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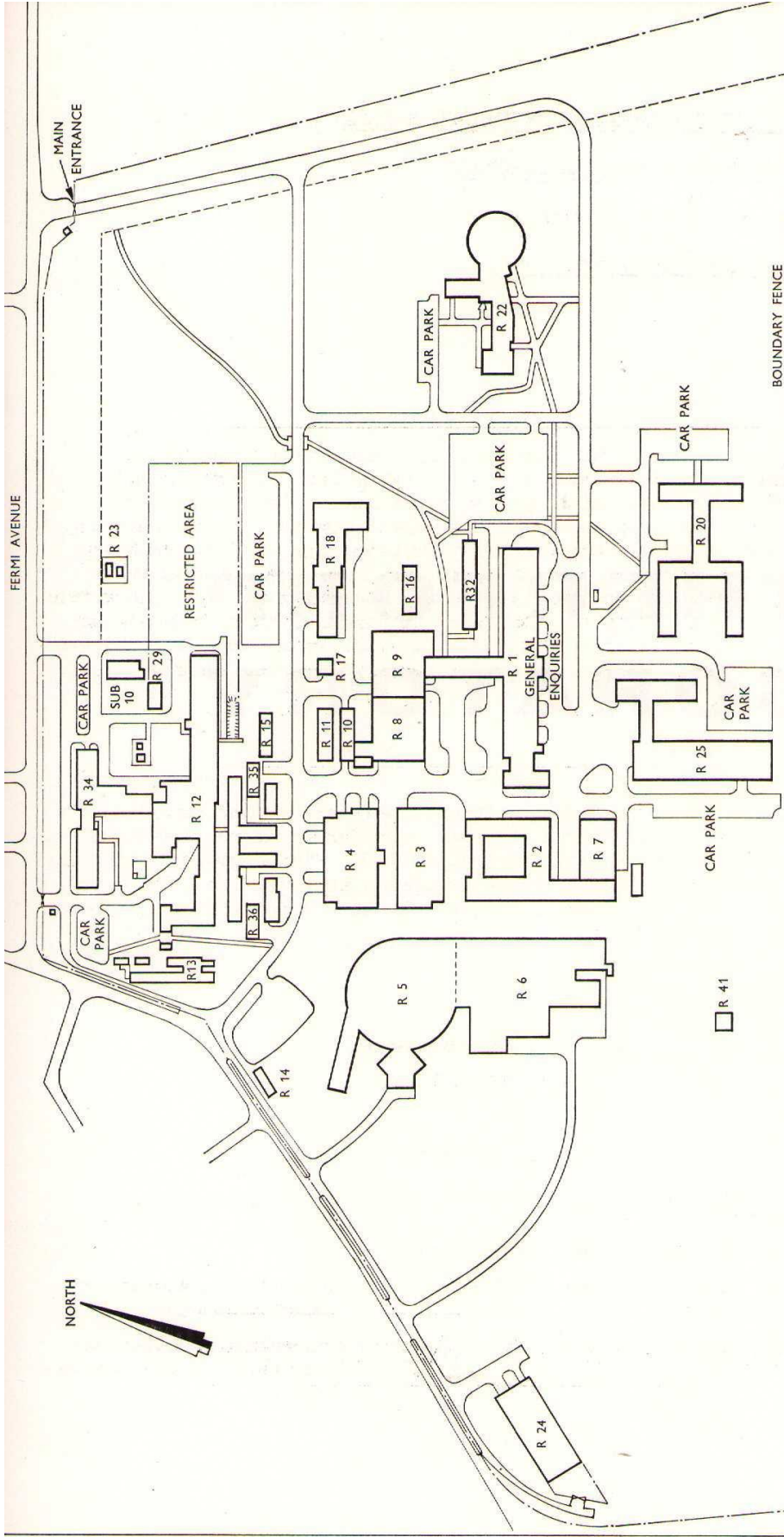
**THE  
RUTHERFORD  
LABORATORY**

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Open Day – 25th April 1964

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NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCE  
**RUTHERFORD HIGH ENERGY LABORATORY**

