The GEC 4070 although less powerful (approaching that of one Atlas) has, as ordered, two 40 megabyte disk drives, 192 kilobytes of store and many other advanced features including a very sophisticated operating system.

Both machines are undergoing an increasingly complex programme of assessment initially by RL staff but soon to be joined by three groups of collaborators from Cambridge, Glasgow and Leeds. This programme will last from 6-12 months and will test each computer to its limit; the machines will also be linked together and to the 360/195. The rapid progress in the development of mini-computers is illustrated by the fact that the PRIME 400 is capable of supporting a user population of 100 and will give acceptable response to 6 intensive interactive users simultaneously. This machine will stay at the RL whereas the GEC 4070 will be moved into a university at a later date for assessment in a user environment.

Many people outside the computer community are puzzled by the term 'interactive computing'. This is a way of using the computer where the user can talk directly to his program, and no doubt occasionally to swear at it.

SALES TO EMPLOYEES

Sales of scrap metal/plastics as set out in RLN 12/73 will be made on 13th and 27th May.

TABLE TENNIS NEWS

The Evening League Section will hold its AGM at 1300 hrs on Friday May 13th in the Atlas Conference Room. All those who played last year in the League, or who wish to play next season, are invited to attend. Nominations for Secretary and Treasurer should be sent to the Secretary (R E Thomas, Ext 6219, Atlas).