SITE PLAN

Buildings to be visited during the Tour

- R.1 SCANNING LAB. AND ORION COMPUTER
- R.2 NIMROD CONTROL ROOM
- R.3 NIMROD POWER SUPPLY HOUSE
- R.4 NIMROD MAGNET ROOM AND INJECTOR HALL
- R.5 NIMROD EXPERIMENTAL HALL 1.
- R.6 NIMROD GENERAL PHYSICS
- R.7 NIMROD CONTROL ROOM
- R.8 SPARK CHAMBER EXHIBITS
- R.9 ENGINEERING EXHIBITS
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- R.23 EXHIBITS
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- R.100 EXHIBITS

NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCE

RUTHERFORD HIGH ENERGY LABORATORY

Chilton, Didcot, Berkshire.

Open Day 25th April 1964.

THE NATIONAL INSTITUTE

The National Institute for Research in Nuclear Science was set up in 1957 and received a Royal Charter on 23rd June, 1958. The principal object is to provide, equip and operate, for common use by Universities and by other Institutions engaged in nuclear science, research facilities, which by reason of their size and cost are beyond the resources of a single University. The Institute is controlled by a Governing Board having a Chairman and fifteen other members, representing the Universities, the Atomic Energy Authority, the University Grants Committee, the Royal Society and the D.S.I.R. At present the Institute has two large scale Laboratories: The Rutherford Laboratory and the Daresbury Nuclear Physics Laboratory in Cheshire where an electron accelerator is to be built. It also manages the Atlas Computer Laboratory, adjacent to the Rutherford Laboratory site, and arranges access to research reactors to meet University needs.

THE RUTHERFORD LABORATORY

The Rutherford High Energy Laboratory is the first Laboratory of the National Institute. It covers an area of about 75 acres and was transferred to the Institute from the Atomic Energy Research Establishment, Harwell, in 1959. The number of staff is about 950 at present, excluding the visitors from Universities and elsewhere, who come to take part in experiments on the Laboratory machines. In the financial year 1963-64, the Laboratory was allocated about £7 million.

Directorate and Division Heads

Director	.. . . . .	Dr. T. G. Pickavance	
Assistant Director	.. . . . .	Mr. L. B. Mullett	
Division Heads:			
Nimrod Division	.. . . . .	Dr. L.C.W. Hobbis	
High Energy Physics Division		Dr. G. H. Stafford	(Directorate Member)
P.L.A. Division (Temporary)	.. ..		
Applied Physics Division	.. . . . .	Mr. Walkinshaw	
Engineering Division	.. . . . .	Mr. P. Bowles	(Directorate Member and Chief Engineer)
Administration Division	.. . . . .	Dr. J. M. Valentine	(Directorate Member and Secretary of the Laboratory).
Electrostatic Generator Group	.. ..	Dr. W. D. Allen	

## THE WORK OF THE LABORATORY

The main work of the Laboratory is concerned with experiments using two proton accelerators: a 7 GeV synchrotron, NIMROD, and a 50 MeV linear accelerator, the P.L.A.

NIMROD accelerates protons to an energy of seven thousand million electron volts and is the first machine in Britain which has sufficient energy to "create" many of the newly discovered elementary particles.

Construction began in August 1957 and first operation at full energy was achieved on 27th August, 1963. The total capital cost was just under £11 million. High energy physics experiments with Nimrod began in February 1964 and there are now some 80-90 physicists involved in these experiments. The majority of them come from British Universities, together with some from the Atomic Energy Research Establishment (A.E.R.E.) and from the Laboratory's own staff.

The P.L.A., which accelerates protons to an energy of 50 million electron volts, was built by A.E.R.E. and transferred to the National Institute. It produced its first 50 MeV beam on 12th July, 1959. It works in a very interesting energy range for nuclear physics and has two special features - a polarised proton source and a "time of flight" device which make possible experiments which any other Laboratory would find very difficult. About 50 nuclear physicists are associated with the P.L.A., the majority again from the Universities.

Very sophisticated techniques are needed to investigate the properties of elementary particles. They fall broadly into three categories - bubble chamber, emulsions, counters and spark chambers. Three large bubble chambers will eventually be used with Nimrod. The largest of these, the British National Hydrogen Bubble Chamber is at present at the European research Laboratory, C.E.R.N. in Switzerland; the other two, the heavy liquid bubble chamber and the liquid helium bubble chamber are under construction at the Laboratory. Both acoustic and visual spark chambers are in use in current experiments with Nimrod.

Many thousands of photographs of the tracks that particles produce in bubble chambers need to be examined and measured. This is done in film processing and scanning laboratories and the large quantity of data from the measurements are passed to a computer for analysis. The Laboratory has an Orion computer, which has been in use for about a year, and will also be able to make use of the Atlas computer which is being installed at the adjacent Atlas Computer Laboratory.

A nuclear and radiochemistry laboratory has been set up, to provide facilities for chemical and physical investigation of materials irradiated by the accelerators. Special equipment is installed in the laboratory for this work.

Rutherford Laboratory staff are participating in two projects for other bodies. A 70 inch variable energy cyclotron is being built for A.E.R.E. and a Laboratory team is responsible for supervising the construction, installation and commissioning of the machine. An electrostatic generator is being built for the Nuclear Structure Laboratory at Oxford University and a Laboratory team is responsible for design and construction of the first stage of the machine and for the integration of the whole accelerator.

Small teams are engaged in work concerned with special developments on accelerators or high energy physics experiments. These cover such topics as investigations on ion

beams, polarised proton targets, applications of superconductivity techniques and a design study on an injector for a proposed 300 GeV European accelerator.

A wide range of engineering skills in civil, chemical, electrical, electronic and mechanical disciplines are employed in support of the work of the Laboratory.

#### FILMS

Colour films entitled "The Rutherford High Energy Laboratory" (25 minutes) and "The Nimrod Vacuum Vessel" (30 minutes) will be shown continuously throughout the afternoon in the Lecture Theatre, Building R. 22.

## EXHIBITS

### BUILDING R.1.

- MAIN ENTRANCE Technical illustrations and diagrams of Nimrod are displayed. Two models of the Laboratory site are also on view.
- LAB 2. Variable Energy Cyclotron Exhibits - A small cyclotron will be in operation. A model of the variable energy cyclotron and a display on the evolution of the cyclotron can also be seen.
- LAB 3. General Physics Exhibits - Electron beam physics work, a new type of high vacuum gauge and a liquid helium level indicator are on display.
- LAB 6. Ion Source Work - A new type of Nimrod proton source can be seen in operation.
- LAB 7. Oxford Electrostatic Generator Exhibits - A display illustrating electrostatic generators can be seen.
- LAB G.8. Scanning Laboratory - Film processing equipment can be seen and scanning and measuring machines will be in operation.
- ORION COMPUTER The Orion computer will be in operation and its associated equipment will be on display.
- 1st FLOOR (end of east wing) Nuclear Emulsion Laboratory - Typical emulsions will be shown under the microscopes used for analysis.
- Scanning Laboratory - A measuring machine used for measuring film tracks from bubble chamber experiments can be seen.

### BUILDING R.2.

- NIMROD CONTROL ROOM The control room will be open and the control equipment used in the operation of Nimrod can be seen. Some features of the control system will be generally displayed.
- LAB G.3. Visual Spark Chambers - Two working arrays of visual spark chambers can be seen showing cosmic ray events.
- LAB G.8. Sonic Spark Chamber - A sonic spark chamber array will be in operation with a small radioactive source.

### BUILDING R.3.

- ALTERNATOR HOUSE The motor-alternator-flywheel sets of the Nimrod power supply can be seen. Auxiliary plant and the power supply control room are also on view.

### BUILDING R.4.

- CONVECTOR HOUSE The convector plant and auxiliaries for the Nimrod power supply can be seen.

BUILDING R.5.

INJECTOR HALL The 15 MeV linear injector of Nimrod is on view. A special display is made of some of the features of the injector.

MAGNET ROOM The Nimrod magnet and its associated equipment is on view. A special display of some of the machine components can be seen inside the magnet ring.

EXPERIMENTAL HALL No.2 (Parasitic Area) The  $\pi$ 1 beam line and its experimental equipment is on display.

BUILDING R.6.

EXPERIMENTAL HALL No.1 Three beam lines,  $\pi$  2,  $\pi$  3 and N 1, are specially displayed. A small freon bubble chamber will be operating with a radioactive source and the heavy liquid bubble chamber can be seen. A fast electronics exhibit and various engineering exhibits will also be on view.

BUILDING R.8.

BUILDING R.9.

Engineering exhibits can be seen in these two buildings representing the work of the Engineering Division and the engineering support teams in other groups.

BUILDING R.12.

THE P.L.A. The proton linear accelerator, experimental areas and control room will be open. Various components of the machine and nuclear physics equipment will be specially displayed.

BUILDING R.16.

SAFETY SERVICES Exhibits can be seen of the work of safety section.

BUILDING R.18.

ELECTRONICS & INSTRUMENTS SECTION

Exhibits on the work of this section can be seen and some industrial chemistry exhibits are also on view.

BUILDING R.25.

HEAVY LABORATORY Target mechanisms, particle separators, cyclotron ion source work and a polarised proton target are on display.

BUILDING R.34.

NUCLEAR & RADIOCHEMISTRY LABORATORY

The Laboratory will be open and some of its facilities specially displayed.

## GENERAL INFORMATION

### EMERGENCY

In the case of an emergency, any telephone within the Laboratory may be used.

IN CASE OF FIRE - DIAL EXT. 2222

FOR MEDICAL ASSISTANCE - DIAL EXT. 6217

Visitors are asked to comply with the local instructions posted at numerous places throughout the Laboratory, in the event of any emergency.

### INFORMATION

General enquiries will be answered at the Information Desk in the Main Entrance Hall of Building R.1. (Telephone Ext. 6643).

### FIRST AID

Members of the St. John's Ambulance Brigade will be on duty to render First Aid in the Messenger's Room, Building R.1. which is located on the Ground Floor, near the North-west entrance to the building, (Telephone Ext. 6217).

### CAR PARKS

Visitors are asked not to park on the roads, but to leave their cars in one of the following car parks, which will be clearly sign posted:-

1. North Car Park, adjacent to Building R.18.
2. Car Park to the East of Building R.1.
3. Car Park to the East of Building R.20.
4. Car Park to the North of Building R.25.

Patrolmen will be on duty to direct visitors to car parks.

### REFRESHMENTS

A set afternoon tea, at a charge of 2/6d. per head, will be served in the Restaurant from 3.00 - 4.30 p.m.

A tea bar serving cups of tea only will also be open in the Restaurant between 3.00 and 4.30 p.m.

Tea and/or Coffee machines are also available in the following buildings:-

Building R.1. - Upper Ground, 1st and 2nd floors;

Building R.2. - Ground floor (Control Block) and 2nd floor (New Block);

Building R.20 - Centre of building;

Building R.25 - Ground and 2nd floor.



There are also chocolate and cigarette machines located as follows:-

Bus Shelter between Buildings R.1. and R.20.

Bus Shelter outside Building R.8.

Building R.1. rear (North-west) entrance.

Building R.2. Ground floor (Control Block), near lift.

Building R.18. Centre of building.

Building R.25. Ground floor, centre (North) entrance.

#### TRANSPORT

Buses to Abingdon, Wantage, Wallingford and other places en route will leave from Building R.1. (Main Entrance) at 5.30 p.m. prompt, for those who have booked Transport.

A Rutherford Laboratory bus will provide a frequent service between the A.E.R.E. Main Gate and the Rutherford Laboratory, Building R.1. (Main Entrance) for the convenience of visitors travelling to and from the Laboratory by public transport.

#### CHILDREN

A creche for children of up to 5 years of age will be situated in Rooms 17-20, Building R.20. (access from centre entrance only, which will be sign posted). It will be supervised by Mrs. A. Whear, assisted by Cadet members of the St. John's Ambulance Brigade.

Parents are requested to let children bring their favourite toy, doll, etc., with them and to collect their children from the creche not later than 5.30 p.m.

For safety reasons, parents are advised not to take children under 10 years of age with them on their tour of the Laboratory, but if this is unavoidable a close watch must be kept in order to prevent accidents. There will be some areas where your children cannot be admitted.

#### TOILET FACILITIES

Toilet facilities are available in all the main buildings and will be sign posted inside the buildings.